

FINAL PROGRAM & EXHIBIT DIRECTORY

Technical Meeting and Exhibition

MST19

MATERIALS SCIENCE & TECHNOLOGY

SEPTEMBER 29 – OCTOBER 3, 2019

PORT

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MATSCITECH.ORG/MST19

WHERE MATERIALS INNOVATION HAPPENS

Organizers:



Co-Sponsored by:



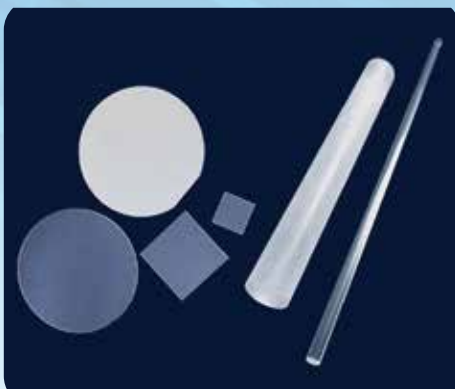


AdValue Technology

Booth #511



Alumina



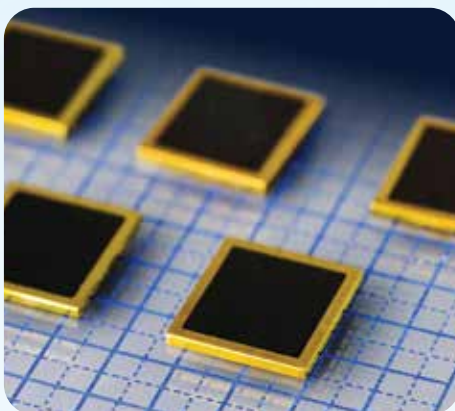
Sapphire



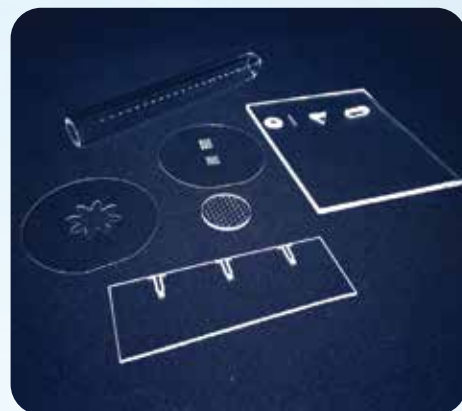
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WELCOME TO MS&T19!

Thank you all for joining us at the 18th installment of the Materials Science & Technology (MS&T) conference series.

My colleagues and I representing the MS&T sponsoring societies on the Program Coordinating Committee have worked hard to develop a comprehensive technical program that addresses structure, properties, processing, and performance across the materials community. We encourage you to take full advantage of the collected expertise found in the 12 topic areas covered by the program. Remember, you are not confined to attending presentations at just one symposium or on a single topic, so browse all of our offerings to create a conference experience that meets your unique needs.

If you haven't already downloaded the MS&T19 conference app, I encourage you to do that today. Through it, you can build a personalized schedule on your phone or tablet that will guide you through the week and help you make the most of your conference.

We hope you enjoy exploring this year's technical program, but also be sure to make time for some of our other events:

- **Visit the Exhibit Hall:** On Tuesday and Wednesday, the exhibit hall will offer lunches and a networking reception—be sure to stop and visit our exhibitors during this time or any time during exhibit hours. See the Exhibit Directory starting on page 189 to find out which companies you can meet.
- **Check Out Our Networking Events:** Receptions, luncheons, banquets, and breakfasts offer opportunities for you to meet and talk with your fellow attendees. See page xiv for a complete listing of events. Some events are free; others require tickets to attend. If a ticketed event still has openings, you can purchase a ticket at the registration desk.
- **Attend the Plenary Session:** Three respected speakers, selected by the four MS&T sponsoring societies, will deliver invited presentations at Tuesday morning's all-conference plenary session. Learn more about this year's speakers on page ii.

On behalf of the MS&T Program Coordinating Committee, I hope you have a productive and enjoyable week.

Monica Ferraris

Chair and ACerS Representative, MS&T19 Program Coordinating Committee

PROGRAM COORDINATING COMMITTEE MEMBERS

2019 Chair and ACerS Representative
MONICA FERRARIS, Politecnico Di Torino

AIST Representative
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ASM Representative
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TMS Representative
CARL CADY, Los Alamos National Laboratory

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AJIT MISHRA, Haynes International

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WHERE MATERIALS INNOVATION HAPPENS

MS&T19
MATERIALS SCIENCE & TECHNOLOGY #MST19

MATSCITECH.ORG/MST19

PLENARY SESSION

Tuesday, October 1 | 8:00 – 10:40 a.m. | Portland Ballroom 251/257/258

ASM/TMS DISTINGUISHED LECTURESHIP IN MATERIALS AND SOCIETY



Carolyn Hansson

Professor of Materials Engineering, University of Waterloo, Canada

The Challenge of 100 Year Service-life Requirement

Abstract *The highway authorities in Canada and the U.S. are considering raising the service-life specification for reinforced concrete highway infrastructure from the current 75 years to 100 years or more. The goals are to reduce the financial and environmental costs and improve the sustainability of the system by limiting the need for maintenance, remediation, and replacement of the structures. In coastal areas and in the northern parts of North America and Europe, the major culprit in limiting the durability of reinforced concrete is salt from seawater and de-icing agents. The chlorides destroy the natural passivity of reinforcing steel in concrete and allow active corrosion, which eventually causes cracking and spalling of the concrete. De-icing agents containing calcium- or magnesium-chloride, can attack the concrete directly. This presentation will describe the research at Waterloo on identifying the most appropriate stainless steels to combat the chloride attack over the long term.*

Biography Hansson received her B.Sc., A.R.S.M, D.I.C., and Ph.D. in metallurgical engineering from Imperial College, London. She has been employed in private sector research, a not-for-profit consulting company, and in academia. Her research has covered many aspects of environmental degradation of materials, particularly the corrosion and erosion of metals and alloys. Over the last 20 years, her major research focus has been the durability of infrastructure materials, particularly the chloride-induced corrosion of reinforcing bar and those properties of the concrete which affect this process. Her current research is focused on the application of corrosion-resistant alloys as reinforcing materials with a view to understanding the influence of the metallurgy on the corrosion resistance and

prediction of the relative life-cycle costs of the different alloys.

She has served on a number of professional boards and committees, including the Natural Sciences and Engineering Council of Canada, the Minister's National Advisory Council for CANMET, the U.S. National Materials Advisory Board and the Acta Materialia Board of Governors. She is a licensed Professional Engineer in Ontario and a Chartered Engineer in the U.K. She is a member of the Order of Canada and a Fellow of the Royal Society of Canada, the Canadian Academy of Engineering, the Danish Academy of Technical Sciences, The Minerals, Metals & Materials Society, the U.K. Institute of Materials, Minerals, and Mining, and the American Concrete Institute. She was also this year's AIST Howe Memorial Lecturer.

ACERS EDWARD ORTON JR. MEMORIAL LECTURE



Minoru Tomozawa

Professor, Department of Materials Science and Engineering, Rensselaer Polytechnic Institute, USA

Glass and Water: Fast Surface Relaxation

Abstract *Water has large influence on various glass properties such as mechanical, optical, and chemical properties. Mechanical strength of glasses decreases in water or water vapor; the strength decreases with increasing loading time and crack growth rate increases in increasing water vapor. Structure and properties of glass can change with time near the glass transition temperature. This time dependence is a unique characteristic of glasses, called "relaxation," and its speed increases with increasing temperature. In the presence of water vapor, it was discovered that the relaxation of surface layer of glasses becomes much faster than that of the bulk relaxation. Correspondingly, the surface relaxation was observed at a temperature much lower than the glass transition temperature. In the present talk, this newly discovered phenomena will be discussed: the method of the measurement of surface relaxation method, its structural origin, its ap-*

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plication to make stronger glass fibers, and its use to explain long standing mysteries related to mechanical properties of glasses, such as degradation of strengthened glasses, glass toughening, and fatigue limit.

Biography Tomozawa is professor of materials science and engineering at Rensselaer Polytechnic Institute. He previously worked there as associate professor (1972–1979), assistant professor (1970–1972), and as a post-doctoral research associate (1969–1970). He also served as director of Rensselaer's Center for Glass Science and Technology from 1985–1992. He received his B.S. degree in electrochemistry at Yokohama National University in Japan and his Ph.D. in metallurgy and materials science at University of Pennsylvania.

Tomozawa's primary research area is glass science. He has authored 295 technical papers, edited nine books, and currently holds three patents. He received the International Contribution Award from the Ceramic Society of Japan in 1991.

His current research interest is glass and water interaction. Through his work he found fast surface relaxation, which led to a new method of making stronger glass fibers and clarification of various mysteries of glasses such as fatigue limit.

Tomozawa is a Fellow of The American Ceramic Society and has been a member since 1969. He is a member of ACerS Glass & Optical Materials Division, serving as Division editor and Division chair. He received the Ceramic Educational Council Outstanding Educator Award (1988), the GOMD's George W. Morey Award (2011), and was recently elected as ACerS Distinguished Life Member (2019).

AIIST ADOLF MARTENS MEMORIAL STEEL LECTURE



Wolfgang Bleck

Chair, Department of Ferrous Metallurgy, IEHK Steel Institute, RWTH Aachen University, Germany

The Fascinating Variety of New Manganese Alloyed Steels

Abstract *The alloying element Manganese is used in virtually all steels for enabling hot formability, to increase hardenability or for solid solution strengthening. Optimizing the balance of conflictive mechanical properties like strength, toughness, fatigue, formability is the key issue of current steel and process*

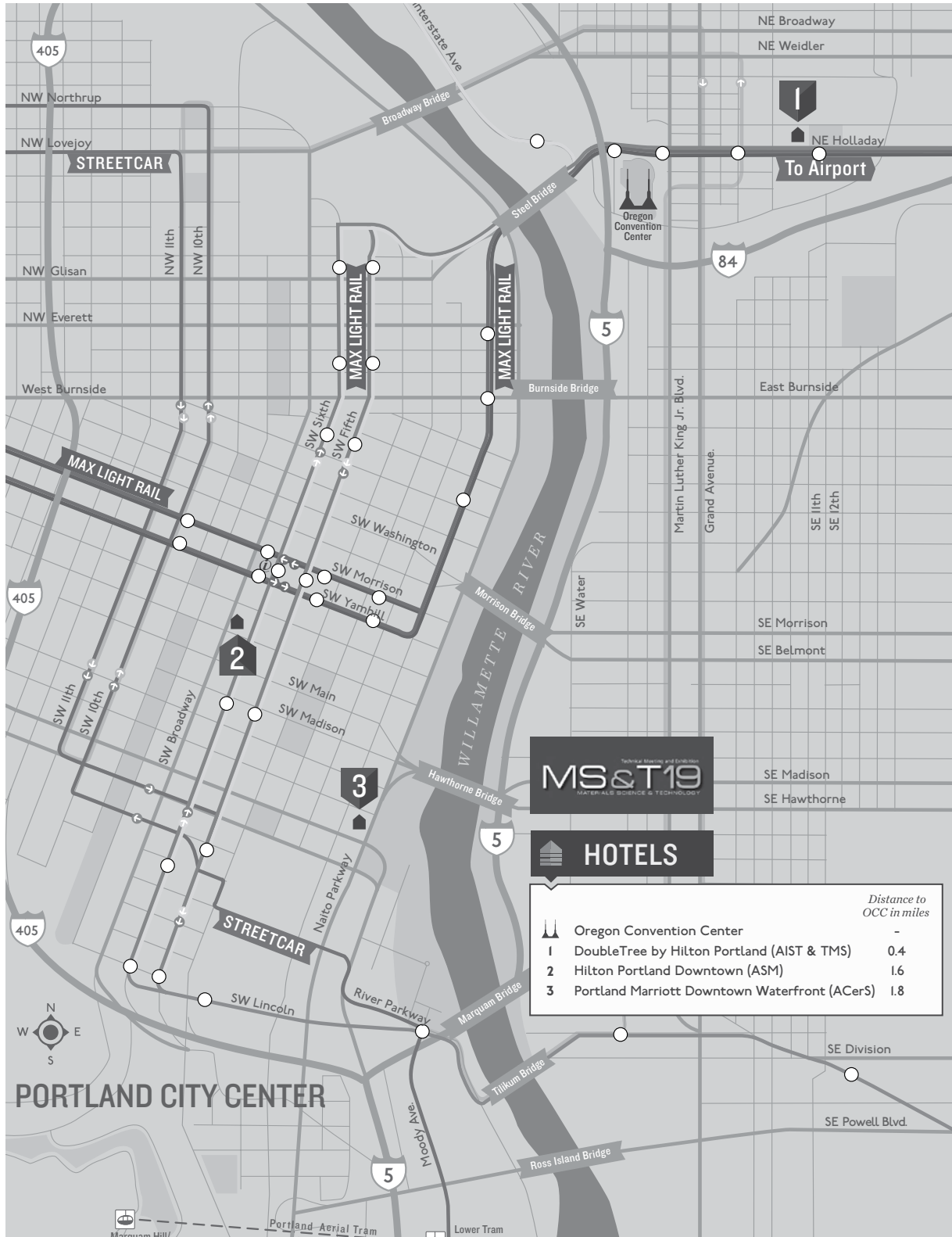
development. Therefore, new steel design concepts use manganese for stabilizing the fcc phase and for adjusting the stacking fault energy. By this, phenomena such as the TRIP, TWIP, or MBIP effects are triggered. This interest in stress-controlled or strain-induced low temperature transformations of the austenite provides the basis for new steel groups like the advanced high strength steels (AHSS), which are of prime interest for sheet metal forming but also for new forging steel concepts.

In medium and high manganese alloyed steels, new alloying concepts and new complex temperature-time-cycles during annealing have been combined for developing nanostructured matrices. A specific feature of these new materials, is that by element partitioning on the nm-scale, local enrichments of carbon and manganese can lead to a complex interplay of phases and crystal defects, providing a new promising field for future materials and process development. The strong interaction of alloying elements among themselves as well as with various crystal defects are regarded as major parameters for the control of mechanical properties. Thus, developing these new steels requires the use of the latest analytical techniques, modern microstructural description methods, advanced simulation techniques, and thorough evaluation of the local and global mechanical behavior.

The talk will provide examples of recent steel and process design with a focus on automotive car body and drive train applications.

Biography Bleck received his Dr.-Ing. degree in physical metallurgy in 1979 from Clausthal University, Germany. From 1980 to 1993, he served as head of the Department of Process and Steel Development of flat-rolled products at ThyssenKrupp Stahl AG in Duisburg, Germany. Since 1994 he has been a professor of ferrous metallurgy at RWTH Aachen University. During his time at RWTH Aachen University, he has served as head of the RWTH Steel Institute; vice rector for structure, research and human resources; dean of the faculty of geo resources and materials engineering; speaker of the collaborative research center SFB 761; and member of the steering committee of the excellence cluster "production in high-wage countries." His research activities include principles of steel design, numerical modeling of material and component properties, and integrated computational materials engineering of steel processing.

NAVIGATING THE CITY

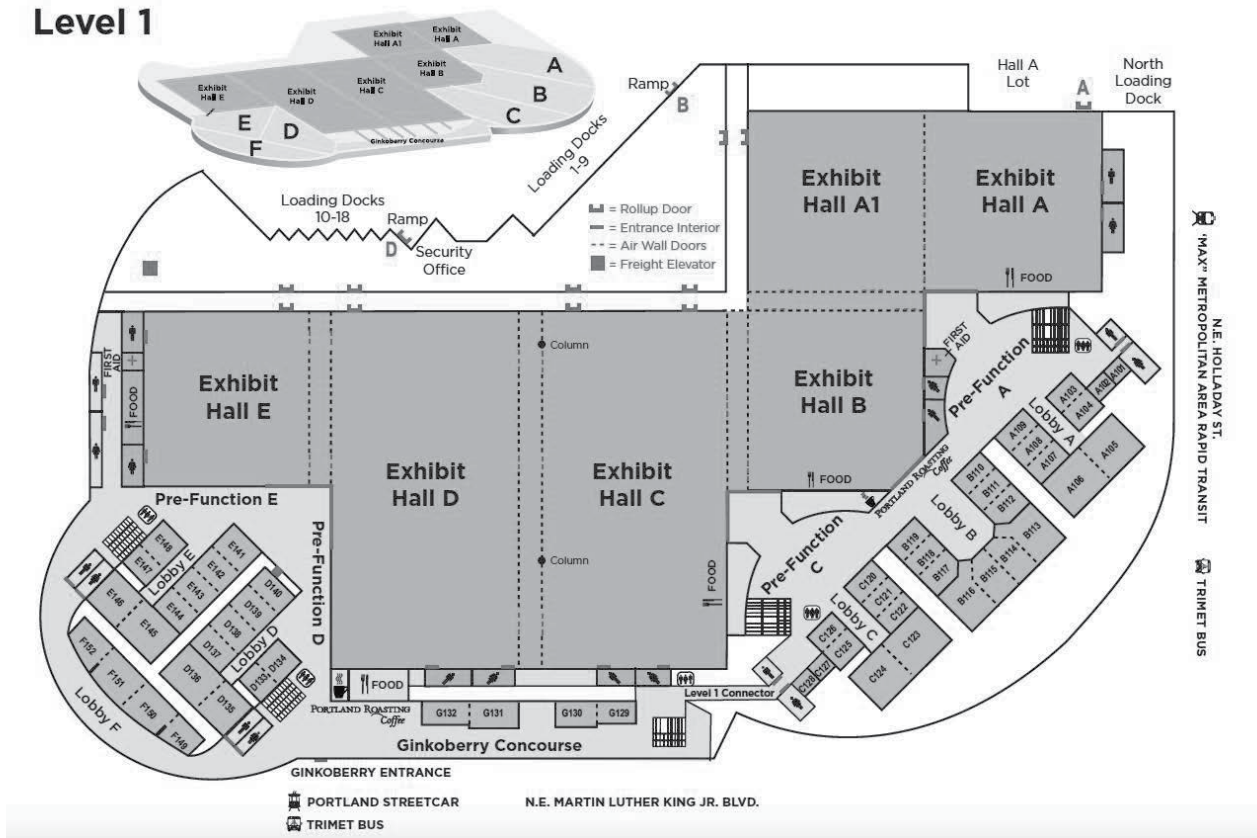


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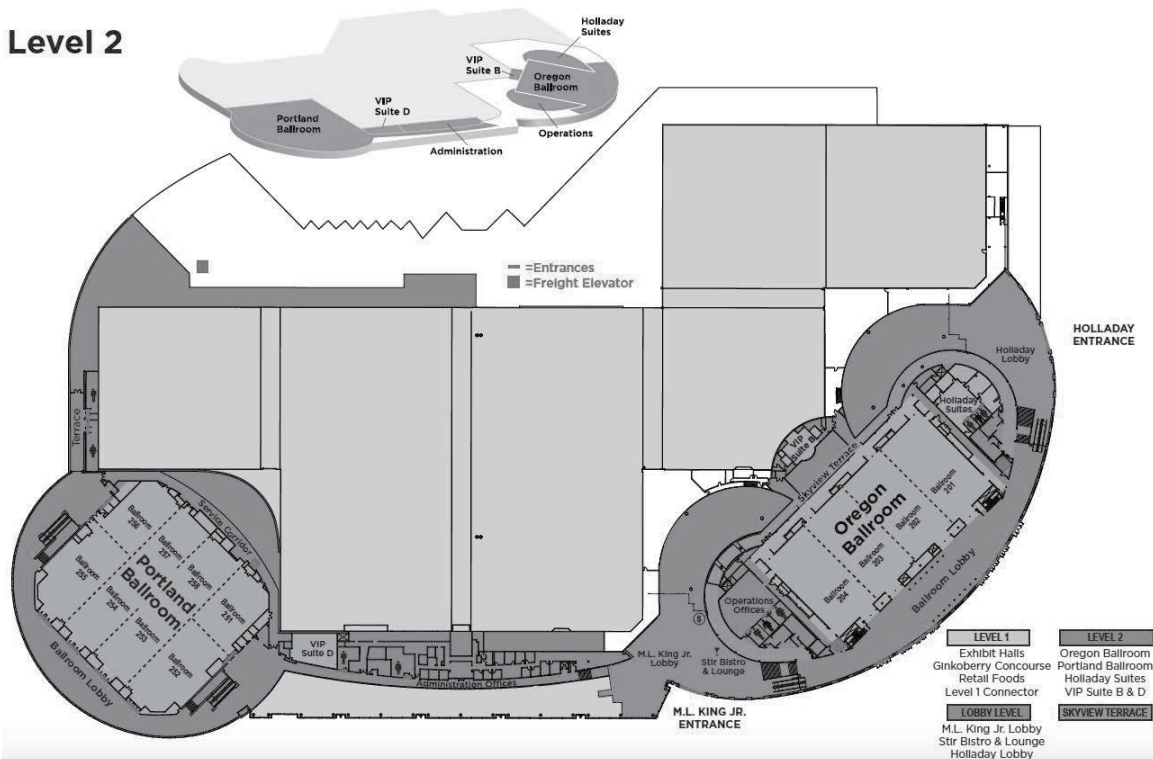
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NAVIGATING THE CONVENTION CENTER

Level 1



Level 2





CONFERENCE PERKS/POLICIES

Your MS&T Full Conference Registration includes:

- MS&T Partners' Welcome Reception (Monday)
- Technical Sessions (Monday – Thursday)
- Electronic access to conference proceedings (please see below for more information)
- Exhibition & poster session
- Exhibit hall happy hour reception (Tuesday)
- Tuesday lunch ticket (full conference attendees/students/exhibitors)
- Wednesday lunch ticket (full conference attendees/exhibitors)
- Exhibition contests and activities
- Complimentary memberships* in ACerS, AIST, TMS, if selected (for non-members only)
- *Non-member students receive one free year Material Advantage membership

Registration includes free

pass for Portland's MAX Light Rail, to get you to and from the conference

(Pick up at registration)

Exhibit Dates & Show Hours

Tuesday, October 1 10:00 a.m. – 6:00 p.m.
 Wednesday, October 2 9:30 a.m. – 2:00 p.m.

Refreshment Breaks

Refreshments are available throughout the concourses of the Oregon Convention Center during the morning and afternoon technical session breaks on Monday, Wednesday and Thursday. The Tuesday morning coffee break will be in the exhibit hall.

Contributed Papers Online Access for Conference Registrants

MS&T19 Proceedings will be published in an online-only format. Conference registrants have free access approximately a week before the meeting through December 31, 2019. Paid access for non-registrants will be available at the same time and will continue for one year.

Society Member Lounges—Not Just for Members!

Visit ACerS, AIST, ASM, and TMS member lounges on the Oregon Convention Center Ginkoberry Concourse to:

- Meet members and society staff
- Learn about membership and benefits offered by each society
- Find books, magazines, journals, and other technical resources
- Network with colleagues

Internet Access

Complimentary WiFi access is available for MS&T19 attendees in public spaces of the Oregon Convention Center.

Meeting App

Download the MS&T19 app to serve as your hand held guide to the meeting. Search for MS&T19 in the App Store and Google Play Store. Once downloaded, log in with the email address you used at registration. App features include:

- Up-to-date program information
- Special events and lectures
- Build your personal conference schedule
- Portland, Oregon information
- Exhibitor and product details
- And much more!

Message Board

For your convenience, a message board is located near the registration area of the Oregon Convention Center to post messages for participants and attendees.

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Badge Pick-up and Onsite Conference Registration

The MS&T Conference registration desk will be located in the Oregon Convention Center Prefunction C. Advance registrants may pick up badges and light rail passes at the registration area during the following hours:

Sunday, September 29	Noon – 5:00 p.m.
Monday, September 30	7:00 a.m. – 6:00 p.m.
Tuesday, October 1	7:00 a.m. – 6:00 p.m.
Wednesday, October 2	7:00 a.m. – 5:00 p.m. (note: end time is different than Mon. and Tue.)
Thursday, October 3	7:00 a.m. – Noon

Guests With Special Needs and Family Needs

ACerS, AIST, ASM, TMS, the Oregon Convention Center, and all the conference hotels strive to accommodate all guests with special needs. Two nursing suites are located near the A and E Meeting rooms on level one. Please see staff at the MS&T registration desk for assistance with any other special needs.

Audio and Visual Recording of Technical Paper Presentations/Sessions

ACerS, AIST, ASM, and TMS reserve the right to any still photography, audio, and video reproduction of presentations at every technical session. Recording of sessions (audio, video, still photography) intended for personal use, distribution, publication, or copyright is strictly prohibited without the express written consent of MS&T and the individual authors. MS&T will take photographs and video during the MS&T conference and exhibition, and reproduce them in MS&T educational, news or promotional material, whether in print, electronic or other media, including the MS&T website. By participating in the MS&T conference and exhibition, you grant MS&T the right to use your name, photograph and biography for such purposes. All postings become the property of MS&T. Postings may be displayed, distributed, or used by MS&T for any purpose.

Cellular Phone Usage

In consideration of attendees and presenters, MS&T19 organizing societies kindly request your cooperation in minimizing disturbances during technical sessions. Please place phones and other electronic devices in silent mode while you are in meeting rooms.

Be Materials-minded

MS&T19 management is committed to being environmentally responsible. Please join us in our efforts by using recycling bins located throughout the convention center.

Alumni Receptions

Purdue University is holding its reception at MS&T. For time and location, see the bulletin board near Registration.

Start in the Session Room

Presenters and session chairs are asked to report to their session rooms 30 minutes prior to the start of their sessions in order to confirm attendance, to load presentations onto the session room laptop computer, and to network. Coffee will be available in the morning at the break stations near session rooms.

Presenters and session chairs for morning sessions should report to their session rooms by 7:30 a.m. and for afternoon sessions by 1:30 p.m.

CALENDAR OF EVENTS

current as of 08-30-19 (subject to change)

Legend:

OCC = Oregon Convention Center

Doubletree by Hilton Portland= Doubletree (AIST & TMS HQ)

Portland Marriott Downtown Waterfront= (ACerS HQ)

Hilton Portland & Executive Tower= Hilton (ASM HQ)

Event	Time	Location	
FRIDAY, SEPTEMBER 27			
Committee and Business Meetings			
ACerS Executive Committee Meeting	11:00 a.m. – 5:00 p.m.	Marriott	Hawthorne
ACerS President's Council of Student Advisors (PCSA) Business Meeting	1:00 p.m. – 6:00 p.m.	Marriott	Salon GH
SATURDAY, SEPTEMBER 28			
Committee and Business Meetings			
ACerS President's Council of Student Advisors (PCSA) Business Meeting	8:00 a.m. – 5:00 p.m.	Marriott	Salon GH
ACerS Board of Directors Meeting	9:00 a.m. – 5:00 p.m.	Marriott	Salon AB
TMS Professional Registration Committee workshop and Meeting	9:00 a.m. – 5:00 p.m.	Doubletree	Idaho
ACerS PCSA/Board of Directors Lunch	Noon – 1:00 p.m.	Marriott	Salon F
TMS Professional Registration Committee dinner	6:00 p.m. – 8:00 p.m.	Off-site	TBD
Educational Courses			
Sintering of Ceramics - short course	9:00 a.m. – 4:30 p.m.	Marriott	Salon D
SUNDAY, SEPTEMBER 29			
Conference Activities			
Registration	Noon – 5:00 p.m.	OCC	Pre-Function C
Society Lounges	Noon – 5:00 p.m.	OCC	Ginkoberry Concourse
ACerS Basic Science Division Ceramographic Exhibit and Competition	Noon – 5:00 p.m.	OCC	Portland Ballroom Lobby
Programming Support Desk	2:00 p.m. – 5:00 p.m.	OCC	Pre-Function C
Educational Courses			
Introduction to Machine Learning for Materials Science	8:00 a.m. – Noon	Marriott	Salon BC
Metallography for Failure Analysis	8:30 a.m. – 4:30 p.m.	Hilton	Galleria III
Sintering of Ceramics	9:00 a.m. – 2:30 p.m.	Marriott	Salon D
Design for Advanced Manufacturing for Lightweighting Certificate	1:00 p.m. – 5:00 p.m.	Hilton	Galleria I
Additive Manufacturing Materials and Processes Workshop	1:00 p.m. – 5:00 p.m.	Doubletree	Roosevelt
Material Advantage Student Functions			
Chapter Leadership Workshop (Material Advantage Chapters officers)	10:00 a.m. – Noon	Marriott	Salon E
Undergraduate Student Speaking Contest Semi-Final 1	1:00 p.m. – 3:00 p.m.	Marriott	Mt Hood
Undergraduate Student Speaking Contest Semi-Final 2	1:00 p.m. – 3:00 p.m.	Marriott	Columbia
Undergraduate Student Speaking Contest Finals	3:00 p.m. – 4:00 p.m.	Marriott	Mt Hood
Student Networking Mixer	7:00 p.m. – 9:00 p.m.	Marriott	Salon EF
Social Functions			
MS&T Women in Materials Science Reception	5:00 p.m. – 6:00 p.m.	OCC	Portland Ballroom Lobby
TMS LGBTQ+ and Allies OPride Networking Mixer	8:00 p.m. – 10:00 p.m.	Offsite	TBD
Committee and Business Meetings			
ACerS Keramos National Board and Business Meeting	7:00 a.m. – 9:00 a.m.	Marriott	Restaurant
ASM Committee Council Office	7:00 a.m. – 5:00 p.m.	Hilton	Boardroom East/West
ASM IMS Board and Judges Breakfast	7:15 a.m. – 8:00 a.m.	Hilton	Executive Suite
TMS Board of Directors Meeting	7:45 a.m. – 2:00 p.m.	Doubletree	Oregon
ACerS Keramos Student Chapter Business Meeting	8:00 a.m. – 9:00 a.m.	Marriott	Salon I
AMS IMS Board Meeting	8:00 a.m. – 11:30 a.m.	Hilton	Directors Suite
Alpha Sigma Mu Board of Trustees	8:00 a.m. – Noon	Hilton	Cabinet Suite
ACerS Board of Directors and Volunteer Leaders Meeting	8:30 a.m. – Noon	Marriott	Salon F
ASM International Metallographic Contest Judging	8:00 a.m. – 5:00 p.m.	Hilton	Council Suite
TMS Superalloys 2020 Organizing Committee Meeting	8:00 a.m. – 5:00 p.m.	Doubletree	Hamilton
ACerS Keramos Convocation & Business Meeting	9:00 a.m. – 11:00 a.m.	Marriott	Salon I
ACerS President's Council of Student Advisors (PCSA) Meeting	9:00 a.m. – Noon	Marriott	Salon GH
ASM Action in Education	10:00 a.m. – 1:00 p.m.	Hilton	Senate Suite
ACerS Keramos Career Speaker	11:00 a.m. – Noon	Marriott	Salon I
ASM Annual Meeting, Awards Dinner and Leadership Luncheon Rehearsal	11:00 a.m. – 2:00 p.m.	Hilton	Galleria
ASM IMS Board and Judges Lunch	11:30 a.m. – 12:30 p.m.	Hilton	Executive Suite

Event	Time	Location	
Committee and Business Meetings			
ACerS Ceramic and Glass Industry Foundation (CGIF) Board of Directors Lunch	Noon – 1:00 p.m.	Marriott	Hawthorne/Belmont/ Laurelhurst
ACerS Publications Committee	Noon – 3:00 p.m.	Marriott	Salon A
TMS Accreditation Committee	12:30 p.m. – 2:30 p.m.	Doubletree	3 Sisters
ACerS Electronics Division Executive Committee Meeting	1:00 p.m. – 4:00 p.m.	Marriott	Eugene
ASM FAS Board Meeting	1:00 p.m. – 5:00 p.m.	Hilton	Directors Suite
ACerS Ceramic and Glass Industry Foundation (CGIF) Board of Directors Meeting	1:00 p.m. – 5:00 p.m.	Marriott	Hawthorne/Belmont/ Laurelhurst
ACerS Nuclear & Environmental Technology Division Executive Committee Meeting	2:00 p.m. – 4:00 p.m.	Marriott	Salem
ACerS Glass and Optical Materials Division Programming and Executive Committee Meeting	2:00 p.m. – 4:30 p.m.	Marriott	Portland
TMS Leadership Recruitment Committee	3:00 p.m. – 4:00 p.m.	Doubletree	Grant
ACerS/JACerS Editors Meeting	3:00 p.m. – 4:30 p.m.	Marriott	Salon A
ACerS Engineering Ceramics Division Executive Committee	3:00 p.m. – 4:30 p.m.	Marriott	Salon G
TMS Diversity Committee Meeting	3:00 p.m. – 4:30 p.m.	Doubletree	Mt. Bachelor
TMS ABET Refresher Training	3:00 p.m. – 5:30 p.m.	Doubletree	3 Sisters
ACerS Basic Science Division Executive Committee Meeting	3:30 p.m. – 5:30 p.m.	Marriott	Salon C
ASM JMEP Editorial Team	4:00 p.m. – 5:30 p.m.	Hilton	Cabinet Suite
TMS Program Committee Meeting	4:00 p.m. – 6:00 p.m.	Doubletree	Oregon
ASM Emerging Technologies Awareness Committee	5:00 p.m. – 7:00 p.m.	Hilton	Plaza Suite
TMS Nanomechanical Materials Behavior Committee	5:45 p.m. – 6:45 p.m.	Doubletree	Alaska
TMS Steels Committee Meeting	6:00 p.m. – 7:00 p.m.	Doubletree	Mt. Hood
TMS Materials Innovation Committee Meeting	6:00 p.m. – 7:30 p.m.	Doubletree	Washington
TMS Mechanical Behavior of Materials Committee Meeting	7:00 p.m. – 8:30 p.m.	Doubletree	Alaska
ACerS Past Presidents Council	7:00 p.m. – 8:30 p.m.	Marriott	Pearl
ASM Materials Properties Database Committee (MPDC) Meeting	7:00 p.m. – 9:30 p.m.	Hilton	Senate Suite
ASM International Materials Reviews (IMR) Committee	7:00 p.m. – 10:00 p.m.	Hilton	Directors Suite
TMS Phase Transformations Committee Meeting	7:30 p.m. – 8:30 p.m.	Doubletree	Oregon
MONDAY, SEPTEMBER 30			
Conference Activities			
Registration	7:00 a.m. – 6:00 p.m.	OCC	Pre-Function C
Programming Support Desk	7:00 a.m. – 6:00 p.m.	OCC	Pre-Function C
Society Lounges	7:00 a.m. – 6:00 p.m.	OCC	Ginkoberry Concourse
ACerS Basic Science Division Ceramographic Exhibit and Competition	8:30 a.m. – 6:00 p.m.	OCC	Portland Ballroom Lobby
MS&T Partners' Welcome Reception	5:00 p.m. – 6:00 p.m.	OCC	Ginkoberry Concourse
Exhibition			
Exhibitor Set-Up	8:00 a.m. – 5:00 p.m.	OCC	Exhibit Hall CD
Poster Installation	3:30 p.m. – 5:00 p.m.	OCC	Exhibit Hall CD
Lectures			
ACerS Navrotsky Award for Experimental Thermodynamics of Solids	8:10 a.m. – 8:55 a.m.	OCC	B119
ACerS/EPDC: Arthur L. Friedberg Ceramic Engineering Tutorial and Lecture	9:00 a.m. – 10:00 a.m.	OCC	Portland Ballroom 253
ACerS Richard M. Fulrath Award Session	2:00 p.m. – 4:40 p.m.	OCC	Portland Ballroom 253
Alpha Sigma Mu Lecture	2:30 p.m. – 4:00 p.m.	OCC	Portland Ballroom 254
Material Advantage Student Functions			
ACerS PCSA Humanitarian Pitch Competition	8:00 a.m. – 11:00 a.m.	Marriott	Mt. Hood
ACerS Lunch with a Pro	Noon – 1:00 p.m.	OCC	ACerS Lounge
AIST Student Plant Tour - EVRAZ Oregon Steel	Noon – 4:00 p.m.	OCC	MLK Lobby
Social Functions			
ASM Women in Materials Engineering Breakfast (Ticketed Event)	7:00 a.m. – 9:00 a.m.	Hilton	Grand Ballroom II
AIST University Industry Relations Roundtable	10:30 a.m. – 1:00 p.m.	Doubletree	Oregon
ASM Leadership Awards Luncheon	11:30 a.m. – 1:00 p.m.	Hilton	Grand Ballroom I
ASM Tuxedo Pick up	4:00 p.m. – 6:00 p.m.	Hilton	Senate Suite
ASM Foundation Reception	5:00 p.m. – 6:30 p.m.	Hilton	Grand Ballroom II
Purdue University Alumni and Friends Reception	6:00 p.m. – 7:30 p.m.	Offsite	Spirit of '77
AIST Steel to Students Reception	6:00 p.m. – 8:00 p.m.	Doubletree	Oregon/Alaska
ACerS Annual Honor and Awards Banquet Reception	6:45 p.m. – 7:30 p.m.	Marriott	Salon EF Prefunction
ACerS Annual Honor and Awards Banquet	7:30 p.m. – 10:00 p.m.	Marriott	Salon EF
ASM Canada Council Suite and Ice Breaker Reception	9:00 p.m. – 12:00 a.m.	Hilton	Grand Ballroom Parlor ABC"
Annual Meetings			
ACerS 121 st Annual Membership Meeting	1:00 p.m. – 2:00 p.m.	OCC	Portland Ballroom 253
ASM 106 th Annual Business Meeting	4:00 p.m. – 5:00 p.m.	Hilton	Grand Ballroom I
ASM IMS Annual General Meeting and Symposium Planning	5:00 p.m. – 6:00 p.m.	OCC	F152

CALENDAR OF EVENTS

current as of 08-30-19 (subject to change)

Legend:

OCC = Oregon Convention Center

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Portland Marriott Downtown Waterfront= (ACerS HQ)

Hilton Portland & Executive Tower= Hilton (ASM HQ)

Event	Time	Location	
MONDAY, SEPTEMBER 30			
Committee and Business Meetings			
ACerS SPEO Meeting	7:00 a.m. – 9:00 a.m.	Marriott	Salon C
ASM Committee Council Office	7:00 a.m. – 5:00 p.m.	Hilton	Boardroom East/West
TMS Membership and Student Development Committee Meeting	7:30 a.m. – 9:00 a.m.	Doubletree	Hamilton
ASM Metallography, Microstructure and Analysis (MMA) Editorial Board	8:00 a.m. – 9:30 a.m.	Hilton	Forum Suite
ASM Foundation Campaign Meeting	8:00 a.m. – 10:00 a.m.	Hilton	Grand Ballroom Parlor C
ASM Guest Hospitality	8:00 a.m. – 10:30 a.m.	Hilton	Executive Suite
ASM Canada Council Business Meeting (ASM)	9:00 a.m. – 10:00 a.m.	Hilton	Cabinet Suite
ASM Past Presidents Meeting	9:30 a.m. – 11:00 a.m.	Hilton	Directors Suite
ASM Women in Materials Engineering Committee	10:00 a.m. – 11:00 a.m.	Hilton	Council Suite
ASM Education Meeting	10:00 a.m. – 11:00 a.m.	Hilton	Senate Suite
ACerS Member Services	10:30 a.m. – Noon	OCC	C128
ACerS Meetings Committee Meeting	10:30 a.m. – Noon	OCC	G129
TMS Executive Committee Meeting	11:30 a.m. – 1:00 p.m.	Doubletree	Madison
ACerS Basic Science Division General Membership Meeting	Noon – 1:00 p.m.	OCC	E143
ACerS Engineering Ceramics Division General Membership Meeting	Noon – 1:00 p.m.	OCC	C122
TMS Integrated Computational Materials Engineering Committee Meeting	12:15 p.m. – 1:45 p.m.	Doubletree	Alaska
ACerS Electronics Division General Membership Meeting	12:30 p.m. – 1:30 p.m.	OCC	A105
TMS Education Committee	12:30 p.m. – 2:00 p.m.	Doubletree	Grant
ASM Awards Policy Committee Meeting	1:30 p.m. – 2:30 p.m.	Hilton	Forum Suite
ASM Membership Committee	1:30 p.m. – 3:30 p.m.	Hilton	Cabinet Suite
ACerS Educational and Professional Development Council (EPDC)	2:00 p.m. – 4:00 p.m.	OCC	G129
TMS Nuclear Materials Committee	5:00 p.m. – 6:30 p.m.	Doubletree	3 Sisters
ASM AM&P Editorial Committee	5:00 p.m. – 7:00 p.m.	Hilton	Plaza Suite
ASM Processing and Application Committee Meeting	5:30 p.m. – 7:00 p.m.	Hilton	Executive Suite
TMS Composite Materials Committee	5:45 p.m. – 6:45 p.m.	Doubletree	Roosevelt
ACerS Nuclear & Environmental Technology Division General Membership Meeting	5:30 p.m. – 6:30 p.m.	OCC	E147
TMS Additive Manufacturing Committee Meeting	6:00 p.m. – 7:30 p.m.	OCC	B113
ASM Finance Committee dinner	6:00 p.m. – 9:00 p.m.	Hilton	Forum Suite
ASM Emerging Professionals Committee Business Meeting	7:00 p.m. – 9:15 p.m.	Hilton	Directors Suite
ASM Alloy Phase Diagram (APD) Committee	7:30 p.m. – 9:30 p.m.	Hilton	Council Suite
TUESDAY, OCTOBER 1			
Conference Activities			
Registration	7:00 a.m. – 6:00 p.m.	OCC	Pre-Function C
Programming Support Desk	7:00 a.m. – 6:00 p.m.	OCC	Pre-Function C
Society Lounges	7:00 a.m. – 6:00 p.m.	OCC	Ginkoberry Concourse
ACerS Basic Science Division Ceramographic Exhibit & Competition	7:00 a.m. – 6:00 p.m.	OCC	Portland Ballroom Lobby
Exhibition			
ASM Mini-Materials Camp	9:00 a.m. – 2:00 p.m.	OCC	Exhibit Hall CD
Poster Installation	10:00 a.m. – 11:00 a.m.	OCC	Exhibit Hall CD
Exhibition Show Hours	10:00 a.m. – 6:00 p.m.	OCC	Exhibit Hall CD
General Poster Session with Presenters #1	11:00 a.m. – Noon	OCC	Exhibit Hall CD
General Poster Session with Presenters #2	Noon – 1:00 p.m.	OCC	Exhibit Hall CD
MS&T Food Court	Noon – 2:00 p.m.	OCC	Exhibit Hall CD
General Poster Viewing	1:00 p.m. – 4:45 p.m.	OCC	Exhibit Hall CD
Exhibitor Networking Reception	4:00 p.m. – 6:00 p.m.	OCC	Exhibit Hall CD
General Poster Session with Presenters #3	4:45 p.m. – 5:45 p.m.	OCC	Exhibit Hall CD



Event	Time	Location	
Lectures			
MS&T Plenary Lectures	8:00 a.m. – 10:40 a.m.	OCC	Portland Ballroom 251/257/258
TMS Young Professional Tutorial Luncheon (ticketed)	Noon – 12:45 p.m.	OCC	G130
TMS Young Professional Tutorial Lecture (open)	12:45 p.m. – 2:00 p.m.	OCC	G130
ASM Edward DeMille Campbell Memorial Lecture	12:45 p.m. – 1:45 p.m.	OCC	Portland Ballroom 254
ACerS Frontiers of Science and Society - Rustum Roy Lecture	1:00 p.m. – 2:00 p.m.	OCC	Portland Ballroom 253
IMS Henry Clifton Sorby Lecture (ASM)	2:00 p.m. – 3:00 p.m.	OCC	F152
ACerS GOMD Alfred R. Cooper Award Session	2:00 p.m. – 4:40 p.m.	OCC	A106
Material Advantage Student Functions			
Material Advantage Committee Meeting	7:30 a.m. – 8:30 a.m.	OCC	G129
ASM DomesDay Competition	10:15 a.m. – 1:30 p.m.	OCC	Exhibit Hall CD
Undergraduate Student Poster Contest judging	10:00 a.m. – 11:00 a.m.	OCC	Exhibit Hall CD
Graduate Student Poster Contest judging	10:00 a.m. – 11:00 a.m.	OCC	Exhibit Hall CD
Undergraduate Student Poster Contest display with presenters	11:00 a.m. – Noon	OCC	Exhibit Hall CD
Graduate Student Poster Contest display with presenters	11:00 a.m. – Noon	OCC	Exhibit Hall CD
Mug Drop Contest	11:15 a.m. – 12:15 p.m.	OCC	Exhibit Hall CD
Disc Golf Contest	12:30 p.m. – 1:30 p.m.	OCC	Exhibit Hall CD
Undergraduate Student Poster Contest display	Noon – 6:00 p.m.	OCC	Exhibit Hall CD
Graduate Student Poster Contest display	Noon – 6:00 p.m.	OCC	Exhibit Hall CD
Student Awards Ceremony	2:00 p.m. – 3:00 p.m.	OCC	Exhibit Hall CD
Social Functions			
ASM Tuxedo Pick Up	11:00 a.m. – 5:00 p.m.	Hilton	Senate Suite
ASM Board of Trustees Photograph	6:00 p.m. – 6:30 p.m.	Hilton	Executive Suite
ASM Awards Dinner Reception	6:00 p.m. – 7:15 p.m.	Hilton	Grand Ballroom Foyer
ASM Head Table Line Up	6:45 p.m. – 7:15 p.m.	Hilton	Grand Ballroom Parlor C
ASM Awards Dinner	7:00 p.m. – 9:30 p.m.	Hilton	Grand Ballroom I/II
ASM President's Reception	9:30 p.m. – 11:30 p.m.	Hilton	Skyline I/II
Committee and Business Meetings			
ASM Board, Finance, Investment & Past President's Breakfast	7:00 a.m. – 8:00 a.m.	Hilton	Skyline I
ACerS Diversity & Inclusion Sub-Committee Meeting	7:00 a.m. – 8:00 a.m.	OCC	C128
ASM Committee Council Office	7:00 a.m. – 5:00 p.m.	Hilton	Boardroom East/West
ASM Journal of Failure Analysis & Prevention (JFAP) Editorial Board	8:00 a.m. – 9:00 a.m.	Hilton	Directors Suite
ASM and Foundation Leadership Operations Review	8:00 a.m. – 10:30 a.m.	Hilton	Skyline II
ASM Volunteerism Planning Meeting	8:30 a.m. – 10:30 a.m.	Hilton	Plaza Suite
ASM Handbook and Technical Book Committee	8:00 a.m. – Noon	Hilton	Cabinet Suite
ASM Materials Education Foundation Board of Trustees	10:00 a.m. – 2:00 p.m.	Hilton	Council Suite
ASM Finance Committee Meeting	11:00 a.m. – 12:30 p.m.	Hilton	Forum Suite
ASM Joining of Advanced and Specialty Materials	Noon – 1:30 p.m.	Hilton	Grand Ballroom Parlor C
ASM <i>Journal of Materials Engineering & Performance</i> (JMEP) Committee	Noon – 2:15 p.m.	Hilton	Plaza Suite
AIST Metallurgy - PPA Committee Meeting	Noon – 2:00 p.m.	OCC	Portland Ballroom 256
TMS Powder Materials Committee Meeting	12:30 p.m. – 2:00 p.m.	Doubletree	3 Sisters
ACerS Bioceramics Division General Business Meeting	1:00 p.m. – 2:00 p.m.	OCC	C122
ASM & Foundation Investment Committee Meeting	1:00 p.m. – 2:30 p.m.	Hilton	Forum Suite
TMS ICTP 2020 Organizer Meeting	2:00 p.m. – 3:00 p.m.	Doubletree	Washington
ASM Board of Trustees Meeting	2:30 p.m. – 4:30 p.m.	Hilton	Grand Ballroom Parlor AB
TMS <i>Metallurgical and Materials Transactions</i> Board of Review	3:00 p.m. – 4:00 p.m.	Doubletree	Oregon
ACerS Panel of Fellows Meeting	3:00 p.m. – 5:00 p.m.	OCC	A101
ASM Student Board Member Meeting	3:30 p.m. – 4:45 p.m.	Hilton	Grand Ballroom Parlor C
ACerS/JACerS Associate Editors Meeting	3:30 p.m. – 5:00 p.m.	OCC	G129
ASM Content Committee Meeting	4:00 p.m. – 5:30 p.m.	Hilton	Cabinet Suite
ACerS Glass and Optical Materials Division General Business Meeting	4:45 p.m. – 5:45 p.m.	OCC	A106
TMS Titanium Committee Meeting	5:00 p.m. – 6:00 p.m.	Doubletree	Mt. Hood
TMS Surface Engineering Committee Meeting	5:00 p.m. – 6:00 p.m.	Doubletree	Roosevelt
TMS High Temperature Alloys Committee Meeting	5:00 p.m. – 6:00 p.m.	Doubletree	3 Sisters
TMS Shaping & Forming Committee Meeting	5:00 p.m. – 6:30 p.m.	Doubletree	Alaska
TMS Refractory Metals & Materials Committee Meeting	6:00 p.m. – 7:00 p.m.	Doubletree	Jefferson/Adams
TMS Corrosion & Environmental Effects Committee Meeting	6:00 p.m. – 7:00 p.m.	Doubletree	Oregon
TMS Biomaterials Committee Meeting	6:00 p.m. – 7:00 p.m.	Doubletree	Hamilton

CALENDAR OF EVENTS

current as of 08-30-19 (subject to change)

Legend:

OCC = Oregon Convention Center
 Doubletree by Hilton Portland= Doubletree (AIST & TMS HQ)
 Portland Marriott Downtown Waterfront= (ACerS HQ)
 Hilton Portland & Executive Tower= Hilton (ASM HQ)

Event	Time	Location	
WEDNESDAY, OCTOBER 2			
Conference Activities			
Registration	7:00 a.m. – 5:00 p.m.	OCC	Pre-Function C
Programming Support Desk	7:00 a.m. – 6:00 p.m.	OCC	Pre-Function C
Society Lounges	7:00 a.m. – 5:00 p.m.	OCC	Ginkoberry Concourse
ACerS Basic Science Division Ceramographic Exhibit & Competition	7:00 a.m. – 5:00 p.m.	OCC	Portland Ballroom Lobby
Exhibition			
General Poster Viewing	9:30 a.m. – 2:00 p.m.	OCC	Exhibit Hall CD
Exhibition Show Hours	9:30 a.m. – 2:00 p.m.	OCC	Exhibit Hall CD
ASM Mini-Materials Camp	9:00 a.m. – 2:00 p.m.	OCC	Exhibit Hall CD
MS&T Food Court	Noon – 2:00 p.m.	OCC	Exhibit Hall CD
General Poster Session Removal	2:00 p.m. – 3:00 p.m.	OCC	Exhibit Hall CD
Exhibitor Tear-Down	2:00 p.m. – 9:00 p.m.	OCC	Exhibit Hall CD
Lectures			
ACerS Basic Science Division Robert B. Sosman Lecture	1:00 p.m. – 2:00 p.m.	OCC	Portland Ballroom 253
Material Advantage Student Functions			
ACerS Student Tour - Pacific Northwest National Laboratory	6:00 a.m. – 7:30 p.m.	Marriott	Lobby
Undergraduate Student Poster Contest Display	9:30 a.m. – 2:00 p.m.	OCC	Exhibit Hall CD
Graduate Student Poster Contest Display	9:30 a.m. – 2:00 p.m.	OCC	Exhibit Hall CD
ACerS Lunch with a Pro	Noon – 1:00 p.m.	OCC	ACerS Lounge
Social Functions			
ASM Tuxedo Drop-Off	7:00 a.m. – Noon	Hilton	Boardroom East/West
Committee and Business Meetings			
ASM Board of Trustees and 2019 Class of Fellows Breakfast	8:00 a.m. – 9:00 a.m.	Hilton	Forum Suite
ASM Committee Council Office	7:00 a.m. – Noon	Hilton	Boardroom East/West
ASM Acta Board of Governors Meeting	7:00 a.m. – 4:00 p.m.	Hilton	
TMS Financial Planning Committee Meeting	8:00 a.m. – 10:30 a.m.	Doubletree	Roosevelt
ASM Programming Committee	11:30 a.m. – 1:00 p.m.	Hilton	Director's Suite
TMS Industrial Advisory Committee	Noon – 4:00 p.m.	Doubletree	Hamilton
ASM FAS General Membership Meeting	6:30 p.m. – 7:30 p.m.	Hilton	Pavilion Ballroom West
ASM FAS Programming Committee Meeting	7:30 p.m. – 9:00 p.m.	Hilton	Pavilion Ballroom West
THURSDAY, OCTOBER 3			
Conference Activities			
Registration	7:00 a.m. – Noon	OCC	Pre-Function C
Programming Support Desk	7:00 a.m. – Noon	OCC	Pre-Function C
ACerS Basic Science Division Ceramographic Exhibit & Competition	7:00 a.m. – Noon	OCC	Portland Ballroom Lobby





LECTURES

(all are located in the convention center)

MONDAY, SEPTEMBER 30

ACERs NAVROTSKY AWARD FOR EXPERIMENTAL THERMODYNAMICS OF SOLIDS

8:10 – 8:55 a.m. | B119

- **Alexander Beutl**, Institute of Inorganic Chemistry-Functional Materials, University of Vienna, Austria
A Novel Apparatus for Coulometric Titrations in Lithium Containing Systems

ACERs/EPDC ARTHUR L. FRIEDBERG CERAMIC ENGINEERING TUTORIAL AND LECTURE

9:00 – 10:00 a.m. | Portland Ballroom 253

- **Kathleen Richardson**, University of Central Florida, USA
Redefining Material Design Paradigms for Next Generation Optical Materials

ACERs RICHARD M. FULRATH AWARD SESSION

2:00 – 4:40 p.m. | Portland Ballroom 253

- **Manabu Fukushima**, National Institute of Advanced Industrial Science and Technology, Japan
Engineering Cellular Ceramics with Modulated Pore Configurations
- **Keigo Suzuki**, Murata Manufacturing Co. Ltd., Japan
Fabrication and Characterization of Nanoscale Dielectrics for the Design of Advanced Ceramic Capacitors
- **Ronald Polcawich**, Defense Advanced Research Projects Agency (DARPA), USA
Piezoelectric Thin Film Processing, PiezoMEMS Devices, and an Overview of PRIGM, SHRIMP, & AMEBA Programs
- **Koichiro Morita**, Taiyo Yuden Co. Ltd., Japan
Dielectric Material Design and Lifetime Prediction for Highly Reliable MLCCS
- **Vilas Pol**, Purdue University, USA
Engineered Ceramic Materials for Energy Storage

ALPHA SIGMA MU LECTURE

2:30 – 4:00 p.m. | Portland Ballroom 254

- **Diana Lados**, FASM, Worcester Polytechnic Institute, USA
The Role of Additive Manufacturing in Industry 4.0: From Integrated Design and Fabrication to Structural Performance and Qualification



TUESDAY, OCTOBER 1

MS&T PLENARY SESSION

8:00 a.m. – 10:40 a.m. | Portland Ballroom 251/257/258

ASM/TMS DISTINGUISHED LECTURESHIP IN MATERIALS AND SOCIETY

- **Carolyn Hansson**, Professor of Materials Engineering, University of Waterloo, Canada
The Challenge of 100 Year Service-life Requirement

ACERs EDWARD ORTON JR. MEMORIAL LECTURE

- **Minoru Tomozawa**, Professor, Department of Materials Science and Engineering, Rensselaer Polytechnic Institute, USA
Glass and Water: Fast Surface Relaxation

AISt ADOLF MARTENS MEMORIAL STEEL LECTURE

- **Wolfgang Bleck**, Chair, Department of Ferrous Metallurgy, IEHK Steel Institute, RWTH Aachen University, Germany
The Fascinating Variety of New Manganese Alloyed Steels

ASM EDWARD DEMILLE CAMPBELL MEMORIAL LECTURE

12:45 p.m. – 1:45 p.m. | Portland Ballroom 254

- **Katherine Faber**, FASM, California Institute of Technology, USA
Breaking Old Barriers: New Opportunities in Brittle Fracture

ACERs FRONTIERS OF SCIENCE AND SOCIETY – RUSTUM ROY LECTURE

1:00 p.m. – 2:00 p.m. | Portland Ballroom 253

- **Jennifer Lewis**, Harvard University, USA
Printing Architected Matter in Three Dimensions

ASM-IMS HENRY CLIFTON SORBY LECTURE

2:00 p.m. – 3:00 p.m. | F152

- **Helmut Clemens**, Montanuniversitaet Leoben, Austria
Development and Characterization of High-performance Materials by Means of Cross-scale Metallography and Complementary Methods

ACERs GOMD ALFRED R. COOPER AWARD SESSION

2:00 p.m. – 4:40 p.m. | A106

COOPER DISTINGUISHED LECTURE

- **Kathleen Richardson**, University of Central Florida, USA
Function-tailoring Strategies for Broadband Infrared Glasses

2019 ALFRED R. COOPER YOUNG SCHOLAR AWARD PRESENTATION

- **Wataru Takeda**, Coe College, USA
Topological Constraint Model of High Lithium Content Borate Glasses

WEDNESDAY, OCTOBER 2

ACERs BASIC SCIENCE DIVISION ROBERT B. SOSMAN LECTURE

1:00 p.m. – 2:00 p.m. | Portland Ballroom 253

- **Yury Gogotsi**, Drexel University, USA
Nanomaterials Born from Ceramics: Transformative Synthesis of Carbons, Carbides and Nitrides

SPECIAL EVENTS

SUNDAY, SEPTEMBER 29

MS&T Women in Materials Science Reception

5:00 p.m. – 6:00 p.m. | OCC – Portland Ballroom lobby

Enjoy the chance to network with professionals and peers in a relaxed environment.

TMS LGBTQ+ and Allies Networking Mixer

8:00 p.m. – 10:00 p.m. | Off-site – TBD

Enjoy an evening of informal networking at a local venue to celebrate shared experiences as LGBTQ+ individuals and allies. Cash bar. Organized by TMS Pride of the TMS Diversity Committee.

MONDAY, SEPTEMBER 30

ACerS Basic Science Division Ceramographic Exhibit and Competition

OCC – Portland Ballroom Lobby

Join us for this intriguing annual poster exhibit that promotes the use of microscopy and microanalysis as tools in the scientific investigation of scientific materials.

Monday: 8:30 a.m. – 6:00 p.m.

Tuesday: 7:00 a.m. – 6:00 p.m.

Wednesday: 7:00 a.m. – 5:00 p.m.

ASM Women in Materials Breakfast (ticketed event)

7:00 a.m. – 9:00 a.m. | Hilton Grand Ballroom

Join your colleagues for a lively discussion of relevant topics with featured speakers. This breakfast sells out each year, so make sure to reserve your tickets ahead of time with your MS&T19 registration.

Things to do in Portland Presentation

9:00 a.m. – 10:00 a.m. | OCC – G130

Tim Mongin with Travel Portland will discuss all the great things to do in Portland during your visit!

ASM Leadership Awards Luncheon (ticketed event)

11:30 a.m. – 1:00 p.m. | Hilton Grand Ballroom

ASM's organizational unit awards, as well as awards and scholarships of the ASM Materials Education Foundation will be presented. ASM's incoming committee/council chairs will also be recognized for their leadership.

ACerS 121st Annual Membership Meeting

1:00 p.m. – 2:00 p.m. | OCC – Portland Ballroom 253

The president reports on Society activities and newly elected officers take their positions during the annual membership meeting. All ACerS members and guests are welcome.

ASM 106th Annual Business Meeting

4:00 p.m. – 5:00 p.m. | Hilton Grand Ballroom 1

Officers will be elected for the 2019-2020 term, as well as other ASM business transactions. ASM members and guests are welcome.

MS&T Partners' Welcome Reception

5:00 p.m. – 6:00 p.m. | OCC – Ginkoberry Concourse

Grab this opportunity to mingle with members and representatives from all five societies and MS&T partners at this reception in the society lounge area.

MONDAY, SEPTEMBER 30

AIST Steel to Students Reception

6:00 p.m. – 8:00 p.m. | DoubleTree by Hilton Hotel Portland, Oregon Room

Students with an interest in steel are encouraged to attend this networking event.

ACerS Annual Honor and Awards Banquet (ticketed event)

6:45 p.m. – 10:00 p.m. | Marriott – Salon EF

Enjoy dinner, conversation, and the presentation of Society awards. You can purchase tickets with your MS&T registration.

(Reception) 6:45 – 7:30 p.m.

(Banquet) 7:30 -10:00 p.m.

TUESDAY, OCTOBER 1

TMS Young Professional Tutorial Luncheon/Lecture

(ticketed event)

Noon – 2:00 p.m. | OCC – G130

Speaker: **Mark Asta**, University of California, Berkeley; Organized by the TMS Young Professionals Committee

MS&T19 Exhibit Happy Hour Reception

4:00 p.m. – 6:00 p.m. | OCC Hall CD

Network with colleagues and build relationships with qualified attendees, buyers, and prospects.

ASM Awards Dinner/Reception

6:15 p.m. – 9:00 p.m. | Hilton Grand Ballroom I/II

Join ASM in celebrating the accomplishments of this year's award recipients and the 2019 Class of Fellows. Tickets, which include the President's Reception following the dinner can be purchased with MS&T registration.

(Reception) 6:15 p.m. – 7:00 p.m. | Foyer

(Banquet) 7:00 p.m. – 9:00 p.m. (invitation only)



PORTLAND OREGON

SEPTEMBER 29 – OCTOBER 3, 2019

STUDENT EVENTS

Undergraduate Student Poster Contest

The contest encourages undergraduate students to present their undergraduate research experiences and improve their communication skills. The poster entered must be the work of an undergraduate and completed during the student's undergraduate education. Work presented in the poster does not have to be performed at the student's home institution, but could be, for example, from a project performed as part of a co-op experience, a summer internship, or a Research Experience for Undergraduates (REU) project.

Graduate Student Poster Contest

The contest, open to current graduate students pursuing M.S. or Ph.D. degrees, recognizes superior research performed during graduate study. Posters must be accepted in the MS&T technical program to be entered into the contest. Entries will be displayed in the general poster session.

Sunday, September 29

Chapter Officer Workshop – FOR CHAPTER OFFICERS ONLY 10:00 a.m. – Noon | Marriott – Salon E

Meet fellow chapter officers, share best practices, and learn about Material Advantage! This workshop is for chapter officers only (chair, vice-chair, secretary, and treasurer). Registration is required for this workshop.

Undergraduate Student Speaking Contest

1:00 p.m. – 4:00 p.m. | Marriott – Mt. Hood/Columbia
MS&T hosts the semifinal and final rounds of the Material Advantage Undergraduate Student Speaking Contest. This contest encourages undergraduate students to present technical papers and improve their presentation skills. The presentation subject must be technical but can relate to any aspect of materials science and engineering. One contestant per university competes in this contest.

Student Networking Mixer

7:00 p.m. – 9:00 p.m. | Marriott – Salon EF
Join in this relaxed, casual, and fun atmosphere designed for students, Material Advantage Faculty Advisors, and society volunteer leaders. Students are encouraged to wear their school colors. Music will be provided.

Monday, September 30

MS&T Partners' Welcome Reception 5:00 p.m. – 6:00 p.m. | OCC-Ginkoberry Concourse

Meet with members and representatives from the MS&T organizing societies and partners at this reception.

Emerging Professionals Symposium

Be sure to attend the symposium *Perspectives for Emerging Materials Professionals* in room B110! Several sessions have been developed to help students and young professionals navigate their career in the materials science profession.

ACerS PCSA Humanitarian Pitch Competition — **NEW** 8:00 a.m. – 11:00 a.m. | Marriott – Mt. Hood

The President's Council of Student Advisors (PCSA) is hosting the inaugural Humanitarian Pitch Competition for students to pitch their ideas to a panel of judges about how they can address a challenge that a community is experiencing. By utilizing their material engineering background, they should aim to show how improved materials/processes will benefit the community in need. Both undergraduate and graduate students are eligible to participate.

ACerS Lunch with a Pro

Noon – 1:00 p.m. | OCC – ACerS Lounge
To foster relationships between students and professionals in the field, ACerS Young Professionals Network (YPN) will pair students with industry, national lab, and academia professionals over lunch. This is an opportunity for students to ask candid questions about careers in materials science in an informal, intimate setting. Lunch is on your own, as the YPN will simply be linking students with professionals. Students should meet at the ACerS Lounge at noon.

AIST Student Plant Tour

Noon – 4:00 p.m. | OCC – MLK Lobby
AIST will offer students the opportunity to tour EVRAZ Oregon Steel—a plate, coil, and large diameter pipe manufacturer for energy and industrial end markets. Advance registration is required.

Tuesday, October 1

Ceramic Mug Drop Contest

11:15 a.m. – 12:15 p.m. | OCC – Exhibit Hall CD
Mugs fabricated by students from ceramic raw materials are judged on aesthetics and breaking thresholds. Mugs are dropped from varying levels until the breaking threshold is reached. The mug with the highest successful drop distance wins!

Ceramic Disc Golf Contest

12:30 p.m. – 1:30 p.m. | OCC – Exhibit Hall CD
This contest is sure to draw a crowd! Students create discs from ceramic or glass materials to meet certain specifications; the discs are then thrown into a regulation disc golf basket. Each disc will be judged in the categories of farthest distance achieved and artistic merit (aesthetics). The disc that is successfully thrown into the disc golf basket from the farthest distance in the fewest number of shots will be named winner of the Ceramic Disc Golf Contest; the most aesthetically pleasing/creative disc will be recorded as "Best Looking" disc.

ASM Geodesic Dome Design Competition "DomesDay"

10:15 a.m. – 1:30 p.m. | OCC – Exhibit Hall CD
Can these domes take the weight? Join us in the exhibit hall for the display, judging, and selection of winners at the annual ASM Geodesic Dome Design Competition! For more information, visit www.asminternational.org/domesday.

Student Awards Ceremony

2:00 p.m. – 3:00 p.m. | OCC – Exhibit Hall CD
Congratulate the winners of this year's contests: Material Advantage Chapters of Excellence, Student Speaking Contest, Graduate and Undergraduate Poster Contests, Ceramic Mug Drop Contest, Ceramic Disc Golf Contest, TMS Superalloys Awards, AIST/AISI Scholarships, and Keramos National Awards.

Wednesday, October 2

ACerS Lunch with a Pro

Noon – 1:00 p.m. | OCC – ACerS Lounge
To foster relationships between students and professionals in the field, ACerS Young Professionals Network (YPN) will pair students with industry, national lab, and academia professionals over lunch. This is an opportunity for students to ask candid questions about careers in materials science in an informal, intimate setting. Lunch is on your own, as the YPN will simply be linking students with professionals. Students should meet at the ACerS Lounge at noon.

ACerS Student Tour

6:00 a.m. – 7:30 p.m. | Marriott – Lobby
Pacific Northwest National Laboratory (PNNL)
ACerS President's Council of Student Advisors (PCSA) offers students an opportunity to attend an all-day tour at the Pacific Northwest National Laboratory in Richland, Washington. The tour is open to all MS&T19 student registrants. Advance registration is required.

SHORT COURSES

SATURDAY, SEPTEMBER 28

Sintering of Ceramics (ACerS)

Ricardo Castro, University of California, Davis
9:00 a.m. – 4:30 p.m. | Marriott Salon D

This course will focus on the principles and practices of sintering, the important roles it plays in other processes, such as additive manufacturing, nanotechnology, and thin films, and the challenges encountered in the powder sintering process. Students will also learn how to solve problems encountered in producing required target microstructures.

SUNDAY, SEPTEMBER 29

Introduction to Machine Learning for Materials Science (ACerS)

Joshua Tappan, Bryce Meredig, Citrine Informatics;
John Mauro, Pennsylvania State University
8:00 a.m. - Noon | Marriott Salon BC

Attendees will get an overview of machine learning and materials informatics with a focus on tools, platforms, and applications for ceramic and glass research. Instructors will also share case studies and success stories of machine learning in glass and ceramics research.

Metallography for Failure Analysis (ASM)

Frauke Hogue, FASM, Hogue Metallography
8:30 a.m. – 4:30 p.m. | Hilton Portland Downtown Galleria III

This full-day short course will start with a short discussion of documentation for failure investigation followed by suggestions for sample preparation techniques, specific for failure analysis such as fracture cleaning and replication, and different etchants for different purposes. The influence of various manufacturing techniques on the microstructure will be discussed and demonstrated including manufacturing and processing imperfections such as cracks, folds, IGA, decarburization. Additionally, the basic structures of various alloys, their heat treatment, and mechanical properties and failure modes are discussed (steels, cast irons, tool steels, stainless steels, super alloys, titanium, copper, and aluminum). Over two dozen case studies of failures will be presented. In each case, metallography plays a major role.



PORTLAND OREGON

SEPTEMBER 29 – OCTOBER 3, 2019

Net Shape Forming-Conventional Processes or Additive Manufacturing? (ASM)

Howard A. Kuhn, FASM, University of Pittsburgh, America Makes
8:30 a.m.–4:30 p.m. | Hilton Portland Downtown Forum Suite

This full-day short course will aid decisions on adoption of Additive Manufacturing (AM) for production of mechanical and thermal load-bearing parts from the perspective of traditional net shape forming. Beyond the basic knowledge of net shape forming and AM materials and process capabilities, we focus on the shape and material flexibilities of AM to develop a design and manufacturing mindset able to capitalize on design for functionality, optimum-shape processing, leaner manufacturing, and greater sustainability values. Additive manufacturing options are illustrated through successful AM applications, and examples are given of AM for production of tooling for conventional net-shape processes, repair of conventionally manufactured parts, and hybrid (additive/subtractive) manufacturing. Cost comparisons of conventional and AM processes will be given along with supply chain considerations in adoption of AM. Attendees will be able to describe the terminology and physical concepts of both net shape forming and metal additive manufacturing processes; understand the differences between design for manufacturing by net-shape processing and design for functionality by AM; describe the circumstances leading to successful AM applications; recognize opportunities for AM in production of tooling for conventional processes, repair of conventional parts, and hybrid additive/subtractive manufacturing; adapt to the supply chain anomalies of AM; and evaluate the potential for success of AM in a given application.

Sintering of Ceramics (ACerS)

Ricardo Castro, University of California, Davis
9:00 a.m. – 2:30 p.m. | Marriott Salon D

Additive Manufacturing Materials and Processes (TMS)

David L. Bourell, University of Texas at Austin; **Sudarsanam Suresh Babu**, University of Tennessee-Knoxville; **Kirk Rogers**, The Barnes Group Advisors
1:00 p.m. – 5:00 p.m. | Doubletree Roosevelt

The purpose of this popular workshop is to familiarize participants with current Additive Manufacturing (AM) processes; current AM practice for metals, polymers, and ceramics; modeling of AM processes, microstructural evolution, and service properties; and current challenges and research opportunities.

Design for Advanced Manufacturing for Lightweighting Certificate (ASM)

Sunniva Collins, Ph.D., FASM, Case Western Reserve University
1:00 p.m. – 5:00 p.m. | Hilton Portland Downtown Forum Suite

This half-day short course will cover where Additive Manufacturing (AM) technologies can be applied for design or economic advantage. Understand lightweighting AM technologies, trends and applications in transportation industries. Demonstrate problem-solving skills in lightweighting through analysis of case studies. Learn the fundamentals of materials science and how to improve properties such as strength, stiffness and ductility in a wide array of lightweight material options. Attendees will be able to understand the use of advanced materials databases (e.g., Granta) and the impact of key market drivers on the selection criteria for critical applications in the transportation industry. Additionally, learn practical uses of AM and advanced materials in advanced manufacturing and how to diagnose and solve practical problems using AM. Gain insights into practical problems through case study analysis.

THURSDAY, OCTOBER 3

Electroceramics in Modern Technology: Applications and Impact (ACerS)

R.K. Pandey, Texas State University

8:00 a.m. – 4:30 p.m. | Marriott Hawthorne/Laurelhurst

This course covers perovskite oxides, leading members of the electroceramic group, and applications related to emerging electronics and sensor technology. In-depth discussions will include applications like spintronics, magneto-electronics, thin film transparent transistors, actuators and transducers, ceramic transistors, and magnetic sensors. Includes the book, *Fundamentals of Electroceramics: Materials, Devices, and Applications* by the instructor.

FRIDAY, OCTOBER 4

Electroceramics in Modern Technology: Applications and Impact (ACerS)

R.K. Pandey, Texas State University

8:00 a.m. – Noon | Marriott Hawthorne/Laurelhurst



UPCOMING CONFERENCES

Event	Date	Location/Sponsor
Energy and Utilities — Industry Insights and Fundamentals	October 7–10, 2019	Oak Ridge, Tenn., USA – AIST
Engineering Solutions for Sustainability: Materials and Resources 4	October 13–16, 2019	Indianapolis, Ind., USA – AIST
Secondary Steelmaking Refractories — A Practical Training Seminar	October 14–17, 2019	San Antonio, Texas, USA – AIST
Heat Treat 2019	October 15–17, 2019	Detroit, Mich., USA – ASM
Hot Rolling Fundamentals — A Practical Training Seminar with Plate Rolling Fundamentals	October 20–24, 2019	Michigan City, Ind., USA – AIST
Continuous Casting — A Practical Training Seminar	October 21–24, 2019	Memphis, Tenn., USA – AIST
AIST European Steel Forum	October 23–25, 2019	Leoben, Austria – AIST
80 th Conference on Glass Problems	October 28–31, 2019	Columbus, Ohio, USA – ACerS
Making Shaping and Treating of Steel:101	October 29–30, 2019	Milwaukee, Wis., USA – AIST
Managing Technology — ArcelorMittal Dofasco G.P.	November 5–7, 2019	Hamilton, Ontario, Canada – AIST
ISTFA 2019	November 10–14, 2019	Portland, Ore., USA – ASM
World Congress on High Entropy Alloys (HEA 2019)	November 17–20, 2019	Seattle, Wash., USA – TMS
ASM Global Materials Summit	December 3–5, 2019	Marco Island, Fla., USA – ASM
Electronic Materials and Applications 2020 (EMA 2020)	January 22–24, 2020	Orlando, Fla., USA – ACerS
44 th International Conference and Expo on Advanced Ceramics and Composites (ICACC 2020)	January 26–31, 2020	Daytona Beach, Fla., USA – ACerS
Modern Electric Furnace Steelmaking — A Practical Training Seminar	February 3–7, 2020	Portland, Ore., USA – AIST
Long Products Rolling — A Practical Training Seminar	February 10–13, 2020	Jacksonville, Fla., USA – AIST
TMS 2020 Annual Meeting & Exhibition (TMS2020)	February 23–27, 2020	San Diego, Calif., USA – TMS
The Making, Shaping and Treating of Steel: 101	February 24, 2020	Richmond, Va., USA (tentative) – AIST
Cold Rolling Fundamentals — A Practical Training Seminar	March 1–6, 2020	Charleston, S.C., USA – AIST
Scrap Supplements and Alternative Ironmaking	March 2–4, 2020	Lake Buena Vista, Fla., USA – AIST
Heat Treat Mexico	March 3–5, 2020	Queretaro, Mexico – ASM
Digital Transformation Forum for the Steel Industry	March 16–19, 2020	Pittsburgh, Pa., USA – AIST
Shape Memory Regional Conference	May 4–5, 2020	Palm Springs, Calif., USA – ASM
AeroMat 2020	May 4–6, 2020	Palm Springs, Calif., USA – ASM
AISTech 2020	May 4–7, 2020	Cleveland, Ohio, USA – AIST
6 th Ceramics Expo	May 5–6, 2020	Cleveland, Ohio, USA – ACerS
Ceramic Manufacturing Solutions Conference	May 6–7, 2020	Cleveland, Ohio, USA – ACerS
2020 Glass and Optical Materials Division Annual Meeting (GOMD2020)	May 17–21, 2020	New Orleans, La., USA – ACerS
27 th Crane Symposium	June 7–9, 2020	Pittsburgh, Pa., USA – AIST
International Thermal Spray Conference	June 10–12, 2020	Vienna, Austria – ASM
Congress on Safety in Engineering and Industry 2020: Leading Safety into the Future	June 21–24, 2020	Philadelphia, Pa., USA – AIST/TMS
5 th International Congress on 3D Materials Science (3DMS 2020)	June 28–July 1, 2020	Washington, D.C., USA – TMS
Long and Forged Products	July 12–15, 2020	Vail, Colo., USA – AIST
Pan American Ceramics Congress and Ferroelectrics Meeting of the Americas (PACC-FMAs 2020)	July 19–23, 2020	Panama City, Panama – ACerS
The 13 th International Conference on the Technology of Plasticity	July 26–31, 2020	Columbus, Ohio, USA – TMS
Materials Challenges in Alternative & Renewable Energy 2020 (MCARE2020) combined with the 4th Annual Energy Harvesting Society Meeting (AEHSM 2020)	August 16–21, 2020	Bellevue, Wash., USA – ACerS
The 14 th International Symposium on Superalloys (Superalloys 2020)	September 13–17, 2020	Seven Springs, Pa., USA – TMS
IMAT 2020 – International Materials Applications & Technologies Conference & Expo	September 14–17, 2020	Cleveland, Ohio, USA – ASM
Sheet Processing and Finishing Lines	September, 2020	Columbus, Ohio, USA – AIST
MS&T20	October 4–8, 2020	Pittsburgh, Pa., USA – MS&T Team
MS&T21	October 17–21, 2021	Columbus, Ohio, USA – MS&T Team

PORTLAND OREGON

SEPTEMBER 29 – OCTOBER 3, 2019

ORGANIZED BY THE LEADING MATERIALS SOCIETIES:



The American Ceramic Society is the premier global membership organization for the technical ceramics and glass community. Celebrate with us Monday evening at ACerS 121st Annual Honors and Awards Banquet for the induction of the 2019 Class of Fellows and awards presentations. The Society's prestigious award lectures will be presented at MS&T19: **ACerS/EPDC Arthur L. Friedberg Ceramic Engineering Tutorial and Lecture, Frontiers of Science and Society—Rustum Roy Lecture, Edward Orton, Jr. Memorial Lecture, Robert B. Sosman Lecture**, and ACerS' newest award, **Navrotsky Award for Experimental Thermodynamics of Solids**. All attendees are welcome to attend the ACerS lectures. Be sure to stop by the member lounge to relax between sessions, network with peers, hear what's new with the Society, and more. ceramics.org



The **Association for Iron & Steel Technology** is a non-profit entity with over 17,500 members from more than 70 countries. AIST is recognized as a global leader in networking, education and sustainability programs for advancing iron and steel technology. Serving the entire iron and steel community, including steel manufacturers, suppliers, consumers and academics, our mission is to advance the technical development, production, processing and application of iron and steel. The Iron and Steel symposia is just one of the highlights for AIST members. The **Adolf Martens Memorial Steel Lecture** is part of the plenary session beginning at 8 a.m. on Tuesday, October 1. Students with an interest in steel are encouraged to attend the Steel to Students Reception on Monday, 30 September! AIST.org



ASM International (ASM) is the world's largest and foremost professional technical society serving the information needs of scientists, engineers, and technicians who develop, test, select, and apply advanced materials, including metals, composites, polymers, and ceramics. With over 25,000 members and 80-plus professional chapters worldwide, ASM engages and connects members to a global network of peers and provides access to trusted materials information through reference content and data, education courses, international events, and applied research. Join us Monday for the **ASM Women in Materials Engineering Breakfast**, the **Alpha Sigma Mu Lecture**, and attend the **ASM Leadership Awards Luncheon**, where ASM Materials Education Foundation, Committee/Council and ASM organizational unit awards will be presented. Attend **ASM's Annual Meeting** where officers will be elected for the 2019-2020 term. On Tuesday, attend the **ASM/TMS Distinguished Lecture** in Materials and Society as included in the Plenary Session. Additionally, ASM will host the **ASM Dome Design Competition** sponsored by the ASM Student Board Members, and the **Edward DeMille Campbell Memorial Lecture** will be presented. You won't want to miss the **ASM Awards Dinner** on Tuesday evening! Join us in celebrating the accomplishments of this year's award recipients and the 2019 Class of Fellows. Tickets, which include the President's Reception, can be purchased via the registration form. asminternational.org



The Minerals, Metals & Materials Society (TMS) is a member-driven international professional society dedicated to fostering the exchange of learning and ideas across the entire range of minerals, metals, and materials science and engineering, from minerals processing and primary metals production, to basic research and the advanced applications of materials. Included among its nearly 14,000 professional and student members are metallurgical and materials engineers, scientists, researchers, educators, and administrators from more than 80 countries on six continents. TMS invites attendees to join us on Tuesday for the **TMS Young Professional Tutorial Lecture**, featuring Mark Asta from the University of California, Berkeley, and for the **ASM/TMS Joint Distinguished Lecture in Materials and Society**, delivered by the University of Waterloo's Carolyn Hansson as part of the MS&T plenary session. TMS.org

CO-SPONSORED BY:



NACE International, The Worldwide Authority Corrosion Society, is the world's largest and most recognized association for corrosion control. With over 36,000 members in 140 countries, NACE International is dedicated to protecting people, assets and the environment from the effects of corrosion. The association is involved in every industry and area of corrosion prevention and control, from chemical processing and water systems, to transportation and infrastructure protection. nace.org

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TMS
The Minerals, Metals & Materials Society

TECHNICAL PROGRAM

Technical Meeting and Exhibition

MST19

MATERIALS SCIENCE & TECHNOLOGY

SEPTEMBER 29 – OCTOBER 3, 2019

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WHERE MATERIALS INNOVATION HAPPENS

Organizers:



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Program Highlights

MS&T19 Plenary Session	TUE	AM	Portland Ballroom 251/257/258	58
MS&T18 Poster Session	TUE	AM & PM	Exhibit Hall CD	132
ACerS Basic Science Division Robert B. Sosman Lecture	WED	PM	Portland Ballroom 253	99
ACerS Frontiers of Science and Society - Rustum Roy Lecture	TUE	PM	Portland Ballroom 253	58
ACerS GOMD Alfred R. Cooper Award Session	TUE	PM	A106	68
Acers Navotsky Award for Experimental Thermodynamics of Solids	MON	AM	B119	37
ACerS Richard M. Fulrath Award Symposium	MON	PM	Portland Ballroom 253	39
ACerS/EPDC: Arthur L. Friedberg Ceramic Engineering Tutorial and Lecture	MON	AM	Portland Ballroom 253	16
Alpha Sigma Mu Lecture	MON	PM	Portland Ballroom 254	44
ASM Edward DeMille Campbell Memorial Lecture	TUE	PM	Portland Ballroom 254	64
ASM-IMS Henry Clifton Sorby Lecture	TUE	PM	F152	66

Additive Manufacturing

Additive Manufacturing Education

Session I	MON	AM	B111	16
Session II	MON	PM	B111	39

Additive Manufacturing of Glass, Ceramics and Composites

Additive Manufacturing of Glass, Ceramics and Composites I	MON	AM	B113	17
Additive Manufacturing of Glass, Ceramics and Composites II	MON	PM	B113	40
Additive Manufacturing of Glass, Ceramics and Composites III	TUE	PM	B113	59
Additive Manufacturing of Glass, Ceramics and Composites IV	WED	AM	B113	79
Additive Manufacturing of Glass, Ceramics and Composites V	WED	PM	B113	100
Poster Session	TUE	PM	Exhibit Hall CD	139

Additive Manufacturing of Metals: Microstructure and Material Properties of Nickel-based Alloys

Optimization of AM Processes for Ni-based Alloys	MON	AM	B117	17
Characterization of Microstructure of AM Ni-based Alloys	MON	PM	B117	40
Microstructure and Properties of Alloy 718	TUE	PM	B117	60
Properties and Performance of AM Materials	WED	AM	B117	79
AM Process - Microstructure - Properties	WED	PM	B117	100

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development

Additive Manufacturing of Fe-based Alloys	MON	AM	B115	18
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Additive Manufacturing of Al-based Alloys	MON	PM	B115	41
Additive Manufacturing of Novel Materials	TUE	PM	B115	60
Additive Manufacturing of Miscellaneous Non-ferrous Alloys	WED	AM	B115	80
Additive Manufacturing: Design, Modeling, Simulations, Defects and Inspection	WED	PM	B115	101
Additive Manufacturing of Composite Materials and Composite Like Structures	THU	AM	B115	119
Additive Manufacturing: Materials, Solidification, Controlled Growth, Properties and Testing	THU	AM	B114	120
Additive Manufacturing: Poster Session I	TUE	PM	Exhibit Hall CD	113
Additive Manufacturing: Poster Session II	TUE	PM	Exhibit Hall CD	140
Additive Manufacturing of Metals: Post Processing				
HIP and Heat Treatment I	TUE	PM	B110	61
HIP and Heat Treatment II	WED	AM	B110	80
Surface Modification	WED	PM	B110	101
Various Post Treatments	THU	AM	B110	120
Poster Session	TUE	PM	Exhibit Hall CD	140
Additive Manufacturing: Effective Production, Characterization, and Recycling of Powder Materials				
Production and Recycling	MON	AM	B116	18
Characterization	MON	PM	B116	41
Poster Session	TUE	PM	Exhibit Hall CD	140
Additive Manufacturing: In-situ Process Monitoring and Control				
Imaging Methods	MON	AM	B112	19
Miscellaneous Methods	MON	PM	B112	42
Modeling Methods	TUE	PM	B112	61
Poster Session	TUE	PM	Exhibit Hall CD	140
Additive Manufacturing: Microstructure and Material Properties of Titanium-based Alloys				
Laser Powder Bed Fusion - Session I	TUE	PM	B116	61
Electron Beam Powder Bed Fusion	WED	AM	B116	81
Directed Energy Deposition and Other Technologies	WED	PM	B116	102
Laser Powder Bed Fusion - Session II	THU	AM	B116	121
Poster Session	TUE	PM	Exhibit Hall CD	140
Additive Manufacturing: Solid-state and Other Nonbeam-based Technologies for the Manufacturing of Metallic Parts				
AM by Friction Stir Welding and Cold Spray Methods	MON	AM	B114	19
AM by Methods Requiring a Sinter Step	MON	PM	B114	42
AM by Wire Arc and Plasma Melting Methods	TUE	PM	B114	62
Poster Session	TUE	PM	Exhibit Hall CD	141

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Corrosion of Additively Manufactured Metals

Corrosion of Additively Manufactured Metals I	WED	AM	B112	86
Corrosion of Additively Manufactured Metals II	WED	PM	B112	107
Poster Session	TUE	PM	Exhibit Hall CD	142

Late News Poster Session

Additive Manufacturing	TUE	PM	Exhibit Hall CD	147
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Biomaterials

Advanced Biomaterials for Biomedical Implants and Biosensing Devices

Session I	MON	AM	C120	20
Session II	MON	PM	C120	43
Poster Session	TUE	AM	Exhibit Hall CD	133

Next Generation Biomaterials

Next Generation Biomaterials I	MON	AM	C122	34
Next Generation Biomaterials II	MON	PM	C122	54
Next Generation Biomaterials III	TUE	PM	C122	73
Next Generation Biomaterials IV	WED	AM	C122	93
Next Generation Biomaterials V	WED	PM	C122	114
Next Generation Biomaterials VI	THU	AM	C122	128
Poster Session	TUE	AM	Exhibit Hall CD	135

Surface Properties of Biomaterials

Novel Biomaterials, Devices, and Test Methods	MON	AM	C121	36
Cell-Biomaterial Interactions	MON	PM	C121	56
Additive Manufactured & Surface-modified Biomaterials	TUE	PM	C121	76
Composite Biomaterials	WED	AM	C121	96
Poster Session	TUE	AM	Exhibit Hall CD	136

Late News Poster Session

Biomaterials	TUE	AM	Exhibit Hall CD	136
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Ceramic and Glass Materials

ACerS Robert B. Sosman Award Symposium: From Carbides to Carbons - from Bulk to Nano

Session I	WED	AM	Portland Ballroom 253	78
Session II	WED	PM	Portland Ballroom 253	99

Alumina at the Forefront of Technology III

Alumina at the Forefront of Technology III	MON	AM	A104	22
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Ceramic and Crystal Materials for Optics and Photonics

Session I	MON	AM	A107	23
Session II	MON	PM	A107	44

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TUE	PM	A107	65

Session III

Ceramics and Glasses Simulations and Machine Learning

Machine Learning and Materials Informatics	MON	AM	A109	23
Multi-scale Simulations of Ceramics and Glasses	MON	PM	A109	45
First Principle Simulations of Ceramics and Glasses	TUE	PM	A109	65

Glass, Amorphous, and Optical Materials: Common Issues within Science & Technology

Advanced Characterizations of Glasses and Glass-ceramics	MON	AM	A106	27
Modeling and Simulations of Glass Materials	MON	PM	A106	48
ACerS GOMD Alfred R. Cooper Award Session	TUE	PM	A106	68
Glass-environment Interactions	WED	AM	A106	88
Advances in Understanding Glassy State and Glass Transition	WED	PM	A106	109
Novel Processing and Functional Applications of Glass Materials	THU	AM	A106	125
Poster Session	TUE	AM	Exhibit Hall CD	134

International Symposium on Ceramic Matrix Composites

CMC I	WED	AM	A103	90
CMC II	WED	PM	A103	111
CMC III	THU	AM	A103	127
Poster Session	TUE	AM	Exhibit Hall CD	135

Phase Transformations in Ceramics: Science and Applications

Experimental Studies on Structure and Control I	TUE	PM	A104	73
Experimental Studies on Structure and Control II	WED	AM	A104	94
Prediction and Novel Methods I	WED	PM	A104	114
Prediction and Novel Methods II	THU	AM	A104	129

Late News Poster Session

Ceramic and Glass Materials	TUE	AM	Exhibit Hall CD	137
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Electronic and Magnetic Materials

Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder

Interface Stability in Advanced Interconnects	TUE	PM	A108	64
Environmental Effect and Current Stressing in Advanced Interconnects	WED	AM	A108	82

Advances in Dielectric Materials and Electronic Devices

Dielectrics and Piezoelectrics: Session I Modeling and Related	MON	AM	A105	21
Dielectrics and Piezoelectrics: Session II Synthesis and Growth	MON	PM	A105	43
Ferroics and Multiferroics: Session I	TUE	PM	A105	64
Ferroics and Multiferroics: Session II	WED	AM	A105	83
Ferroics and Related Materials	WED	PM	A105	103
Poster Session	TUE	AM	Exhibit Hall CD	133

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Semiconductor Heterostructures: Theory, Growth, Characterization, and Device Applications

Semiconductor Heterostructures	WED	PM	C121	116
Poster Session	TUE	AM	Exhibit Hall CD	136

137Late News Poster Session

Electronic and Magnetic Materials	TUE	AM	Exhibit Hall CD	137
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Energy

Hybrid Organic-Inorganic Materials for Alternative Energy

Photovoltaics	TUE	PM	E147	69
Energy Storage	WED	AM	E147	89
Hybrids for Alternative Energy I	WED	PM	E147	110
Hybrids for Alternative Energy II	THU	AM	E147	126
Poster Session	TUE	PM	Exhibit Hall CD	143

Hydrogen Effects on Materials Performance

Hydrogen Effects on Steels	MON	AM	E146	28
Hydrogen Effects on High Entropy Alloys and Superalloys	MON	PM	E146	49
Advanced Computational and Experimental Methods for Probing Hydrogen-Materials Interactions	TUE	PM	E146	69

Materials for Nuclear Applications

Metallic Systems	MON	AM	E148	29
Nuclear Fuels and Cladding	MON	PM	E148	51
Fundamentals of Radiation Effects	TUE	PM	E148	71
Carbide and Advanced Reactor Materials	WED	AM	E148	92
Poster Session	TUE	PM	Exhibit Hall CD	144

Materials Issues in Nuclear Waste Management

Materials Issues in Nuclear Waste Technology I: Properties of Nuclear Waste Forms: Modeling, Experiments, and Applications	MON	AM	E147	30
Materials Issues in Nuclear Waste Technology II: Properties of Nuclear Waste Forms: Modeling, Experiments, and Applications	MON	PM	E147	51
Poster Session	TUE	PM	Exhibit Hall CD	144

Late News Poster Session

Energy	TUE	PM	Exhibit Hall CD	147
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Failure Analysis

Failure Analysis & Characterization

Tools & Techniques	MON	AM	F150	25
Fatigue & Failure I	MON	PM	F150	47
Environmentally Assisted Failures	TUE	PM	F150	67
Fatigue & Failure II	WED	PM	F150	108

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PROGRAM AT-A-GLANCE

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Microanalysis, Microscopy and Metallography in Failure Analysis (Joint FAS-IMS)

THU	AM	F150	124
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Failure Analysis: Industry Specific Failures

Aerospace	MON	AM	F151	26
Non-Metallic Failures	MON	PM	F151	48
Boilers, Pressure Vessels, Welding & Joining Failures	TUE	PM	F151	67
Agricultural, Forestry & Logging Failures	WED	AM	F151	87
Process-Related Failures	WED	PM	F151	108

Failure Prevention and Unconventional Failures

Unusual & Unconventional Failures & Failure Analysis	WED	AM	F149	87
Failure Prevention	THU	AM	F149	125

Late News Poster Session

Failure Analysis	TUE	AM	Exhibit Hall CD	137
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Fundamentals and Characterization

Actinide and Lanthanide Materials III

Fuels	TUE	PM	C120	59
Oxides, Compounds, Metals	WED	AM	C120	78

Alloy Design for Additive Manufacturing: Developing New Feedstock Materials

Development of Alloy Feedstocks	WED	AM	B111	84
Computational Materials Design and Advanced Characterization	WED	PM	B111	104

Bulk Metallic Glasses and their Composites – Progresses, Outcomes and Prospects

Mechanical Properties	WED	AM	E146	84
Glass Formation, Crystallization and Serration	WED	PM	E146	105
Helium Irradiation Effects in Materials	THU	AM	E146	122

Characterization and Modeling of Metal Whisker Formation

Sn Whisker Formation	MON	AM	E142	24
Whisker Ubiquity and Mitigation	MON	PM	E142	45

Characterization of Materials and Properties through Metallography, Mechanical Testing and Analysis - From Fundamentals to the Cutting Edge

Metallographic Preparation Techniques from Fundamentals to Novel Solutions	MON	AM	F152	24
Microstructural Characterization and the Correlation of Microstructure to Mechanical Properties I	MON	PM	F152	45
Quantification, Classification and Simulation of Microstructures and Properties I	TUE	PM	F152	66
Quantification, Classification and Simulation of Microstructures and Properties II	WED	AM	F152	85
Microstructural Characterization and the Correlation of Microstructure to Mechanical Properties II	WED	PM	F152	106

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Microstructural Characterization and the Correlation of Microstructure to Mechanical Properties III

THU	AM	F152	123
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Poster Session

TUE	PM	Exhibit Hall CD	142
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Data Science for Material Property Interpretation

Machine Learning with Microscopy Data

MON	AM	E145	25
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Dimensionality Reduction and Insight Generation from Materials Data

MON	PM	E145	46
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Machine Learning Applications to Materials Data

TUE	PM	E145	66
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Poster Session

TUE	PM	Exhibit Hall CD	143
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Emergent Materials under Extremes and Decisive In-situ Characterizations

Decisive In-situ Characterizations

MON	PM	D137	47
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Pressure-induced Dramatic Changes in Structures and Properties I

WED	AM	E145	87
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Materials under Irradiation and Beyond

WED	PM	E145	108
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Pressure-induced Dramatic Changes in Structures and Properties II

THU	AM	E145	124
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Grain Boundaries, Interfaces, and Surfaces in Functional Materials: Fundamental Structure-Property-Performance Relationships

Modeling of Interface Structure, Chemistry and Transport

MON	AM	E143	27
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Ferroelectricity/Nanocrystalline and Nanoparticulate Materials

MON	PM	E143	49
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Interfaces in Energy Storage and Conversion Materials

TUE	PM	E143	68
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Characterization of Interface Properties

WED	AM	E143	89
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Interface Evolution During Materials Processing and Deformation

WED	PM	E143	109
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Poster Session

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PSDK XIV: Phase Stability and Diffusion Kinetics

Gibbs: Ab Initio and CALPHAD Modeling

MON	AM	E144	35
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Gibbs: Phase Equilibria, Diffusion and Materials Design

MON	PM	E144	56
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Thermodynamics and Modeling

TUE	PM	E144	74
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Diffusion and Kinetics

WED	AM	E144	95
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Applications of Thermodynamics and Diffusion

WED	PM	E144	115
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Software Development

THU	AM	E144	130
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Sandphobic Thermal/Environmental Barrier Coatings

Sandphobic Thermal/Environmental Barrier Coatings I

WED	PM	C120	116
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Sandphobic Thermal/Environmental Barrier Coatings II

THU	AM	C120	130
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Late News Poster Session

Fundamentals and Characterization

TUE	PM	Exhibit Hall CD	148
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PROGRAM AT-A-GLANCE

Iron and Steel (Ferrous Alloys)

Advanced High Strength Steels / From Design to End Users

Steel Design	MON	AM	C124	20
Steel Processing & Applications	TUE	PM	C124	62
Poster Session	TUE	PM	Exhibit Hall CD	141

Advances in Understanding of Martensite in Steels

Design & Modeling	WED	AM	C125	83
Characterization & Properties	WED	PM	C125	104
Transformations & Crystallography	THU	AM	C125	122

Advances in Zinc-coated Sheet Steel Processing and Properties

Advances in Zinc-coated Sheet Steel Processing and Properties	MON	PM	C125	44
Poster Session	TUE	PM	Exhibit Hall CD	142

Applications of Modern Characterization Techniques to Ferrous Alloys and Steel Products

Applications of Modern Characterization Techniques to Ferrous Alloys and Steel Products I	WED	PM	C124	105
Applications of Modern Characterization Techniques to Ferrous Alloys and Steel Products II	THU	AM	C124	122

Formability and Fracture of Metal Sheets

Formability and Fracture of Metal Sheets I	TUE	PM	C123	68
Formability and Fracture of Metal Sheets II	WED	AM	C123	88
Poster Session	TUE	PM	Exhibit Hall CD	143

Gas/Metal Reactions, Diffusion, and Phase Transformation during Heat Treatment of Steel

Gas/Metal Reactions, Diffusion, and Phase Transformation during Heat Treatment of Steel	MON	AM	C123	26
Poster Session	TUE	PM	Exhibit Hall CD	143

Retained Austenite for High and Ultrahigh Strength Steels

Retained Austenite for High and Ultrahigh Strength Steels	TUE	PM	C125	75
Poster Session	TUE	PM	Exhibit Hall CD	145

Thermomechanical Processing in Shaping and Forming of Steels

Thermomechanical Processing in Shaping and Forming of Steels I	WED	PM	C123	118
Thermomechanical Processing in Shaping and Forming of Steels II	THU	AM	C123	131
Poster Session	TUE	PM	Exhibit Hall CD	146

Late News Poster Session

Iron and Steel (Ferrous Alloys)	TUE	PM	Exhibit Hall CD	148
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Materials-Environment Interactions

Advanced Coatings for Wear and Corrosion Protection

Advanced Coatings for Wear and Corrosion Protection I	TUE	PM	B118	62
Advanced Coatings for Wear and Corrosion Protection II	WED	AM	B118	81
Advanced Coatings for Wear and Corrosion Protection III	WED	PM	B118	102
Poster Session	TUE	PM	Exhibit Hall CD	141

Advanced Materials for Harsh Environments

Session I	MON	AM	C126	21
Session II	MON	PM	C126	43
Session III	TUE	PM	C126	63

Advanced Materials for Oil and Gas Applications - Performance and Degradation

Advanced Materials for Oil and Gas Applications - Performance and Degradation	TUE	PM	B111	63
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Crosscutting Issues in Corrosion of Materials: Control, Monitoring, Mitigation and Material Selection

Cross-cutting Applications of Steel and Its Corrosion Protection	WED	AM	B119	86
Cross-cutting Corrosion Technologies	WED	PM	B119	107
Cross-cutting Issues in Lightweight Alloy Corrosion	THU	AM	B119	124

Materials vs Minerals: Bridging the Gap between Materials Science and Earth and Planetary Science

Session I	MON	AM	F149	30
Session II	MON	PM	F149	52

Substrate Protection for Corrosion Prevention

Session I	MON	AM	B118	36
Session II	MON	PM	B118	56
Poster Session	TUE	PM	Exhibit Hall CD	146

Thermal Protection Materials and Systems

TPS Computational Methods & Approaches/TPS Materials Development & Testing I	WED	AM	B114	97
TPS Materials Development and Testing II	WED	PM	B114	118

Thermodynamics of Materials in Extreme Environments

Thermodynamic Studies of Nuclear Materials I	MON	AM	B119	37
Thermodynamic Studies of Nuclear Materials II	MON	PM	B119	57
Thermodynamics and Long Term Stability of Materials for Fuel Cells and Other Energy Applications	TUE	PM	B119	77
Experimental and Computational Thermodynamics of Protective Barriers and Reactivity of Materials under Extreme Conditions	WED	AM	C124	98

Late News Poster Session

Materials-Environment Interactions	TUE	PM	Exhibit Hall CD	148
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PROGRAM AT-A-GLANCE

Modeling

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales

Session I	MON	AM	G132	28
Session II	MON	PM	G132	50
Session III	TUE	PM	G132	70
Session IV	WED	AM	G132	90
Session V	WED	PM	G132	110
Session VI	THU	AM	G132	126
Poster Session	TUE	AM	Exhibit Hall CD	134

Modeling Variability of Mechanical Behavior through ICME Techniques with Emphasis on Verification, Validation & Uncertainty Quantification

Additive Manufacturing	MON	AM	D135	32
Data Science	MON	PM	D135	53
Uncertainty Quantification	TUE	PM	D135	72
Poster Session	TUE	AM	Exhibit Hall CD	135

Multi-scale Modeling of Microstructure Deformation in Material Processing

Multi-scale Modeling of Microstructure Deformation in Material Processing I	MON	AM	D134	32
Multi-scale Modeling of Microstructure Deformation in Material Processing II	MON	PM	D134	53
Poster Session	TUE	AM	Exhibit Hall CD	135

Nanomaterials

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials

Metal and Semiconductor Nanostructures	MON	PM	C123	46
Rational Design and Synthesis of Nanostructures	TUE	PM	D134	66
Ceramic Nanostructures and Energy Applications	WED	AM	D134	85
2D Nanomaterials & Polymer-derived Ceramics	WED	PM	D134	106
Poster Session	TUE	AM	Exhibit Hall CD	134

Nanostructured Materials under Extreme Environments

Materials Designed for Radiation Environment I	MON	AM	D133	33
Mechanisms, Microstructure Evolution, and Mechanical Properties of Nanostructured Materials I	MON	PM	D133	54
Materials Designed for Radiation Environment II	TUE	PM	D133	72
Mechanisms, Microstructure Evolution, and Mechanical Properties of Nanostructured Materials II	WED	AM	D133	93
Materials under Radiation, High-temperature, and Other Extreme Environments	WED	PM	D133	113

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry

Session I	MON	PM	C124	54
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Session II	WED	AM	C126	93
Session III	WED	PM	C126	113
Session IV	THU	AM	C126	128

Late News Poster Session

Nanomaterials	TUE	AM	Exhibit Hall CD	138
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Processing and Manufacturing

11th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing

Novel Materials Processing Paradigm I	MON	AM	Portland Ballroom 255	16
Novel Materials Processing Paradigm II	MON	PM	Portland Ballroom 255	38
Novel Materials Design for Sustainable Society	TUE	PM	Portland Ballroom 255	58
Energy, Sustainability, and Biobased Materials I	WED	AM	Portland Ballroom 255	77
Energy, Sustainability, and Biobased Materials II	WED	PM	Portland Ballroom 255	99
Design and Development of Sustainable Technologies	THU	AM	Portland Ballroom 255	119
Poster Session	TUE	PM	Exhibit Hall CD	138

Advanced Manufacturing, Processing, Characterization and Modeling of Functional Materials

Additive Manufacturing of Functional Materials	WED	AM	D136	82
NiTiHf Alloys	WED	PM	D136	103
Magnetic and Other SMAs	THU	AM	D136	121
Poster Session	TUE	PM	Exhibit Hall CD	141

Advances in Surface Engineering

Session I	MON	AM	D137	22
Poster Session	TUE	PM	Exhibit Hall CD	142

Boron Based Materials and Coatings: Structure, Properties, Processing, and Applications

Boron Based Materials and Coatings: Structure, Properties, Processing, and Applications	TUE	PM	E141	65
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Joining of Advanced and Specialty Materials XXI

Friction and Friction Stir Welding I	MON	AM	Portland Ballroom 252	29
Friction and Friction Stir Welding II / Welding Proceses	MON	PM	Portland Ballroom 252	50
Welding in the Automotive Industry / Joining, Brazing and Adhesive of Advanced Materials	TUE	PM	Portland Ballroom 252	70
Micro and Nano-Joining / Steel Welding I	WED	AM	Portland Ballroom 252	91

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	Date	StartTime	Room	Page
Welding Metallurgy / Steel Welding II	WED	PM	Portland Ballroom 252	111
Dissimilar Materials Joining	THU	AM	Portland Ballroom 252	127
Poster Session	TUE	PM	Exhibit Hall CD	143
Light Metal Technology				
Aluminum Technology	TUE	PM	D138	70
Magnesium Technology	WED	AM	D138	92
Processing Technology I	WED	PM	D138	112
Processing Technology II	THU	AM	D138	128
Poster Session	TUE	PM	Exhibit Hall CD	144
Mechanochemical Synthesis and Reactions in Materials Science IV				
Session I	MON	AM	E141	31
Session II	MON	PM	E141	52
Poster Session	TUE	PM	Exhibit Hall CD	144
Metal and Polymer Matrix Composites IV				
Polymer Matrix Composites I	MON	AM	D136	31
Polymer Matrix Composites II	MON	PM	D136	52
Metal Matrix Composites	TUE	PM	D136	71
Metamorphic Manufacturing – Incremental Deformation Processing for Agile, High-quality Metallic Component Production				
Metamorphic Manufacturing I: Concepts and Pathways	MON	AM	D138	32
Metamorphic Manufacturing II: Microstructures by Design	MON	PM	D138	52
Multifunctional Ceramic- and Metal-matrix Composites: Processing, Microstructure, Properties and Performance				
Characterization and Properties of Ceramic and Metal Matrix Composites	MON	AM	C125	33
Poster Session	TUE	PM	Exhibit Hall CD	145
Powder Metallurgy of Light, Reactive and Other Non-ferrous Metals				
Metal Injection Moulding and Powder Processing	TUE	PM	F149	74
Powder Metallurgy of Titanium, Aluminium, Magnesium and Calcium I	WED	AM	D135	94
Powder Metallurgy of Titanium, Aluminium, Magnesium and Calcium II	WED	PM	D135	115
Powder Metallurgy of Superalloys, Amorphous Metal Powder and Molybdenum-Silicon-Boron Alloy	THU	AM	D135	129
Poster Session	TUE	PM	Exhibit Hall CD	145
Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work – Rustum Roy Symposium				
Session I	MON	AM	D139	35
Session II	MON	PM	D139	55

Date	StartTime	Room	Page
TUE	PM	D139	74
TUE	PM	Exhibit Hall CD	145

Session III

Poster Session

Sintering and Related Powder Processing Science and Technologies

Fundamentals of Sintering	TUE	PM	E142	75
Characterization of Sintering	WED	AM	E142	95
Advanced Sintering Techniques	WED	PM	E142	117
SPS Sintering	THU	AM	E142	130
Poster Session	TUE	PM	Exhibit Hall CD	145

Surface Protection for Enhanced Materials Performance: Science, Technology, and Application

CMAS Degradation and Mitigation / Environmental Barrier Coatings	TUE	PM	D137	76
Thermal Barrier Coatings / Ceramic Coatings Formed by Aerosol Deposition I	WED	AM	D137	96
Ceramic Coatings Formed by Aerosol Deposition II / Coatings and Surface Modifications for Oxidation, Corrosion, and Wear Resistance	WED	PM	D137	117
Poster Session	TUE	PM	Exhibit Hall CD	146

Synthesis, Characterization, Modeling and Applications of Functional Porous Materials

Porous Materials I	WED	AM	D139	97
Porous Materials II	WED	PM	D139	118
Porous Materials III	THU	AM	D139	131
Poster Session	TUE	PM	Exhibit Hall CD	146

Ultra High Performance Metallic Systems for Aerospace, Defense, and Automotive Applications

Shape Memory Alloys, Bulk Metallic Glasses and Functionally Graded Materials	MON	AM	D140	37
Titanium, Aluminum and Hierarchical Materials	MON	PM	D140	57
High Entropy Alloys and High Temperature Materials	TUE	PM	D140	77
Ultrafine Grain and Severe Plastic Deformation Influence on Materials	WED	AM	D140	98
Poster Session	TUE	PM	Exhibit Hall CD	146

Late News Poster Session

Processing and Manufacturing	TUE	PM	Exhibit Hall CD	149
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Special Topics

Activating Allies: Navigating the Intersectional Landscape of Diversity & Inclusion

Abolishing the "Other" - How Intersectionality Challenges Our Current Approaches to Inclusion of People of Minority Identity	MON	PM	A104	39
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Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the Way): The Elizabeth Judson Memorial Symposium

ABET Changes and Visit Success	MON	AM	A108	24
Improving Materials Education	MON	PM	A108	46

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Global Young Investigators Forum

Global Young Investigator's Forum: Session I	WED	AM	A109	89
Global Young Investigator's Forum: Session II	WED	PM	A109	109
Poster Session	TUE	AM	Exhibit Hall CD	134

Journal of the American Ceramic Society Awards Symposium

JACerS Award Symposium Session I	WED	AM	A107	91
JACerS Award Symposium Session II	WED	PM	A107	112

Perspectives for Emerging Materials Professionals

Session I	MON	AM	B110	34
Session II	MON	PM	B110	55

Undergraduate Global University

What to Expect Post Bachelor's Degree I	MON	AM	A103	38
What to Expect Post Bachelor's Degree II	MON	PM	A103	58



11th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Novel Materials Processing Paradigm I

Program Organizers: Surojit Gupta, University of North Dakota; Yiquan Wu, Alfred University; Hisayuki Suematsu, Nagaoka University of Technology; John Wolodko, University of Alberta; Christopher Taylor, DNV GL; Junichi Tatami, Yokohama National University; Enrico Bernardo, University of Padova; Zhengyi Fu, Wuhan University of Technology; Rajiv Asthana, University of Wisconsin; Allen Appleb, Oklahoma State University; Richard Sisson, Worcester Polytechnic Institute; Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Mritunjay Singh, Ohio Aerospace Institute

Monday AM Room: Portland Ballroom 255
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Junichi Tatami, Yokohama National University; Yiquan Wu, Alfred University; Bai Cui, University of Nebraska-Lincoln; Manabu Fukushima, National Institute of Advanced Industrial Science and Technology

8:00 AM
Manufacturing Potential of Flash Sintering: *Rishi Raj*¹; ¹University of Colorado

8:20 AM Invited
Laser Shock Processing of Ceramic Materials: *Bai Cui*¹; Fei Wang¹; Xueliang Yan¹; Chenfei Zhang¹; Leimin Deng¹; Michael Nastasi¹; Yongfeng Lu¹; ¹University of Nebraska Lincoln

8:40 AM Invited
Mechanism of Microwave Activation on Molybdenite: Shuang-ping Yang¹; *Qihang Liu*¹; Miao Wang¹; ¹Xi'an University of Architecture and Technology

9:00 AM Invited
Pressureless Densification, Microstructure Tailoring and Performance Optimization of Ta_{0.8}Hf_{0.2}C Solid Solution Ultra-high Temperature Ceramics: *Jie Yin*¹; Xuejian Liu¹; Zhengren Huang¹; ¹Shanghai Institute of Ceramics Chinese Academy of Sciences

9:20 AM
Properties, Microstructures and Modeling of Gelation-freezing Derived Ceramic Thermal Insulators: *Manabu Fukushima*¹; Hideki Hyuga¹; Yu-ichi Yoshizawa¹; ¹National Institute of Advanced Industrial Science and Technology (AIST)

9:40 AM Invited
Processing of ZnS and Cr-doped ZnS Infrared Transparent Ceramics: *Yiyu Li*¹; Yiquan Wu¹; ¹Alfred University

10:00 AM Invited
Novel Single Crystals for Electro-optical Applications: Growth and Characterization: *Kiyoshi Shimamura*¹; Encarnación García Villora¹; ¹National Institute for Materials Science

10:20 AM Break

10:40 AM Invited
Improving the Accident-tolerance of Zircaloy Cladding by Gradient Ceramic Coating: *Jie Zhang*¹; ¹Institute of Metal Research, Chinese Academy of Sciences

11:00 AM Invited
Polymer Derived High Temperature Ti-SiOC: *Kathy Lu*¹; Ni Yang¹; ¹Virginia Polytechnic Institute

11:20 AM Invited
Reaction-bonded Microwave and Flash Sintering of SiC-B4C Composites: *Raymond Brennan*¹; Selva Raju²; Michael Kornecki³; ¹U.S. Army Research Laboratory; ²ORAU; ³SURVICE Engineering

11:40 AM Invited
Synthesis of Coarser and Equiaxed h-BN Particles from B₄C by Adding Alkali Earth Compounds and Firing in NH₃ Gas: *Junichi Tatami*¹; Midori Sotokawa¹; Takanoki Wakata¹; Motoyuki Iijima¹; ¹Yokohama National University

12:00 PM Invited
Towards the Processing of Transparent Ceramics without Pressure Assisted Sintering: *Ricardo Castro*¹; Joao Rodrigues Neto¹; ¹University of California, Davis

ACerS/EPDC: Arthur L. Friedberg Ceramic Engineering Tutorial and Lecture

Monday AM Room: Portland Ballroom 253
September 30, 2019 Location: Oregon Convention Center

9:00 AM Invited
Redefining Material Design Paradigms for Next Generation Optical Materials: *Kathleen Richardson*¹; ¹University of Central Florida

Additive Manufacturing Education — Session I
Program Organizers: Somayeh Pasebani, Oregon State University; Hang Yu, Virginia Polytechnic Institute and State University; Amy Elliott, Oak Ridge National Laboratory

Monday AM Room: B111
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Amy Elliott, Oak Ridge National Laboratory; Hang Yu, Virginia Polytechnic Institute and State University

8:00 AM Invited
Additive Manufacturing Education at Georgia Tech: *David Rosen*¹; ¹Georgia Institute of Technology

8:30 AM Invited
Data Analytics for Metal Additive Manufacturing: *Amir Mostafaei*¹; Nihal Sivakumar¹; David Crockett¹; Anthony Rollett¹; ¹Carnegie Mellon University

9:00 AM Invited
Engineering Better Additive Manufacturing Education: Leveraging Research-based Approaches to Prepare the Future Workforce: *Nicholas Meisel*¹; ¹Pennsylvania State University

9:30 AM Invited
Additive Manufacturing in Capstone Design Projects at Materials Innovation Guild @ University of Louisville: *Vamsi Balla*¹; Kunal Kate¹; Sundar Atre¹; ¹University of Louisville

10:00 AM Break

10:30 AM Invited
Hands-on Additive Manufacturing Education for Undergraduate Materials Engineers: *Zachary Cordero*¹; ¹Rice University

MONDAY AM

11:00 AM Invited

Meta-crystals: Damage-tolerant Architected Lattice Materials and Its Educational Use in Visualising Crystal Microstructure: *Chen Liu*¹; Jedsada Lerthanasarn¹; Minh-Son Pham¹; ¹Imperial College London

Additive Manufacturing of Glass, Ceramics and Composites — Additive Manufacturing of Glass, Ceramics and Composites I

Program Organizers: Tobias Schaedler, Hrl Laboratories Llc; Matthew Dickerson, Air Force Research Laboratory; Rebecca Dylla-Spears, Lawrence Livermore National Laboratory; Chang-Jun Bae, Korea Institute of Materials Science (KIMS)

Monday AM Room: B113
September 30, 2019 Location: Oregon Convention Center

Session Chair: Tobias Schaedler, HRL Laboratories, LLC

8:00 AM Invited

Additive Manufacturing of Multi-functional Materials by Design: from Smart Materials to Assembly-free Transducers: *Xiaoyu Zheng*¹; ¹Virginia Tech

8:30 AM

Additive Manufacturing of Ferroelectric Oxides and Ceramic Matrix Composites: *Tulsi Patel*¹; John Bowen¹; S. Pamir Alpay²; Rainer Hebert²; Matthew Dickerson¹; ¹Air Force Research Laboratory; ²University of Connecticut

8:50 AM

Improving Crystallographic Alignment and Piezoelectric Properties in Direct Written Piezoelectric Ceramics: *Rebecca Walton*¹; Michael Brova¹; Beecher Watson¹; Elizabeth Kupp¹; Richard Meyer²; Gary Messing¹; ¹The Pennsylvania State University; ²The Applied Research Laboratory at Penn State

9:10 AM

Ceramic Fused Filament Fabrication (CF3) 3D Printing of NiO-YSZ Structures for Solid Oxide Fuel Cells: Noah Wright¹; Paramjot Singh¹; Jacob Zimmerman¹; Vamsi Balla¹; Alex Bates¹; Sam Park¹; Rak-Hyun Song¹; *Kunal Kate*¹; ¹University of Louisville

9:30 AM

Zetamix: 3D Printing of Dense Ceramics by Fused Filament Fabrication: Julien Sourice¹; *Yogesh Ramadoss*¹; ¹NANOE

9:50 AM

Additive Manufacturing of High-temperature Ceramics for Aerospace Applications: *Lisa Rueschhoff*¹; Connor Wyckoff¹; Matthew Dickerson¹; ¹Air Force Research Laboratory

10:10 AM Break

10:30 AM Invited

Design for Ceramic Additive Manufacturing: *Shawn Allan*¹; ¹Lithoz America, LLC

11:00 AM

Small-scale TZP Architectures Manufactured Via Stereolithography: *Hunter Rauch*¹; Hang Yu¹; Huachen Cui¹; Xiaoyu Zheng¹; ¹Virginia Tech

11:20 AM

Additive Manufacturing of Multi-material Systems for Aerospace Applications: *Michael Halbig*¹; Mrityunjay Singh²; ¹NASA Glenn Research Center; ²Ohio Aerospace Institute

Additive Manufacturing of Metals: Microstructure and Material Properties of Nickel-based Alloys — Optimization of AM Processes for Ni-based Alloys

Program Organizers: Andrzej Wojcieszynski, ATI Specialty Materials; Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Sudarsanam Babu, University of Tennessee, Knoxville

Monday AM Room: B117
September 30, 2019 Location: Oregon Convention Center

Session Chair: Andrzej Wojcieszynski, ATI Specialty Materials

8:00 AM

Processing Optimization for Additive Manufacturing of Nickel Superalloys: *Dongsheng Li*¹; Gopal Das¹; Seyed Nikham²; Tom Maloney³; ¹Advanced Manufacturing LLC; ²Western New England University; ³Connecticut Center of Advanced Technology

8:20 AM

Effects of Laser Processing Parameters and Build Orientation on the Surface Roughness and High-cycle Fatigue Life of Inconel 718 Manufactured Using Laser Powder Bed Fusion: *Dillon Watring*¹; Kristen Carter¹; Dustin Crouse²; Ashley Spear¹; ¹Department of Mechanical Engineering, University of Utah; ²Metals Customer Innovation Center, 3D Systems

8:40 AM

The Effect of Static Magnetic Field on Electron Beam Melting Process of Ti6Al4V: *Shuang Han*¹; Qiang Zhu¹; ¹Southern University of Science and Technology

9:00 AM

Wire-arc Additive Manufacturing of Single Crystals: *Jacob Miller*¹; Michael Maughan¹; ¹University of Idaho

9:20 AM

Developing Processing Parameters for Epitaxial Growth in Single Crystal CMSX-4 Single Beads via Laser Powder Bed Fusion: *Amir Mostafaei*¹; Joseph Pauza¹; Anthony Rollett¹; ¹Carnegie Mellon University

9:40 AM

LPBF Production of Inconel 939: Powder Evaluation & Process Parameters Investigation: *Simone Parizia*¹; Giulio Marchese¹; Abdollah Saboori¹; Mariangela Lombardi¹; Paolo Fino¹; Diego Manfredi²; Sara Biamino¹; ¹Politecnico di Torino; ²Istituto Italiano di Tecnologia

10:00 AM

High Throughput Process Mapping of Metal Additive Manufacturing Applied to Austenitic Stainless Steel and Ni-based Superalloys: *Ankur Kumar Agrawal*¹; Gabriel Meric De Bellefon¹; Dan Thoma¹; ¹University of Wisconsin-Madison



Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Additive Manufacturing of Fe-based Alloys

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Specialty Materials; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Monday AM Room: B115
September 30, 2019 Location: Oregon Convention Center

Session Chair: Prashanth Konda Gokuldoss, Tallinn University of Technology

8:00 AM

Characterization of the Balling Defect in Stainless Steels during Laser Powder Bed Additive Manufacturing: Debomita Basu¹; *Bryan Webler*¹; Jack Beuth¹; ¹Carnegie Mellon University

8:20 AM

Concurrent Chemical and Structural Microanalysis of 316L Stainless Steel Parts Built with Closed Lifecycle Additive-subtractive Manufacturing: *Justin Morrow*¹; Marcus Jackson²; John Konopka¹; Dan Thoma³; Frank Pfefferkorn²; ¹Thermo Fisher Scientific; ²University of Wisconsin-Madison; ³Grainger Institute for Engineering

8:40 AM

On the Contribution of Defects on Small-scale Mechanical Properties of Additive Manufactured Stainless Steel 316: *Mahmoud Baniyadi*¹; Nicholas Sutton¹; Meysam Haghshenas²; ¹Georgia Southern University; ²University of North Dakota

9:00 AM

On the Thermal Stability of the Cellular Microstructure of Additively Manufactured Stainless Steel 316L: *Janith Wann*¹; Andrew Birnbaum²; John Michopoulos²; Amit Bagchi²; Ajit Achuthan¹; ¹Clarkson University; ²U.S. Naval Research Laboratory

9:20 AM

Modeling and Characterization of as-built Microstructure of SLM-processed 17-4PH Stainless Steel: *Abhinav Saboo*¹; Swathi Vunnam²; Dana Frankel¹; Thomas Starr²; ¹QuesTek Innovations LLC; ²University of Louisville

9:40 AM

The Effect of Microstructural Features on the Local Stress Field in Additively Manufactured 17-4 Steel: *Ajit Achuthan*¹; Robert Saunders²; John Michopoulos²; Amit Bagchi²; ¹Clarkson University; ²US Naval Research Laboratory

10:00 AM Break

10:20 AM

Microstructures and Properties of Tool Steels Produced by Laser Powder Bed Fusion: Yining He¹; Jack Beuth¹; *Bryan Webler*¹; ¹Carnegie Mellon University

10:40 AM

Correlation between Processing Parameters and Mechanical Properties of Additive Manufactured H13 Steel: *Piter Gargarella*¹; Adriel de Oliveira²; Luiz Henrique de Lima¹; Bianca Caroline Felipe¹; Claudemiro Bolfarini¹; Nelson de Alcântara¹; ¹Materials Engineering Department, Federal University of São Carlos; ²Posgraduate Program in Materials Science and Engineering, University of São Carlos

11:00 AM

Additive Manufacturing of Duplex Stainless Steel via Selective Laser Melting and Subsequent Heat Treatment: *Gregory Nigon*¹; Somayeh Pasebani¹; Burkan Isgor¹; ¹Oregon State University

Additive Manufacturing: Effective Production, Characterization, and Recycling of Powder Materials — Production and Recycling

Program Organizers: James Paramore, U.S. Army Research Laboratory; Ulf Ackelid, Freemelt AB; Sudarsanam Babu, University of Tennessee, Knoxville; Brady Butler, U.S. Army Research Laboratory; Zhigang Fang, University of Utah; Ola Harrysson, North Carolina State University; Don Li, Arconic Titanium & Engineered Products; Andrzej Wojcieszynski, ATI Specialty Materials

Monday AM Room: B116
September 30, 2019 Location: Oregon Convention Center

Session Chairs: James Paramore, United States Army Research Laboratory; Brady Butler, United States Army Research Laboratory

8:00 AM Keynote

Hydrogen Assisted Magnesiothermic Reduction (HAMR) for Making Low-oxygen Ti Powder: *Pei Sun*¹; Z. Zak Fang¹; Ying Zhang¹; Yang Xia¹; Hyrum Lefler¹; Tuoyang Zhang¹; ¹University of Utah

8:30 AM

Effects of Recycling PREP and Plasma Atomized Ti-6Al-4V Powder from LENS Process: *Courtney Morgan-Barnes*¹; Ryan Stokes¹; Joseph Young¹; Linkan Bian¹; Matthew Priddy¹; Haley Doude¹; Jacob Easley¹; ¹Mississippi State University

8:50 AM

Characterization of Titanium Powder Produced from Battlefield Scrap for Additive Manufacturing: *Christopher Massar*¹; ¹Worcester Polytechnic Institute

9:10 AM Invited

Exploring the Feasibility of Cryomilled Aluminum Alloy 5083 as Feed Stock Material for Additive Manufacturing: *Franklyn Kellogg*¹; Andelle Kudza²; Ryan Rogers³; Brandon McWilliams²; ¹SURVICE Engineering; ²US Army Research Laboratory; ³Bowhead Science and Technology

9:40 AM

Additive Manufacturing Alloys: Influence of Powder Preparation Method in Aluminum Matrix Composites: *Jakob Hamilton*¹; Ola Harrysson²; Christopher Rock²; Iris Rivero¹; ¹Rochester Institute of Technology; ²North Carolina State University

10:00 AM Break

10:20 AM

Assessment of 316L Stainless Steel Powder Produced from Recycled Machining Chips for Closed Lifecycle Additive-Subtractive Manufacturing: *Marcus Jackson*¹; Justin Morrow²; John Konopka²; Dan Thoma³; Frank Pfefferkorn¹; ¹University of Wisconsin-Madison; ²Thermo Fisher Scientific; ³Grainger Institute for Engineering

10:40 AM

Metal Particulate Produced by Modulation-assisted Machining: Indrani Biswas¹; Stiven Puentes¹; James Mann²; Srinivasan Chandrasekar¹; *Kevin Trumble*¹; ¹Purdue University; ²University of West Florida

MONDAY AM

Additive Manufacturing: In-situ Process Monitoring and Control — Imaging Methods

Program Organizers: Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Powder Metals; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Monday AM Room: B112
September 30, 2019 Location: Oregon Convention Center

Session Chair: Ulf Ackelid, Freemelt AB

8:00 AM

High-speed Video Monitoring of Stochastic PBFAM Flaw Formation: David Corbin¹; *Abdalla Nassar*¹; Edward Reutzell¹; Michael Krane¹; Ryan Overdorff²; ¹Applied Research Laboratory; ²3D Systems

8:20 AM

Enabling Thermal Signature Mapping in AM Parts Using Infrared Imaging: *Sujana Chandrasekar*¹; Jamie Coble¹; Fred List²; James Carver²; Caitlin Hensley¹; Travis Mcfalls³; Vincent Paquit²; Ryan Dehoff²; Sudarsanam Babu¹; ¹University of Tennessee, Knoxville; ²Oakridge National Laboratory; ³BWXT Technologies

8:40 AM

Feedback Control of Scanning Laser Epitaxy (SLE) – Estimation of Melt Pool Temperature and Size: *Amrita Basak*¹; Rohan Bansal²; Suman Das²; ¹Pennsylvania State University; ²Georgia Institute of Technology

9:00 AM Invited

In Situ Detection and Tracking of Spatter in Laser Powder Bed Fusion: Christopher Barrett¹; Evan Harris¹; Carolyn Carradero-Santiago¹; Jeremy McKnight¹; Eric MacDonald¹; *Brett Conner*¹; ¹Youngstown State University

9:40 AM

Identification of Powder Layer Defects in Additive Manufacturing via Digital Image Correlation: *Jamison Bartlett*¹; Xiaodong Li¹; ¹University of Virginia

10:00 AM Break

10:20 AM

Oxygen and Moisture Effects on Particle-melt Pool Wetting Characterized via In-situ High Speed Imaging in Laser Directed Energy Deposition: *James Haley*¹; Enrique Lavernia²; Julie Schoenung²; Ryan Dehoff¹; ¹Oak Ridge National Laboratory; ²University of California, Irvine

10:40 AM

Process Monitoring and Control Using Electron Signals in the EBM Process: *Mouda Tung*¹; Chris Ledford¹; Timothy Horn¹; ¹North Carolina State University, Center for Additive Manufacturing and Logistics

11:00 AM

Real Time Observation of Binder Jetting Printing Process Using High-speed X-ray Imaging: *Niranjan Parab*¹; Cang Zhao¹; Ross Cunningham²; Kamel Fezzaa¹; John Barnes³; Anthony Rollett²; Tao Sun¹; ¹Argonne National Laboratory; ²Carnegie Mellon University; ³The Barnes Group Advisors

11:20 AM

In Situ Observation of Crack Mitigation Effects of Alloy Additives in Tungsten: *Bey Vrancken*¹; Rishi Ganeriwala¹; Wayne King¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

Additive Manufacturing: Solid-state and Other Nonbeam-based Technologies for the Manufacturing of Metallic Parts — AM by Friction Stir Welding and Cold Spray Methods

Program Organizers: Olaf Andersen, Fraunhofer Society; J. Brian Jordon, University of Alabama; Orlando Rios, Oak Ridge National Laboratory; Paul Allison, University of Alabama; Mark Norfolk, Fabrisonic LLC; Luke Brewer, University of Alabama

Monday AM Room: B114
September 30, 2019 Location: Oregon Convention Center

Session Chair: Olaf Andersen, Fraunhofer Society

8:00 AM Introductory Comments

8:10 AM

SLS Production Friction Stir Plugs by Solid State Additive Deposition: *Kathryn Anderson*¹; Paul Allison¹; Robert Amaro²; ¹The University of Alabama; ²Southern Research

8:30 AM

Smoothed Particle Hydrodynamics Simulation of Additive Friction Stir Manufacturing of Aluminum Alloy 6061: *George Stubblefield*¹; Kirk Fraser²; Paul Allison¹; Brian Jordon¹; ¹University of Alabama; ²National Research Council Canada

8:50 AM

Microstructure and Mechanical Properties of Solid-state Additive Friction Stir Processed Alloy 600 on 304L Stainless Steel: Biswajit Dalai¹; Jie Song²; Syeda Sumaiya²; Benjamin Sutton³; Nicholas Mohr³; Young-Sik Pyun⁴; Seetha Mannava²; Matthew Steiner²; *Vijay Vasudevan*²; ¹Lulea University of Technology; ²University of Cincinnati; ³Electric Power Research Institute; ⁴Sun Moon University

9:10 AM

Advances in Processing and Microstructure Control in Additive Friction Stir Deposition: *Joey Griffiths*¹; Hang Yu¹; ¹Virginia Polytechnic Institute

9:30 AM

Microstructural-mechanical Property Relationship of Additive Friction Stir-deposition Al-Mg1-Si-Cu: *Brandon Phillips*¹; Dustin Avery¹; Tao Liu¹; Omar Rodriguez²; C.J.T. Mason¹; J. B. Jordon¹; Luke Brewer¹; Paul Allison¹; ¹University of Alabama; ²NASA Marshall Space Flight Center

9:50 AM

Analysis of Metallic Feedstock Powder for Solid-state Additive Manufacturing: *Kyle Tsakopoulos*¹; Victor Champagne²; Danielle Cote¹; ¹Worcester Polytechnic Institute; ²Army Research Lab

10:10 AM Break

10:30 AM

Cold Spray of Metallic Particles: The Effects of Surface Oxide Layer: *Vahid Rahneshtin*¹; Arvand Navabi¹; Trevor Bond¹; Adebayo Badmos¹; Nima Rahbar¹; Winston Soboyejo¹; ¹Worcester Polytechnic Institute

10:50 AM

Influence of Impacting Particle Size and Stacking Fault Energy on Ag Films Deposited by High Velocity Aerosol Deposition: *Jeremiah McCallister*¹; Michael Becker¹; John Keto¹; Desiderio Kovar¹; ¹The University of Texas at Austin

11:10 AM

Laser Assisted Cold Spray Deposition of 4340 Steel: *Luke Brewer*¹; Dallin Barton¹; Venkata Bhattiprolu¹; Gregory Thompson¹; ¹University of Alabama



11:30 AM

Microstructural and Mechanical Properties of Solid-state Additively Manufactured Aluminum Metal Matrix Composite: *Taylor Mason*¹; Rogie Rodriguez²; Brandon Phillips¹; Dustin Avery¹; Brady Williams¹; Paul Allison¹; Brian Jordon¹; ¹The University of Alabama; ²Boeing Research and Technology

Advanced Biomaterials for Biomedical Implants and Biosensing Devices — Session I

Program Organizers: Tolou Shokuhfar, University of Illinois at Chicago; Sahar Vahabzadeh, Northern Illinois University

Monday AM Room: C120
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Tolou Shokuhfar, University of Illinois at Chicago; Sahar Vahabzadeh, Northern Illinois University

8:00 AM Invited

Carbon Nanostructures for Neuroregeneration: Potential and Challenges: *Fariborz Tavangarian*¹; ¹Pennsylvania State University, Harrisburg

8:30 AM

A Synergistic Effect of Proteins and Inorganic Ions on the Degradation of Absorbable Zn, and Zn-Ag-based Biomaterials: *Malgorzata Sikora-Jasinska*¹; Ehsan Mostaed¹; Jaroslaw W. Drelich¹; ¹Michigan Technological University

8:50 AM

Electrochemical Studies of Titanium Alloys for Dental Implants: *Jaewan Bae*¹; Jacob Benoun¹; Vilupanur Ravi¹; ¹Cal Poly Pomona

9:10 AM

Iron Effects on Physical, Mechanical and Biological Properties of Brushite Cement: *Sahar Vahabzadeh*¹; Sarah Fleck¹; Joshua Marble¹; ¹Northern Illinois University

9:30 AM

Magnesium Alloy as Body Implant: Stress Corrosion Cracking Behaviour under Heat Treated Condition in Physiological Environment: *Shashikant Vagge*¹; ¹College of Engineering Pune

9:50 AM

Ti Based Superelastic Scaffolds Prepared by Fiber Sintering: *Taehyun Nam*¹; Shuanglei Li¹; ¹Gyeongsang National University

10:10 AM Break

10:30 AM

Mg-Zn-Sr Alloy based Interference Screw Developed for ACL Reconstruction: *Huafang Li*¹; ¹University of Science and Technology Beijing

10:50 AM

Modification of Low Modulus Titanium Alloys by Addition of Interstitial Solute for Biomedical Load Bearing Applications: *Madhusudan Chakraborty*¹; Pallab Majumdar²; ¹Adamas University; ²IIT Kharagpur

11:10 AM

Production of Biodegradable Mg and Mg-0.4Zn Wires Intended for Sternal Fixation in Pediatric Patients: *Karel Tesar*¹; Pavel Klein²; Elena Filova³; Zbynek Sucharda⁴; Karel Balik⁴; ¹Czech Technical University in Prague; ²Charles University; ³Institute of Physiology of the Czech Academy of Sciences; ⁴The Institute of Rock Structure and Mechanics of the Czech Academy of Sciences

11:30 AM

The Effects of Alloy Purity and Surface Finish on Corrosion Susceptibility of Nitinol Heart Valves: *Grazziela Sena*¹; Alan Pelton²; Chris Braeuner³; Matthew Di Prima⁴; Philip Strafford⁴; Srinidhi Nagaraja²; Vilupanur Ravi¹; ¹California State Polytechnic University, Pomona; ²G. Rau Inc.; ³ADMEDES GmbH; ⁴US Food and Drug Administration

Advanced High Strength Steels / From Design to End Users — Steel Design

Program Organizers: Alla Sergueeva, NanoSteel Company Inc.; Daniel Branagan, The NanoSteel Company

Monday AM Room: C124
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Gary Cola, Flash Steelworks; Christian Klinkenberg, SMS group

8:00 AM

Effect of Ni Content on Impact Toughness in Tempered Martensitic Steels: *Shigeki Kitsuya*¹; Katsuyuki Ichimiya¹; Kazukuni Hase¹; ¹JFE Steel Corporation

8:20 AM

Effect of Yttrium-based Rare Earth on the Microstructure and Impact Toughness of E36 Shipbuilding Steel: *Maolin Ye*¹; Xiaojun Xi¹; Shufeng Yang¹; Jingshe Li¹; ¹University of Science and Technology Beijing

8:40 AM

Hydrogen Uptake and Its Effect on Mechanical and Fracture Behavior of Ultra-high Strength Press-hardened Steels: *Lawrence Cho*¹; Peter E. Bradley¹; Matthew J. Connolly¹; May L. Martin¹; Damian S. Lauria¹; Frank DeRio¹; Kyoung Rea Jo²; Eun Jung Seo³; Andrew J. Slifka¹; ¹National Institute of Standards and Technology, Boulder; ²Graduate Institute of Ferrous Technology, Pohang University of Science and Technology; ³Advanced Steel Processing and Products Research Center (ASPPRC), Colorado School of Mines

9:00 AM

Correlation between EBSD Quantification and Dilatometry Examination of an X70 Steel: *Anthony Roccisano*¹; Shahrooz Nafisi²; Reza Ghomashchi¹; ¹The University of Adelaide; ²The University of Adelaide, University of Alberta, Consolidated Metco

9:20 AM

Evolution of Microstructure and Mechanical Properties during Conventional and Ultra-fast Heating of a Low Carbon Steel: The Effect of Soaking Time: Miguel Valdés-Tabernero¹; Florian Vercruyse²; Miguel Monclús¹; Jon Molina-Aldareguia¹; Roumen Petrov²; *Ilchat Sabirov*¹; ¹IMDEA Materials Institute; ²Ghent University

9:40 AM

Effect of Strain Rate on the Columnar to Equiaxed Transition in an As-cast Medium Carbon Low Alloy Steel during Hot Deformation: *Kanwal Chadha*¹; Mohammad Jahazi²; John Spray¹; ¹University of New Brunswick; ²Ecole de Technologie Supérieure

10:00 AM Break

10:15 AM

Steel-copper Nano Composites Materials: Volodymyr Tsyganov¹; Valery Naumik¹; Harold Byalik¹; Leonid Ivshenko¹; *Richard Mokhnach*¹; ¹Zaporizhy National Technical University

10:35 AM

Research and Application of Heating Agent for 2.3 Ton Ingots: *Tongjun Zhou*¹; Junzhan Liu¹; ¹Baowu Group

MONDAY AM

Advanced Materials for Harsh Environments — Session I

Program Organizers: Navin Manjorran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Monday AM
September 30, 2019 Room: C126
Location: Oregon Convention Center

Session Chairs: Gurbinder Kaur; Gary Pickrell, Virginia Tech; Navin Manjorran, Solve Technology and Research, Inc.

8:00 AM Keynote

Materials Under Extreme Environments at the Atomic Scale: *Susan Sinnott*¹; ¹Pennsylvania State University

8:40 AM Invited

Alloy Design and Process Development for Direct Shape Forming of Fe-based ODS Alloys with Oxidation Resistance by Cold Spray Deposition: *Iver Anderson*¹; Rebecca Whitesell¹; Emma White¹; Timothy Prost¹; Stuart Maloy²; Timothy Eden³; Todd Palmer³; ¹Iowa State University / Ames Laboratory; ²Los Alamos National Laboratory; ³Pennsylvania State University

9:00 AM

Alloy Coatings by Electrodeposition for Improved Corrosion Resistance: *Timothy Hall*¹; Jing Xu¹; Santosh Vijapur¹; Jennings Taylor¹; Maria Inman¹; Rajeswaran Radhakrishnan¹; Stephen Snyder¹; ¹Faraday Technology, Inc.

9:20 AM

Adsorption and Corrosion Inhibition Effect of Ammonium Molybdate Tetrahydrate on Mild Steel in 1M of HCl: *Ojo Sunday Fayomi*¹; ¹Covenant University

9:40 AM

Corrosion Assessment and Materials Selection for The Construction of Flue Gas Core Components at Advanced Pressurized Oxy-fuel Combustion Plants: *Yimin Zeng*¹; Kaiyang Li²; Jing-li Luo²; ¹NRCan, Canada; ²University of Alberta

10:00 AM Break

10:20 AM

Development of a Diamond Containing Material for Drilling in UltraHard Formations: *Jianhui Xu*¹; Weicheng Li²; Xu Wang¹; Jianlin Yao²; Chris Cheng¹; Yonghong Wang¹; Xiongwen Yang¹; ¹CNPC USA, CNPC; ²Chuanqing Drilling Engineering Company, CNPC

10:40 AM

High Temperature Corrosion of Iron Alloys for Direct Fired sCO₂ Power Cycle Applications: *Joseph Tylczak*¹; Gordon Holcomb¹; Richard Oleksak²; Ömer Dogan¹; ¹National Energy Technology Laboratory; ²National Energy Technology Laboratory, Leidos Rsearch Support Team

11:00 AM

Corrosion Behavior of Iron and Nickel Based Alloys in Superheater Tube Environments: *Kasey Hanson*¹; Preet Singh¹; ¹Georgia Tech

11:20 AM Concluding Comments

Advances in Dielectric Materials and Electronic Devices — Dielectrics and Piezoelectrics: Session I Modeling and Related

Program Organizers: Amar Bhalla, University of Texas; Ruyan Guo, University of Texas at San Antonio; Rick Ubc, Boise State University; Danilo Suvorov, Jožef Stefan Institute

Monday AM
September 30, 2019 Room: A105
Location: Oregon Convention Center

Session Chairs: Vojislav Mitic, University Nis; Ivair Santos, State University of Maringá

8:00 AM Invited

Using First Principles Methods to Understand and Optimize the Properties of Microwave Ceramic Dielectrics: *Nathan Newman*¹; Justin Gonzales¹; Christopher Muhich¹; ¹Arizona State University

8:20 AM Invited

The Fractals Microelectronics Frontiers and Graphs Theory Applications: *Vojislav Mitic*¹; Goran Lazovic²; Branislav Randjelovic³; Vesna Paunovic³; Jyh Ming Wu⁴; Dragan Mancic³; Jih Ru Hwu⁴; Branislav Vlahovic³; ¹University Nis, Fac. Electronic Engineering, ITS. S.A.S.A.; ²Faculty of Mechanical Engineering University of Belgrade; ³Faculty of Electronic Engineering University Nis; ⁴National Tsing Hua University; ⁵NCCU

8:40 AM

Phase Stability of Tetragonal BiFeO₃ and Bi(Fe,Cr)O₃ Heterostructures by Density-functional Theory: *Michael Walden*¹; Cristian Ciobanu¹; Geoff Brennecke¹; ¹Colorado School of Mines

9:00 AM

Electronic Structure and Optical Properties of La-doped K₂Sr₂Nb₅O₁₅: A First-principles Investigation: *Qian Chen*¹; Jie Xu¹; Shuyao Cao¹; Yiting Guo¹; Feng Gao¹; Guanghua Cheng²; ¹Northwestern Polytechnical University; ²Xi'an Institute of Optics and Precision Mechanics of Chinese Academy of Sciences

9:20 AM

Impact of Structure on Polarization Reversal in Polycrystalline Ferroelectric/Ferroelastic Ceramics: *Jan Schultheiß*¹; Jurij Koruza¹; ¹TU Darmstadt

9:40 AM

Empirical Modeling of Cation Ordering in Perovskite Ceramics: *Evan Smith*¹; Rick Ubc¹; ¹Boise State University

10:00 AM Break

10:20 AM Invited

NSMM Modeling and Design of Dielectric Materials: Shannon Rogers¹; Keith Rekeczis¹; *Steven Tidrow*¹; ¹Alfred University

10:40 AM

Numerical Optimization and Experimental Characterization of Stacked 1:3 Piezoelectric Composites for Energy Harvesting: *Bryan Gamboa*¹; Amar Bhalla¹; Ruyan Guo¹; ¹University of Texas, San Antonio

11:00 AM Invited

PLD Growth of STO Thin Films on Graphene Oxide-buffered Si (001) Surface: *Zoran Jovanovic*¹; Urška Gabor¹; Elena Tchernychova²; Matejka Podlogar¹; Danilo Suvorov¹; Matjaž Spreitzer¹; ¹Jozef Stefan Institute; ²National Institute of Chemistry

11:20 AM Invited

Ultra-low Temperature Co-fired Ceramics (ULTCC) –A Review on Current Compositions Introduced: *Heli Jantunen*¹; ¹Oulu University

11:40 AM Invited

Effect of the Nb+5 Doping on the Physical Properties of BaTiO₃ Electroceramics: Marco Aurélio de Oliveira¹; Jean-Claude M'Peko²; Antonio Carlos Hernandez²; Ruyan Guo³; Amar Bhalla³; *Jose de los Santos Guerra*¹; ¹Universidade Federal de Uberlandia; ²Universidade de São Paulo; ³The University of Texas at San Antonio

Advances in Surface Engineering — Session I

Program Organizers: Brian Skinn, Faraday Technology, Inc.; Timothy Hall, Faraday Technology, Inc.; Sandip Harimkar, Oklahoma State University; Michael Roach, University of Mississippi Medical Center; Rajeev Gupta, The University of Akron

Monday AM
September 30, 2019

Room: D137
Location: Oregon Convention Center

Session Chair: Brian Skinn, Faraday Technology, Inc.

8:00 AM

Method of Thermal Spray Coating Fiber-reinforced Composite Materials: *Irina Downs*¹; Daryl Crawmer¹; Raymond Meuer¹; Jim Watts¹; ¹Fisher Barton Technology Center

8:20 AM

Fabrication and Analysis of Biomimetic Micro-patterned Ionic Polymer-metal Composite (IPMC) Thin-film Actuators: *Allison Arnold*¹; Kavin Sivaneri Varadharajan Idhaim¹; Kevin Tennant¹; Laura Leyzorek¹; Edward Sabolsky¹; Ji Su¹; ¹West Virginia University

8:40 AM

Extreme Modification of Surface Wettability by Nanosecond Laser Treatment: Pablo Pou¹; Jesús del Val¹; *Antonio Riveiro*¹; Rafael Comesaña¹; Felipe Arias-González¹; Fernando Lusquiños¹; Aida Badaoui¹; Juan Pou¹; ¹University of Vigo

9:00 AM

A Comparative Study of the Effects of Surface Treatments and Finishes on the High Temperature Oxidation Behavior of Alloy 800 in a 400 °C Steam Environment: *Richard Chiang*¹; Sebastien Teysseyre²; Jeffery Aguiar³; Geogy Abraham⁴; Vivekanand Kain⁴; Vijay Vasudevan¹; ¹University of Cincinnati; ²Canadian Nuclear Laboratories; ³Idaho National Laboratory; ⁴Bhabha Atomic Research Centre

9:20 AM

Nanostructured Aluminum Decoration of Multi-walled Carbon Nanotubes (MWCNTs): *Mohammed Elsharkawi*¹; Amal Esawi¹; ¹The American University In Cairo

9:40 AM

Development of Multifunctional Coatings via Anodizing: *Enkeleda Dervishi*¹; Randall Edwards¹; Moraya Gutierrez¹; Nan Li¹; Raven Buntyn¹; Jamie Stull¹; Don Johnson¹; Dan Hooks¹; ¹Los Alamos National Laboratory

10:00 AM Break

10:20 AM

Determination of Bonding Strength of Cold Sprayed Splats Using In-situ Nano-scratch Technique: *Cheng Zhang*¹; Pranjal Nautiyal¹; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University

10:40 AM

Design on Interpretable Convolutional Neural Networks for Surface Roughness Analysis: *Christopher Kantzos*¹; Jacky Lao¹; Anthony Rollett¹; ¹Carnegie Mellon University

11:00 AM

Atomistic Origins of Temperature-dependent Shear Strength in 2D Materials: *Adam Hinkle*¹; John Curry¹; Tomas Babuska¹; Mark Wilson¹; Michael Dugger¹; Brandon Krick²; Nicolas Argibay¹; Michael Chandross¹; ¹Sandia National Laboratories; ²Lehigh University

11:20 AM

Advances in Plasma Thermochemical Treatment: *Fuyao Yan*¹; Mufu Yan¹; Ruiliang Liu¹; Yang Yang¹; Yanxiang Zhang¹; ¹Harbin Institute of Technology

Alumina at the Forefront of Technology III — Alumina at the Forefront of Technology III

Program Organizers: William Walker, Federal-Mogul; Charles Compson, Almatix; William Carty, Alfred University; Marina Pascucci, CeraNova

Monday AM
September 30, 2019

Room: A104
Location: Oregon Convention Center

Session Chair: William Walker, Federal-Mogul Powertrain

8:20 AM

Advances in Additive Manufacturing of High Strength Alumina and Alumina-derived Ceramics: *Shawn Allan*¹; Nicole Ross¹; Martin Schwentenwein²; ¹Lithoz America, LLC; ²Lithoz GmbH

8:40 AM Invited

Ribbon Ceramics: *Patrick Tepesch*¹; John Olenick²; ¹Corning Incorporated; ²ENrG Incorporated

9:10 AM Invited

Corrosion Stability of Alumina in Water: *William Carty*¹; Hyojin Lee¹; Paul Ormond²; ¹Alfred University; ²AluChem

9:40 AM

Investigating the Dependence of Microstructure Evolution during Liquid Phase Sintering on Grain Boundary Chemistry in Al₂O₃: *Sarah Whipkey*¹; William Carty¹; ¹Alfred University

10:00 AM Break

10:20 AM Invited

Grain Boundary Complexion Engineering: Lessons Learned in Alumina: *Amanda Krause*¹; ¹University of Florida

10:50 AM

Investigating the Grain Growth Kinetics of Al₂O₃ During Liquid Phase Sintering in the CaO-Al₂O₃-SiO₂ System: *Sarah Whipkey*¹; William Carty¹; ¹Alfred University

11:10 AM

From Micro to Macro: Crack Evolution in Alumina under Compressive Loading: *Tomoko Sano*¹; Brendan Koch²; Calvin Lo²; Haoyang Li²; James Hogan²; ¹US Army Research Laboratory; ²University of Alberta

11:30 AM

Alumina Ceramics at Elevated Temperatures: *William Walker*¹; ¹Federal-Mogul

Ceramic and Crystal Materials for Optics and Photonics — Session I

Program Organizers: Yiquan Wu, Alfred University; Jas Sanghera, Naval Research Laboratory; Akio Ikesue, World-Lab. Co., Ltd; Mark Dubinsky, Army Research Laboratory; Randall Hay, U.S. Air Force Research Laboratory; Xiang-Hua Zhang, Université de Rennes 1; Michael Squillante, RMD, Inc; Long Zhang, Chinese Academy of Sciences; Takunori Taira, National Institutes of Natural Science

Monday AM
September 30, 2019

Room: A107
Location: Oregon Convention Center

Session Chairs: Victoria Blair, Army Research Laboratory; Yiquan Wu, Alfred University

8:00 AM Invited

Additive Manufacturing of Transparent Ceramics: *Zachary Seeley*¹; Timothy Yee¹; Nerine Cherepy¹; Stephen Payne¹; ¹Lawrence Livermore National Laboratory

8:40 AM Invited

Strategies to Strengthen Ceramics for Windows and Domes: *Ivar Reimanis*¹; ¹Colorado School of Mines

9:20 AM Invited

Sulfide Ceramics for Optics and Photonics: *Odile Merdrignac-Conanec*¹; Guillaume Durand¹; Noha Hakmeh¹; Renguang Ye²; Xiang-Hua Zhang¹; ¹University of Rennes 1-UMR CNRS 6226-ISCR; ²China Jiliang University-UMR CNRS 6226-ISCR

9:40 AM Invited

A Comparison of Rare Earth Dopants in a Nanocomposite Material System for Infrared Laser Gain Media: *Victoria Blair*¹; Steven Kilczewski¹; Zackery Fleischman¹; ¹Army Research Laboratory

10:00 AM Break

10:20 AM Invited

Fabrication Processes for Transparent Polycrystalline YAG, LuAG, and ZnO: *Hyunjun Kim*¹; Randall Hay²; Shekhar Guha²; Alan Martinez¹; Randall Corns¹; Samuel Opeka¹; Michael Cinibulk²; ¹AFRL/UES, Inc.; ²AFRL

10:40 AM Invited

Fabrication of Novel Laser Optics by Spark Plasma Sintering Technique: *Hiroaki Furuse*¹; ¹Kitami Institute of Technology

11:00 AM Invited

Transparent MgAl₂O₄ Spinel Ceramics with Enhanced Strength via Suppressing the Grain Growth: *Ha-Neul Kim*¹; Ji-Won Kim¹; Jae-Woong Ko¹; Young-Jo Park¹; Jon-Do Yun²; Young-Chul Kim³; Ki-Deok Yang³; ¹Korea Institute of Materials Science; ²Kyungnam University; ³Finetech

11:20 AM Invited

Transparent Ceramics for Laser and Optical Applications: *Benxue Jiang*¹; ¹Shanghai Institute of Optics and Fine Mechanics

Ceramics and Glasses Simulations and Machine Learning — Machine Learning and Materials Informatics

Program Organizers: Mathieu Bauchy, University of California, Los Angeles; Peter Kroll, University of Texas; Efrain Hernandez, Army Research Laboratory

Monday AM
September 30, 2019

Room: A109
Location: Oregon Convention Center

Session Chair: Peter Kroll, University of Texas Arlington

8:00 AM Invited

Embedding Machine Learning in the Physics of Disordered Solids: *Ekin Cubuk*¹; ¹Google Brain

8:40 AM

Machine Learning Applied to Zeolite Synthesis Enabled by Automatic Literature Data Extraction: *Zach Jensen*¹; Elsa Olivetti¹; ¹Massachusetts Institute of Technology

9:00 AM

Machine Learning-aided Development of Empirical Force-fields for Glassy Materials: Han Liu¹; *Mathieu Bauchy*¹; ¹University of California, Los Angeles

9:20 AM

Utilization of Artificial Neural Network to Explore the Compositional Space of Hollandite-structured Materials for Cs Incorporation: *Dipta Ghosh*¹; Bijaya Karki¹; Jianwei Wang¹; ¹Louisiana State University

9:40 AM

Physics-Based Machine Learning Models for High Throughput Screening of Novel Scintillator Chemistries: *Blas Uberuaga*¹; Ghanshyam Pilania¹; Christopher Stanek¹; Kenneth McClellan¹; ¹Los Alamos National Laboratory

10:00 AM Break

10:20 AM

Machine Learning to Predict the Elastic Properties of Glasses: *N. M. Anoop Krishnan*¹; Nishank Goyal¹; Divyarth Saxena¹; Sourabh Singh¹; Suresh Bishnoi¹; Ravinder Ravinder¹; Hariprasad Kodamana¹; ¹Indian Institute of Technology

10:40 AM

Exploring Molecular Dynamics Descriptors to Improve Machine Learning Predictions of Glass Forming Ability: *Benjamin Afflerbach*¹; Lane Schultz¹; Izabela Szlufarska¹; Dane Morgan¹; ¹University of Wisconsin-Madison

11:00 AM

Leveraging Machine Learning to Predict Microstructural and Macroscopic Properties of Alumina: *Russell Gleason*¹; Branden Kappes¹; Geoff Brennecke¹; Aaron Stebner¹; ¹Colorado School of Mines

11:20 AM

Machine Learning and Energy Minimization Approaches for Crystal Structure Predictions: A Review and New Horizons: *Jake Graser*¹; Steven Kauwe¹; Taylor Sparks¹; ¹University of Utah

11:40 AM

Prediction of Compressive Strength and Modulus of Elasticity of Concrete Using Machine Learning Models: *Taihao Han*¹; Aditya Kumar¹; ¹Missouri University of Science and Technology



MONDAY AM

Characterization and Modeling of Metal Whisker Formation — Sn Whisker Formation

Program Organizers: Philip Eisenlohr, Michigan State University; Eric Chason, Brown University; Carol Handwerker, Purdue University

Monday AM Room: E142
September 30, 2019 Location: Oregon Convention Center

Session Chair: Carol Handwerker, Purdue University

8:00 AM
Formation and Evolution of Tin Surface Defects Using Cyclic Mechanical Loading: *Xi Chen*¹; ¹Purdue University

8:20 AM
Nucleation of Whisker Grains at Grain Boundaries in Sn Films at Early Stage of Thermal Cycling: *Congying Wang*¹; John Blendell¹; Carol Handwerker¹; ¹Purdue University

8:40 AM Invited
Pressure Induced Whisker Growth in Sn Coatings: *Piyush Jagtap*¹; Nupur Jain¹; Eric Chason¹; ¹Brown University

9:10 AM
The Effects of Bismuth on Tin Whisker Growth after High Temperature, High Humidity Storage: *Andre Delhaise*¹; Zohreh Bagheri¹; Stephan Meschter²; Jeffrey Kennedy¹; Polina Snugovsky¹; ¹Celestica; ²BAE Systems

9:30 AM Invited
Understanding Driving Forces and Mechanisms of Tin Whiskers on Thermally Strained Films Using Multi-physics Simulations: Aritra Chakraborty¹; Pratheek Shanthraj²; *Philip Eisenlohr*¹; ¹Michigan State University; ²University of Manchester

Characterization of Materials and Properties through Metallography, Mechanical Testing and Analysis - From Fundamentals to the Cutting Edge — Metallographic Preparation Techniques from Fundamentals to Novel Solutions

Program Organizer: Michael Keeble, Buehler

Monday AM Room: F152
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Burak Akyuz, pH2, LLC; Larry Somrack, NSL Analytical Services, Inc; Henry Udomon, Struers Inc.

8:00 AM
Sample Preparation on Studying of Nanostructured Materials: *Ke Han*¹; ¹Florida State University

8:20 AM
Modern Dimple Polishing for Microstructure Analysis: *Jake Jokisaari*¹; ¹Ted Pella

8:40 AM
Mechanical TEM Sample Preparation: *Pablo Mendoza*¹; ¹Allied High Tech

9:00 AM Invited
A Simple Quick X-Section Method for Paint/Coating Samples: *Andrew Havics*¹; ¹PH2 LLC

9:20 AM
Metallography of Thermal Spray Coatings: Challenges and Opportunities: *Kaushal Kishore*¹; Dheeraj Lal¹; Manashi Adhikary¹; Sandip Bhattacharyya¹; ¹Tata Steel Limited

9:40 AM
Expanding Materials Characterization with Raman and TOF-SIMS Integrated with FIB-SEM: *Dean Miller*¹; Dave Zapotok¹; Zdenek Juracka¹; Jon Hiller¹; Ute Schmidt²; Tavis Ezell²; Nancy Senabulya³; Bobby Kerns³; Victor Maroni⁴; Daniel Abraham⁴; ¹Tescan USA; ²WITec GmbH; ³University of Michigan; ⁴Argonne National Laboratory

10:00 AM Break
10:20 AM Invited
Challenges in the Metallographic Preparation and Etching of Additive Manufactured Materials: *Michael Keeble*¹; ¹Buehler

10:40 AM
Revealing Overheating in 7175 Aluminum: *Gabriel Lucas*¹; Brian Battle¹; ¹Scot Forge Company

11:00 AM
Metallurgical Investigation of Tie Rod of Bottom Dispenser Bucket Used in Steel Making Process: A Critical Case Study: *Souvik Das*¹; ¹Tata Steel

11:20 AM
Semi-muffle Box Furnace Temperature Uniformity and It's Effects on Microstructure: *Michael Connelly*¹; ¹Connelly Consulting

11:40 AM
One Million Indents, a Hardness (and Modulus) Story: Ude Hangen¹; Jacob Noble²; Bernie Becker²; *Douglas Stauffer*²; ¹Bruker Nano GMBH; ²Bruker Nano Inc

Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the Way): The Elizabeth Judson Memorial Symposium — ABET Changes and Visit Success

Program Organizers: Gregg Janowski, University of Alabama at Birmingham; Devarajan Venugopalan, University of Wisconsin-Milwaukee; Jeffrey Fergus, Auburn University; Janelle Wharry, Purdue University; Tonya Stone, Mississippi State University; Thomas Bieler, Michigan State University; Ronald Gibala, University of Michigan

Monday AM Room: A108
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Gregg Janowski, University of Alabama at Birmingham; Jeffrey Fergus, Auburn University; Devarajan Venugopalan, University of Wisconsin - Milwaukee; Thomas Bieler, Michigan State University

8:00 AM Introductory Comments
8:10 AM
Effect of Changes in EAC/ABET Definitions, Criterion 3, and Criterion 5: Gregg Janowski¹; Devarajan Venugopalan²; *Jeffrey Fergus*³; ¹University of Alabama at Birmingham; ²University of Wisconsin-Milwaukee; ³Auburn University

8:40 AM
The Development of Effective Program Educational Objectives: *Jeffrey Fergus*¹; ¹Auburn University

9:10 AM
Preparing for an ABET Evaluations – Common Issues: *Jeffrey Fergus*¹; ¹Auburn University

9:40 AM

Efficient (And Easy) College Wide Processes for Outcomes Assessment: Efficiently Automate Your Outcomes Assessment, Analysis, Reporting, and Documentation Process in a Simple System: *Steven Yalisove*¹; ¹University of Michigan

10:10 AM Break

10:30 AM **Question and Answer Period:** Discussion on Preparing for an EAC/ ABET Visit

Data Science for Material Property Interpretation — Machine Learning with Microscopy Data

Program Organizers: Alex Belianinov, Oak Ridge National Laboratory; Ichiro Takeuchi, University of Maryland; Jeff Simmons, Wright Patterson Air Force Research Laboratory; Jason Hatrick-Simpers, National Institute of Standards and Technology

Monday AM Room: E145
September 30, 2019 Location: Oregon Convention Center

Session Chair: Alex Belianinov, Oak Ridge National Laboratory

8:00 AM Invited

Data Science and the MGI: *James Warren*¹; ¹National Institute of Standards and Technology

8:40 AM

Workflows for Curation and Analysis of Microstructure-Aware Materials Data: Application to Aging of U-Nb Alloys: *Robert Hackenberg*¹; Logan Ward²; ¹Los Alamos National Lab; ²University of Chicago

9:00 AM

Data Analytics for Correlative Multimodal Chemical and Functional Imaging: *Anton Ievlev*¹; Olga Ovchinnikova¹; ¹Oak Ridge National Laboratory

9:20 AM

Neural Networks for Processing of Low Signal-to-noise Data in Scanning Probe Microscopy: *Nikolay Borodinov*¹; Sabine Neumayer¹; Sergei Kalinin¹; Olga Ovchinnikova¹; Rama Vasudevan¹; Stephen Jesse¹; ¹Oak Ridge National Laboratory

9:40 AM Invited

Recent Advances in 3D Reconstruction Based on Spherical Indexing of EBSD Data: *Marc De Graef*¹; ¹Carnegie Mellon University

10:20 AM Break

10:35 AM

Automated Defect Detection in Electron Microscopy with Machine Learning: *Dane Morgan*¹; Mingren Shen¹; Wei Li²; Kevin Field³; ¹University of Wisconsin, Madison; ²Google; ³Oak Ridge National Laboratory

10:55 AM Invited

4D STEM Data Acquisition, Analytics and Functional Material Property Extraction: *Debangshu Mukherjee*¹; Suhas Somnath¹; Alex Belianinov¹; Stephen Jesse¹; *Raymond Unocic*¹; ¹Oak Ridge National Laboratory

Failure Analysis & Characterization — Tools & Techniques

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Monday AM Room: F150
September 30, 2019 Location: Oregon Convention Center

Session Chairs: James Lane, Rimkus Consulting Group, Inc.; Francisco Rumiche, Pontificia Universidad Católica del Perú; Mark Hood, Hood Engineering; Nicholas Cherolis, Baker Engineering and Risk Consultants, Inc.

8:00 AM

Failing Well: Case Studies Focused on the Fundamentals of Successful Failure Analysis: *John Hasler*¹; Rachel Wittman¹; ¹Intertek

8:20 AM

Visual Examination Techniques for Failure Analysis: *David Christie*¹; ¹IMR Test Labs

8:40 AM Invited

Creep Damage on High Energy Piping: *Erhan Ulvan*¹; ¹Acuren Group Inc.

9:00 AM

Use of Surface Replication Systems as a Method of Non-destructive Failure Analysis: *Joel Davis*¹; ¹Rolls-Royce Corporation

9:20 AM Invited

Fractography Assisted Wear Mechanism for Engine VSI Application: *Craig Schroeder*¹; *Paul Qiao*¹; ¹L.E. Jones Company

9:40 AM Invited

On The Use of Thermal Simulations to Explain Complex Failures Modes of Bearings within Machineries: *Pierre Dupont*¹; ¹UMONS, Faculté Polytechnique de MONS (FPMs)

10:00 AM Break

10:20 AM

Lateral Constraint in Flat Punch Nanoindentation: *Nathan Bailey*¹; ¹Exponent, Inc.

10:40 AM Invited

Failure Localization in Conductive Materials for Flexible Electronics: *Meredith Nevius*¹; Andy Schultz¹; Kevin Pollock¹; ¹Exponent

11:00 AM

Simultaneous Topographical and Electrochemical Mapping using Scanning Ion Conductance Microscopy—scanning Electrochemical Microscopy (SICM-SECM): *Gabriela Mendoza*¹; *Byong Kim*¹; Keibock Lee¹; ¹Park Systems

11:20 AM

Confocal Microscope Imaging of Sub-surface Damage in Glass: *David Schoen*¹; Amy Marquardt¹; Edward Barnard²; ¹Exponent, Inc; ²Lawrence Berkeley National Laboratory



Failure Analysis: Industry Specific Failures — Aerospace

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Monday AM Room: F151
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Dale Alexander, Engineering Systems Incorporated; William Rossey, General Electric Aviation; William Carden, McSwain Engineering; Matthew Fox, NTSB; Wesley Pridemore, General Electric

8:00 AM Invited

Overview of NTSB Commercial Space Investigations: *Lorenda Ward*¹; ¹National Transportation Safety Board

8:40 AM

Investigation of a Helicopter Accident Where Cyclic Control Was Lost Due to Improper Maintenance: *Aaron Slager*¹; ¹Bell

9:00 AM Invited

Helicopter Main Rotor Servo Disconnect Failure Due to Self-locking Nut Reuse: *Richard McSwain*¹; William Carden¹; Eric Van Iderstine¹; Leah Godwin¹; ¹McSwain Engineering, Inc.

9:20 AM

Carbide Tools in Hard Metals Machining: Matthew Carter¹; *Urmaze Naterwalla*¹; ¹The Boeing Company

9:40 AM

747 Main Landing Gear Fracture after Overhaul: *Joe Epperson*¹; ¹Retired NTSB

10:00 AM Break

10:20 AM Invited

The Little Plane that Could: Failure Analysis of a Robust Turbine Engine: *Dale Alexander*¹; Richard Baron¹; Mark Lewis¹; Casey Smith¹; Pierce Umberger¹; Ellen Wright¹; ¹ESi

10:40 AM

Failure of Polycrystalline CT Blade Fir Trees and the Role of Carbide Morphology: *William Carden*¹; Amy Wells¹; Richard McSwain¹; ¹McSwain Engineering, Inc.

11:00 AM Invited

13-8Mo Gallium Induced Fatigue: *Eric Allred*¹; ¹Collins Aerospace

11:20 AM Invited

Fan Blade Fatigue Fractures in CFM56-7B Engines: *Matthew Fox*¹; ¹National Transportation Safety Board

11:40 AM

Failure Analysis of a Second-stage Turbine Disk Rupture: *Donald Kramer*¹; ¹National Transportation Safety Board

Gas/Metal Reactions, Diffusion, and Phase Transformation during Heat Treatment of Steel — Gas/Metal Reactions, Diffusion, and Phase Transformation during Heat Treatment of Steel

Program Organizer: Daniel Baker, General Motors

Monday AM Room: C123
September 30, 2019 Location: Oregon Convention Center

Session Chair: Daniel Baker, General Motors

8:00 AM

Age Hardening in Lightweight FeMnAl Steels with Nickel Additions: Laura Bartlett¹; *Michael Piston*¹; Krista Limmer²; Daniel Field²; ¹Missouri University of Science & Technology; ²CC DEVCOM Army Research Laboratory

8:20 AM

Microstructural Refinement in Martensitic and Maraging Steels: *Vikas Sinha*¹; E.J. Payton²; M. Gonzales²; ¹Air Force Research Laboratory/UES Inc. ; ²Air Force Research Laboratory

8:40 AM

Mechanism for Z-phase Formation in 11CrMoVNbN Martensitic Heat-resistant Steel: *Myung-Yeon Kim*¹; Jae-Hyeok Shim¹; Young-Kook Lee²; Woo-Sang Jung¹; Young-Su Lee¹; ¹Korea Institute of Science and Technology; ²Yonsei university

9:00 AM

Effects of Heat Treatments on High Strength Low-alloy Nitrogen Steel: *John Chinella*¹; ¹U S Army Research Laboratory

9:20 AM

Correlation of Microstructure and Hardness of Spheroidization Annealed Carbon Steel: *Chang-Young Son*¹; ¹POSCO/Hot Rolled & Wire Rod Research Group

9:40 AM

Effect of Zr Microalloying on Austenite Grain Size of Low-carbon Steels: *Minghao Shi*¹; Rangasayee Kannan¹; Lulu Guo¹; Xiaoguang Yuan²; Leijun Li¹; ¹University of Alberta; ²Shenyang University of Technology

10:00 AM Break

10:20 AM

Nanocrystallization during Plasma Nitriding of Steels: *Jiawei Yao*¹; Mufu Yan¹; Fuyao Yan¹; ¹Harbin Institute of Technology

10:40 AM

Effect of Plasma Nitriding at Different Temperatures on Microstructure and Mechanical Properties of AerMet100 Steel: *Baofeng Chen*¹; Fuyao Yan¹; Mufu Yan¹; Yanxiang Zhang¹; ¹Harbin Institute of Technology

11:00 AM

Microstructural Evolution during Aging of a TRIP-aided Mo-free Lean Duplex Stainless Steel: *Kyung-Tae Park*¹; Jeomyong Choi²; ¹Hanbat National University; ²Zhangjiagang Pohang STS Co. Ltd.

11:20 AM

Effects of Microstructural Evolution on Corrosion Characteristics of Co-reduced UHS Stainless Steel: *Sungsoo Park*¹; ¹POSCO

MONDAY AM

Glasses, Optical Materials, and Devices: Current Issues in Science & Technology — Advanced Characterizations of Glasses and Glass-ceramics

Program Organizers: Jincheng Du, University of North Texas; S. Sundaram, Alfred University

Monday AM
September 30, 2019 Room: A106
Location: Oregon Convention Center

Session Chairs: S. K. Sundaram, Alfred University; Sabyasachi Sen, University of California, Davis

8:00 AM Invited

Advanced Nanoscale Characterization of Buried Glass Interfaces by Atom Probe Tomography: *Daniel Schreiber*¹; Daniel Perea¹; Karen Kruska¹; Matthew Olszta¹; Josef Matyas¹; Joseph Ryan¹; ¹Pacific Northwest National Laboratory

8:40 AM Invited

Pentacoordinated Silicon in Alkali Silicate Glasses: Pressure, Temperature and Compositional Effects and Analogies to Borate and Germanate Systems: *Jonathan Stebbins*¹; Saurav Bista¹; ¹Stanford University

9:10 AM Invited

Total Scattering Studies of Deformation Behavior of Bulk Metallic Glasses: *Dong Ma*¹; ¹Oak Ridge National Laboratory

9:40 AM

Scattering of Visible Light by Crystalline Particles in Glass: *Mackenzie Stevens*¹; Shannon Rogers¹; Hyojin Lee¹; Bill Carty¹; ¹Alfred University

10:00 AM Break

10:20 AM Invited

Structures and Properties of New Sodium Thioborosilicate Glasses: *Steve Martin*¹; Brittany Curtis¹; Steven Kmiec¹; ¹Iowa State University of Science and Technology

10:50 AM

Threshold Detection of Crystalline Particles in Glass by X-ray Diffraction: *Shannon Rogers*¹; Mackenzie Stevens¹; Hyojin Lee¹; William Carty¹; ¹Alfred University

11:10 AM

Influence of Local Structure of the CaO-BO_{1.5}-AlO_{1.5} Melts on Their Thermal Conductivity: *Hodaka Aoki*¹; Sakae Shirayama¹; Kazuki Morita¹; ¹The University of Tokyo

11:30 AM

Synthesis and Electrical Conductivity of a Novel, Vanadium Containing, Mixed Conductor Glass: *Swati Soman*¹; Mohit Yadav¹; Ajit Kulkarni¹; ¹Indian Institute of Technology Bombay

Grain Boundaries, Interfaces, and Surfaces in Functional Materials: Fundamental Structure-Property-Performance Relationships — Modeling of Interface Structure, Chemistry and Transport

Program Organizers: Ming Tang, Rice University; Shen Dillon, University of Illinois, Urbana-Champaign; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute of Technology

Monday AM
September 30, 2019 Room: E143
Location: Oregon Convention Center

Session Chairs: Ming Tang, Rice University; Fadi Abdeljawad, Clemson University

8:00 AM Keynote

Charged Grain Boundaries: Structural, Electrochemical, and Mechanical Effects: *Vikrant Karra*¹; *Edwin Garcia*¹; ¹Purdue University

8:40 AM Invited

Grain Boundary Segregation in Binary and Ternary Alloys: *Fadi Abdeljawad*¹; ¹Clemson University

9:10 AM

Modeling Solute Interfacial Segregation Effects on θ' Precipitates in Al-Cu Alloys: *James Morris*¹; German Samolyuk¹; Dongwon Shin¹; Patrick Shower¹; Lawrence Allard¹; Matthew Chisholm¹; Jonathan Poplawsky¹; Amit Shyam¹; ¹Oak Ridge National Laboratory

9:30 AM

Developing a Realistic Grain Boundary Model to Study Solute Segregation from First Principles: *Malavikha Rajivmoorthy*¹; Amy Clarke¹; Mark Eberhart¹; ¹Colorado School of Mines

9:50 AM

Exploring the Potential Energy Landscape of $\Sigma 5(310)$ Cu Grain Boundary: *Keshab Bashyal*¹; Lin Li¹; ¹University of Alabama

10:10 AM Break

10:30 AM Invited

Effective Transport Properties of Polycrystalline Materials: *W. Beck Andrews*¹; Erik Hanson¹; Min-Ju Choe¹; *Katsuyo Thornton*¹; ¹University of Michigan

11:00 AM

Anisotropic Mobility of Faceted $\Sigma 11$ $\langle 110 \rangle$ Tilt Grain Boundaries in Face Centered Cubic Metals: *Megan McCarthy*¹; Timothy Rupert¹; ¹University of California, Irvine

11:20 AM

Coherent Spinodal Decomposition in Nanoscale Systems: *Youtian Zhang*¹; *Ming Tang*¹; ¹Rice University



Hydrogen Effects on Materials Performance — Hydrogen Effects on Steels

Program Organizers: Samantha Lawrence, Los Alamos National Laboratory; Kip Findley, Colorado School of Mines; Megan Cordill, Erich Schmid Institute for Materials Science

Monday AM Room: E146
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Kip Findley, Colorado School of Mines; Paul Gibbs, Los Alamos National Laboratory

8:00 AM Introductory Comments

8:10 AM

Hydrogen Embrittlement Testing on Electroplated Compact Samples by the Incremental Step-loading Method: *Simon Laliberté-Riverin*¹; Jonathan Bellemare¹; Frédéric Sirois¹; Myriam Brochu¹; ¹Polytechnique Montréal

8:30 AM Invited

Effect of Retained Austenite on the Hydrogen Embrittlement Susceptibility in Hot Rolled High Strength Quenching and Partitioning Steels: *Laura Moli Sanchez*¹; Lode Duprez¹; Koenraad Theuwsen¹; ¹ArcelorMittal R&D Gent

9:00 AM

Investigating Hydrogen-assisted Deformation of Oligocrystalline Austenitic Stainless Steel: *Thale Smith*¹; Coleman Alleman¹; Chris San Marchi¹; ¹Sandia National Laboratories

9:20 AM

The Influence of Hydrogen on the Mechanical Response and Microstructure of Additively-manufactured 316L Stainless Steels: *Kaila Bertsch*¹; Akihide Nagao²; Bailey Kuehl¹; Baily Syring¹; Dan Thoma¹; ¹University of Wisconsin - Madison; ²JFE Steel Corporation

9:40 AM

Key Factors behind Hydrogen Embrittlement of Cadmium Plated 4340 Steel: *Jonathan Bellemare*¹; Simon Laliberté-Riverin¹; David Ménard¹; Myriam Brochu¹; Frédéric Sirois¹; ¹Polytechnique Montréal

10:00 AM Break

10:20 AM Invited

Understanding the Bounds of Oxygen Mitigated Hydrogen Embrittlement in Ferritic Steels: *Joseph Ronevich*¹; Farid El Gabaly¹; Norm Bartelt¹; Konrad Thurmer¹; Chris San Marchi¹; Rob Kolasinski¹; ¹Sandia National Laboratories

10:50 AM

Low Cycle Fatigue Behavior of Strain-hardened 316L Stainless Steel for Hydrogen Fuel Cell Vehicles: *Dayane Oliveira*¹; Jeffery Gibeling¹; Christopher San Marchi²; ¹University of California, Davis; ²Sandia National Laboratories, Livermore

11:10 AM

Assessing Hydrogen-assisted Fatigue Crack Initiation and Propagation in Austenitic Stainless Steels: *Chris San Marchi*¹; Paul Gibbs²; Kevin Nibur³; Guy Bergel¹; Jay Foulk¹; ¹Sandia National Laboratories; ²Los Alamos National Laboratory; ³Hy-Performance Materials Testing, LLC

11:30 AM

Atmospheric Corrosion and Cracking of SS304 Used for Dry Storage of Spent Nuclear Fuel: *Jenifer Locke*¹; *Jay Srinivasan*¹; Timothy Weirich¹; Jason Taylor²; Charles Bryan²; Eric Schindelholz²; ¹Ohio State University; ²Sandia National Laboratory

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales — Session I

Program Organizers: M Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen's University; Josh Kacher, Georgia Institute of Technology; Caizhi Zhou, Missouri University of Science and Technology; Lei Cao, University of Nevada, Reno

Monday AM Room: G132
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Abigail Hunter, Los Alamos National Laboratory; Tim Rupert, University of California, Irvine

8:00 AM Invited

Coupled Experimental and Computational Studies of Amorphous Grain Boundary Complexions: *Timothy Rupert*¹; ¹University of California, Irvine

8:30 AM Invited

Development of Microstructure-sensitive and Mechanism-based Modeling Tools by Integrating Experimental Characterization with Multiscale Modeling: Longsheng Feng¹; Pengyang Zhao¹; Steve Niezgodá¹; Michael Mills¹; Yunzhi Wang¹; ¹Ohio State University

9:00 AM

Discovery of a Wide Variety of Linear Complexions in Metallic Alloys: *Vladyslav Turlo*¹; Timothy Rupert¹; ¹University of California, Irvine

9:20 AM

Linking Strongest Grain Size to Underlying Deformation Mechanisms in Nanocrystalline Materials: Ankit Gupta¹; Gregory Thompson²; *Garritt Tucker*¹; ¹Colorado School of Mines; ²University of Alabama

9:40 AM

Computation of Embrittling Potencies of Sulfur for a Range of Nickel Pure Tilt Grain Boundaries via Atomistic Simulation Methods: *Doruk Aksoy*¹; Rémi Dingreville²; Douglas E. Spearot¹; ¹University Of Florida; ²Sandia National Labs

10:00 AM Break

10:20 AM Invited

Integration between Modeling and Experiments at the Micron Scale: *Laurent Capolungo*¹; Aaron Tallman¹; Aaron Kohnert¹; Darshan Bamney²; Douglas Spearot²; Ricardo Lebensohn¹; ¹Los Alamos National Laboratory; ²University of Florida

10:50 AM Invited

Phase Field Dislocation Dynamics (PFDD) for Nanoscale Metals: Xiaoyao Peng¹; Nithin Mathew²; Irene Beyerlein³; Kaushik Dayal¹; *Abigail Hunter*²; ¹Carnegie Mellon University; ²Los Alamos National Laboratory; ³University of California, Santa Barbara

11:20 AM

Implementing Grain Boundaries in Phase-field Dislocation Dynamics: Tengfei Ma¹; Pranay Chakraborty¹; *Lei Cao*¹; ¹University of Nevada

11:40 AM

Growth of Twin Embryos by Disconnection Propagation in Mg: Molecular Dynamics and Continuum Modeling: *Yang Hu*¹; Vladyslav Turlo¹; Subhash Mahajan²; Irene Beyerlein³; Enrique Lavernia¹; Julie Schoenung¹; Timothy Rupert¹; ¹University of California, Irvine; ²University of California, Davis; ³University of California, Santa Barbara

MONDAY AM

Joining of Advanced and Specialty Materials XXI — Friction and Friction Stir Welding I

Program Organizers: Mathieu Brochu, McGill University; Anming Hu, University of Tennessee; Hiroaki Mori, Osaka University; Yuri Hovanski, Brigham Young University; Darren Barborak, WeldQC Inc; Akio Hirose, Osaka University; Peng He, Harbin Institute of Technology; Zhiyong Gu, University of Massachusetts Lowell; Zhenzhen Yu, Colorado School of Mines

Monday AM
September 30, 2019

Room: Portland Ballroom 252
Location: Oregon Convention Center

Session Chair: Yuri Hovanski, Brigham Young University

8:00 AM Keynote

Friction Stir Welding of Creep Strength Enhanced Ferritic Steels for Power Plant Applications: *Glenn Grant*¹; Jens Darsell¹; Arun Devaraj¹; Dalong Zhang¹; Hellen Jiang¹; ¹Pacific Northwest National Laboratory

8:40 AM Invited

Physical and Numerical Simulation of Friction Stir Welding for Al-based Alloys: *Anton Naumov*¹; Anatolii Borisov¹; Anastasiya Doroshchenkova¹; Hannes Wenzel²; ¹Peter the Great St. Petersburg Polytechnic University; ²Brandenburg University of Technology (BTU) Cottbus – Senftenberg

9:00 AM Invited

Modeling of Local Flow Stresses Near the Tool in Friction Stir Welding of 2xxx Series Aluminum: *Michael Miles*¹; Tracy Nelson¹; ¹Brigham Young University

9:20 AM Invited

High Speed Friction Stir Lap Welding of Al Alloys: *Piyush Upadhyay*¹; Li Xiao¹; Tim Roosendaal¹; ¹Pacific Northwest National Laboratory

9:40 AM

Effect of Post Weld Heat Treatment on Microstructure and Mechanical Properties of Linear Friction Welded Ti-6Al-4V: Sidharth Rajan¹; *Priti Wanjara*²; Javad Gholipour Baradari²; Abu Syed Kabir¹; ¹Carleton University; ²National Research Council Canada

10:00 AM Break

10:20 AM

Basic Study on Numerical Analysis of Friction Stir Welded Dissimilar Joint with New Particle Method based on MPS: *Hisashi Serizawa*¹; Kenta Mitsuji²; Fumikazu Miyasaka²; ¹JWRI, Osaka University; ²Osaka University

10:40 AM

Development of a Numerical Model for Dissimilar Lap Joint FSW by using Particle Method: *Fumikazu Miyasaka*¹; Kenta Mitsuji¹; ¹Osaka University

11:00 AM

Transient Microstructure Evolution during Friction Stir Processing of Dual Phase Advanced High Strength Steel: *Koichi Taniguchi*¹; Yong Chae Lim²; Zhili Feng²; ¹JFE Steel corporation; ²Oak Ridge National Laboratory

11:20 AM

A Meshless Approach for 3D Modeling of Linear Friction Welding Process: Srujan Rokkam¹; *Quang Truong*¹; ¹Advanced Cooling Technologies, Inc.

11:40 AM

Load-Deflection Relationship and Feedback Position Control to Compensate for the welding System During Friction Stir Welding: Jinyoung Yoon; Minjung Kang¹; *Cheolhee Kim*; ¹KITECH

Materials for Nuclear Applications — Metallic Systems

Program Organizers: Philip Edmondson, Oak Ridge National Laboratory; Yutai Katoh, Oak Ridge National Laboratory; Jake Amoroso, Savannah River National Laboratory; Levi Gardner, University of Utah; Amy Gandy, University of Sheffield; Karl Whittle, University of Liverpool; Monica Ferraris, Politecnico di Torino

Monday AM
September 30, 2019

Room: E148
Location: Oregon Convention Center

Session Chairs: Philip Edmondson, Oak Ridge National Laboratory; Djamel Kaoumi, NC State University

8:00 AM

Evolution of Microstructure, Deformation Mechanisms, and Internal Damage During Creep-Fatigue Testing of Alloy 709 (Fe-20Cr-25Ni): *Ty Porter*¹; Kip Findley¹; Michael Kaufman¹; Richard Wright²; ¹Colorado School of Mines; ²Idaho National Laboratory

8:20 AM

Enhancing the Properties of a Cast FeNiMnCr10 Co-free High-entropy Alloy Through Hot Rolling: *Hans Pommerenke*¹; Jiaqi Duan¹; Matthew Luebbe¹; Nathan Curtis¹; Haiming Wen¹; ¹Missouri University of Science and Technology

8:40 AM

Effects of Ti and Al Additions on Irradiation Behavior of FeMnNiCr Based High-Entropy Alloys: *Matthew Luebbe*¹; Andrew Hoffman¹; Hans Pommerenke¹; Li He²; Kumar Sridharan²; Haiming Wen¹; ¹Missouri University of Science and Technology; ²University of Wisconsin

9:00 AM

Aging Behavior and Microstructure Evolution in Ni-Cr-Mo-W (Haynes 244) Alloy After Surface Treatment by Laser Shock Peening (LSP): *Jie Song*¹; Anurag Sharma¹; Seetha Mannava¹; Vijay Vasudevan¹; ¹University of Cincinnati

9:20 AM

A Metallic Multilayer Composite for use in Fluoride Molten Salt Reactors: Samuel McAlpine¹; *Govindarajan Muralidharan*²; Seong Gu Kim³; Michael Short¹; ¹Massachusetts Institute of Technology; ²Oak Ridge National Laboratory; ³University of New Mexico

10:00 AM Break

10:20 AM

Rapid Multiscale Simulation of Cladding Performance: Application to HT-9: *Aaron Tallman*¹; Arul Mariyappan¹; Wei Wen¹; Laurent Capolungo¹; Carlos Tome¹; ¹Los Alamos National Laboratories

10:40 AM

Anisotropy in Thermal Creep and Creep Life Prediction of Zr-2.5%Nb Pressure Tube Alloy: *Vivek Patel*¹; Ram Niwas Singh¹; ¹Homi Bhabha National Institute

11:00 AM

In-situ Characterization of Zirconium Alloy Degradation to Support Nuclear Sensing Applications: *Michael Reynolds*¹; Corey Efav¹; Samuel McMurdie¹; Pete Barnes¹; Hongqiang Hu²; Claire Xiong¹; Michael Hurley¹; ¹Boise State University; ²Idaho National Laboratory

11:20 AM

Effect of Ultrasonic Nanocrystalline Surface Modification (UNSM) on the Oxidation Behavior of Alloy 800HT in a Supercritical Carbon Dioxide (SCO₂) Environment: *Richard Chiang*¹; Sebastien Teyssyre²; Jeffery Aguiar³; Lucas Teeter⁴; Julie Tucker⁴; Vijay Vasudevan¹; ¹University of Cincinnati; ²Canadian Nuclear Laboratories; ³Idaho National Laboratory; ⁴Oregon State University

11:40 AM

The Effects of Ultrasonic Nanocrystal Surface Modification at Room Temperature and Elevated Temperatures on Residual Stress, Microstructure and Mechanical Properties of Nuclear Alloys IN600 and IN690.: Harsha Venkat S Naralasetty¹; Auezkhan Amanov²; Young Sik Pyoun²; Jie Song¹; Nicholas Mohr³; Seetha R. Mannava¹; Vijay Vasudevan¹; ¹University of Cincinnati; ²Sun Moon University; ³Electric Power Research Institute

Materials Issues in Nuclear Waste Management — Materials Issues in Nuclear Waste Technology I: Properties of Nuclear Waste Forms: Modeling, Experiments, and Applications

Program Organizers: Jake Amoroso, Savannah River National Laboratory; Kyle Brinkman, Clemson University; Kevin Fox, Savannah River National Laboratory; Cory Trivelpiece, Savannah River National Laboratory; Jarrod Crum, Pacific Northwest National Laboratory

Monday AM
September 30, 2019

Room: E147
Location: Oregon Convention Center

Session Chairs: Jake Amoroso, Savannah River National Laboratory; Kevin Fox, Savannah River National Laboratory

8:00 AM Invited

Disorder and Mass Transport in Model Waste Forms: Blas Uberuaga¹; ¹Los Alamos National Laboratory

8:40 AM

Investigations into Physical and Chemical Characteristics of Nuclear Waste Glass Alteration Layers: Joelle Reiser¹; Joseph Ryan¹; Benjamin Parruzot¹; ¹Pacific Northwest National Laboratory

9:00 AM Invited

The Relationship between Zeolite Type and Glass Dissolution Rate Resumption: James Neeway¹; Radha Motkuri¹; Jarrod Crum¹; Emily Freeman²; Giannis Mpourmpakis²; Adam Mallette³; Jeffrey Rimer³; ¹Pacific Northwest National Laboratory; ²University of Pittsburgh; ³University of Houston

9:40 AM

Thermodynamics of Zeolite Precipitation in Stage III Glass Corrosion: Mathieu Bauchy¹; ¹University of California, Los Angeles

10:00 AM Break

10:20 AM

Predicting the Density of High-Level Waste Glass Compositions: Cory Trivelpiece¹; Thomas Edwards¹; ¹Savannah River National Laboratory

10:40 AM

Modeling of Carbonation Effects in a Cementitious Waste Form under Dry Environmental Conditions: Peng Zhang¹; Zhiliang Chen¹; Andrew Garrabrants¹; Kevin Brown¹; J.C.L. Meeussen²; Hans van der Sloot³; David Kosson¹; ¹Vanderbilt University; ²Nuclear Research Group, Netherlands; ³Hans van der Sloot Consultancy, Netherlands

11:00 AM

Energetics and Structure of Uranium-incorporated Iron Oxides: Andy Lam¹; Katherine Morris²; Samuel Shaw²; Jesús Velázquez¹; Alexandra Navrotsky¹; ¹University of California, Davis; ²University of Manchester

11:20 AM

Electrical Properties of Nuclear Glasses: Muriel Neyret¹; Dylan Jouglard¹; Norma Pereira Machado¹; Rafael Bianchini Nuernberg¹; Leire del Campo²; Mohammed Malki²; Andrea Piarristeguy³; Annie Pradel³; ¹CEA Marcoule; ²CNRS-CEMHTI; ³CNRS-ICG-Université de Montpellier

Materials vs Minerals: Bridging the Gap between Materials Science and Earth and Planetary Science — Session I

Program Organizers: Jessica Rimsza, Sandia National Laboratories; Krishna Muralidharan, University of Arizona; Thomas Zega, University of Arizona

Monday AM
September 30, 2019

Room: F149
Location: Oregon Convention Center

Session Chairs: Thomas Zega, University of Arizona; Jessica Rimsza, Sandia National Laboratories

8:00 AM Introductory Comments

8:10 AM Invited

Molecules, Nanoclusters and Materials in the Extreme Environment of Interstellar Space: Lucy Ziurys¹; ¹University of Arizona

8:40 AM

Transmission Electron Microscopy of Refractory Minerals from Primitive Chondritic Meteorites: Tarunika Ramprasad¹; Thomas Zega²; ¹Material Science and Engineering, University of Arizona; ²Lunar and Planetary Laboratory, University of Arizona

9:00 AM

Combining the Tools of Atomic-scale Characterization with Density-functional Theory and Thermodynamic Modeling to Unravel the Origins of the First Solar-system Solids: Thomas Zega¹; Venkat Manga¹; Krishna Muralidharan¹; ¹University of Arizona

9:20 AM

Atomistic Insights into Grain Collision Dynamics in the Solar Nebula: Benjamin Geller¹; Steven Baro¹; Krishna Muralidharan¹; ¹University of Arizona

9:40 AM Invited

Deciphering the Energy Landscapes of Solvated Interfaces: An Integrative Approach of Experimental Thermodynamics and Computational Chemistry: Nadine Kabengi¹; James D. Kubicki²; ¹Georgia State University; ²The University of Texas at El Paso

10:10 AM Break

10:30 AM

Synthesis and Characterization of Ceramic Foams from Earth Abundant Materials: Pratish Rao¹; Krishna Muralidharan¹; Moe Momayez¹; Keith Runge¹; ¹University of Arizona

10:50 AM

Thermodynamics of (111) Twin Complexions in Spinel: A First-principles Study: Venkateswara Manga¹; Thomas Zega¹; ¹University of Arizona

Mechanochemical Synthesis and Reactions in Materials Science IV — Session I

Program Organizers: Antonio Fuentes, Cinvestav Unidad Saltillo; Laszlo Takacs, University of Maryland Baltimore County; Challapalli Suryanarayana, University of Central Florida; Jacques Huot, Université du Québec a Trois-Rivieres

Monday AM
September 30, 2019

Room: E141
Location: Oregon Convention Center

Session Chairs: Antonio Fuentes, Cinvestav del IPN; Jacques Huot, Université du Québec a Trois-Rivieres

8:00 AM Invited

In-situ Synthesis of AlN-CNT Nanocomposites by Mechanochemical Reaction of Al and Melamine: *Jurgen Eckert*¹; Seyyed Amin Rounaghi²; Hossein Eshghi³; Sergio Scudino⁴; Elaheh Esmacili²; Ali-Reza Kiani-Rashid³; ¹Erich Schmid Institute of Materials Science; ²Birjand University of Technology; ³Ferdowsi University of Mashhad; ⁴IFW Dresden

8:40 AM Invited

Effect on Phase Evolution and Thermal Stability of Mechanically Alloyed AlCoCrFeNi High-entropy Alloy on Addition of Mn and Ti: *Nilay Mukhopadhyay*¹; Vikas Shivam¹; Joysurya Basu¹; ¹Indian Institute of Technology (BHU)

9:20 AM Invited

A Mechanochemical Effect in Cutting of Ductile Metals: *Anirudh Udupa*¹; Tatsuya Sugihara²; Jason Davis¹; Mojib Saei¹; James Mann³; Srinivasan Chandrasekar¹; *Kevin Trumble*¹; ¹Purdue University; ²Osaka University; ³University of West Florida

10:00 AM Break

10:20 AM

Influence of Al Addition on Phase Evolution and Thermal Stability of CoCrFeNiTi High-entropy Alloy Processed by Mechanical Alloying: *Vikas Shivam*¹; Joysurya Basu¹; N. Mukhopadhyay¹; ¹Indian Institute of Technology (BHU) Varanasi

10:40 AM

Mechanically Activated SHS of Silicon-based Nanostructured Materials: *Sergio Cordova*¹; Rodrigo Mesta¹; Evgeny Shafirovich¹; ¹University of Texas at El Paso

11:00 AM

Neutron Total Scattering Analysis of Materials Processed by Far-from-equilibrium Methods: *Eric O'Quinn*¹; Joerg Neuefeind²; Antonio Fuentes³; Matthew Tucker²; Maik Lang¹; ¹University of Tennessee; ²Oak Ridge National Laboratory; ³Cinvestav Unidad Saltillo

11:20 AM

Mechanically Driven Phase Transformation in Sn Reinforced Al-Cu-Fe Quasicrystalline Matrix Nanocomposite: Influence of Mechanical Milling and Cryomilling: *Yagnesh Shadangi*¹; Joysurya Basu¹; Kausik Chattopadhyay¹; Bhaskar Majumdar²; Nilay Mukhopadhyay¹; ¹IIT BHU; ²Defence Metallurgical Research Laboratory

11:40 AM

Mechanically Activated Combustion Synthesis of Nb₅Si₃/Nb Composites: *Reina Trevino*¹; Edgar Maguregui¹; Evgeny Shafirovich¹; ¹University of Texas at El Paso

Metal and Polymer Matrix Composites IV — Polymer Matrix Composites I

Program Organizers: Nikhil Gupta, New York University; Tomoko Sano, U.S. Army Research Laboratory

Monday AM
September 30, 2019

Room: D136
Location: Oregon Convention Center

Session Chairs: Kunal Kate, University of Louisville; Ozgur Keles, San Jose State University

8:00 AM Introductory Comments

8:10 AM Invited

Fused Filament Fabrication 3D Printing of Kenaf Fiber Reinforced Polymer Composites: Maxim Livchak¹; Rajeeva Thilakarathne¹; Paramjot Singh¹; Jagannadh Satyavolu¹; *Kunal Kate*¹; ¹University of Louisville

8:30 AM Invited

Super Water Repellant Cellulose Acetate Mats: *Fateh Mikaeili*¹; Perena Gouma¹; ¹Ohio State University

8:50 AM

Mechanical Behavior of 3D Printed Continuous Glass-fiber-reinforced Nylon: *Ozgur Keles*¹; Stephanie Luke¹; David Soares¹; Afrah Siddiqi¹; ¹San Jose State University

9:10 AM

Microstructure-controlled Damage Mechanisms in Elastomer-matrix Syntactic Foams: Quantitative 3D Analyses from In situ XCT Experiments: *Brendan Croom*¹; Helena Jin²; Judith Brown²; Jay Carroll²; Kevin Long²; Xiaodong Li¹; ¹University of Virginia; ²Sandia National Laboratories

9:30 AM

The Tribological Behavior of Polytetrafluoroethylene (PTFE) Composites: *Akshata Patil*¹; ¹Dover India Pvt. Ltd.

9:50 AM

Unveiling the Effects of Tow Architecture Variability on the Performance of Continuous Fiber Reinforced Composite Tubes: *Frederick Heim*¹; John Daspti¹; Xiaodong Li¹; ¹University of Virginia

10:10 AM Break

10:30 AM

A Study of the Effect of Mixing Method and Particle Size on Polymer Composites: *Morgan Watt*¹; Rosario Gerhardt¹; ¹Georgia Institute of Technology

10:50 AM

Hydroxylated Boron Nitride Nanotube Reinforced Polyvinyl Alcohol Nanocomposite Films with Simultaneous Improvement of Mechanical and Thermal Properties: *Xiaolong Lu*¹; Jenniffer Bustillos¹; Pranjal Nautiyal¹; Tyler Dolmetsch¹; Cheng Zhang¹; Tony Thomas¹; Yao Chen²; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University; ²Soochow University

11:10 AM

On the Potential of PEEK-MAX Composites for Biomedical Applications: *Sabah Javaid*¹; Maharshi Dey¹; Caleb Matzke¹; Naima Kaabouch¹; Surojit Gupta¹; ¹University of North Dakota



MONDAY AM

Metamorphic Manufacturing – Incremental Deformation Processing for Agile, High-quality Metallic Component Production — Metamorphic Manufacturing I: Concepts and Pathways

Program Organizers: Kester Clarke, Colorado School of Mines; Glenn Daehn, Ohio State University

Monday AM Room: D138
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Kester Clarke, Colorado School of Mines; Glenn Daehn, The Ohio State University

8:20 AM Introductory Comments Glenn Daehn, The Ohio State University

8:35 AM Metamorphic Manufacturing: A View from Two Perspectives: *George Spanos*¹; Michael Rawlings¹; ¹TMS

8:55 AM Invited Comparison of Robotic Blacksmithing, 3D Printing and CNC Machining for Aerospace Replacement Parts: *Nathan Ames*¹; Ed Herderick¹; Marc Purslow¹; Blair Woodring¹; ¹Ohio State University

9:35 AM Robotic Blacksmithing, Building on Past Success: *Brian Thurston*¹; ¹Daehn Research Group

9:55 AM Break

10:15 AM Invited Opportunities and Challenges in Flexible Dieless Forming - A Summary of Double-Sided Incremental Forming (DSIF) Work at Northwestern University: *Jian Cao*¹; ¹Northwestern University

10:55 AM Rapid Prototyping of Forming Tools Using 4340 Steel Through Additive Manufacturing: *Ryan Mier*¹; Colt Montgomery¹; ¹Los Alamos National Labs

11:15 AM Metamorphic Manufacturing Activities and Evolving Opportunities at Case Western Reserve University: *John Lewandowski*¹; Roger Quinn¹; Kenneth Loparo¹; Robert Gao¹; ¹Case Western Reserve University

Modeling Variability of Mechanical Behavior through ICME Techniques with Emphasis on Verification, Validation & Uncertainty Quantification — Additive Manufacturing

Program Organizers: Jacob Hochhalter, University of Utah; Michael Sangid, Purdue University; Corbett Battaile, Sandia National Laboratories; Barron Bichon, Southwest Research Institute

Monday AM Room: D135
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Jacob Hochhalter, University of Utah; Harry Millwater, UTSA

8:00 AM Invited NASA's Engineering Predictive Practices for Durability and Damage Tolerance (D&DT) of Thin Walled Materials: *Richard Russell*¹; ¹NASA

8:30 AM Invited Development and Transition of a Computational Materials Framework to Support Qualification of Additively Manufactured Components: Edward Glaessgen¹; *Michael Gorelik*²; ¹NASA Langley Research Center; ²Federal Aviation Administration

9:00 AM Simulating the Impact of Process Parameters on Microstructure for the Powder Bed Fusion Process: *Christopher Lang*¹; Saikumar Yeratapally²; Edward Glaessgen¹; ¹NASA Langley Research Center; ²National Institute of Aerospace

9:20 AM Simulations to understand the effects of pores on the mechanical behavior of materials produced using powder bed fusion process: *Saikumar Reddy Yeratapally*¹; Christopher Lang²; Edward Glaessgen²; ¹National Institute Of Aerospace; ²NASA Langley Research Center

9:40 AM Invited Next Steps for Probabilistic Modeling of Additive Manufacturing of Titanium Alloys: Thomas Ales¹; A. Baker¹; H. L. Fraser¹; D.G. Harlow¹; Y. Wang¹; *Peter Collins*¹; ¹Iowa State University

10:10 AM Break

10:30 AM Multi-scale Additive Manufacturing Process Simulation: Application of CALPHAD Modeling Tools to Determine Material Properties Relevant to Part Scale Models: *Ryan Jennings*¹; ¹Kansas City National Security Campus

10:50 AM Invited The Stochastic Behavior of Additive Lattices: *Brad Boyce*¹; Bradley Jared¹; Ashley Roach²; Jared Allison³; Amber Dressler¹; Carolyn Seepersad³; ¹Sandia National Laboratories; ²University of California at Santa Barbara; ³University of Texas at Austin

11:10 AM Fatigue Crack Growth Surrogate Models from Symbolic Regression for Use during Topology Optimization: *Keven Carlson*¹; Geoffrey Bomarito²; Miguel Aguilo³; Jacob Hochhalter¹; ¹University of Utah; ²NASA Langley Research Center; ³Sandia National Laboratories

Multi-scale Modeling of Microstructure Deformation in Material Processing — Multi-scale Modeling of Microstructure Deformation in Material Processing I

Program Organizers: Lukasz Madej, AGH University of Science and Technology; Jaimie Tiley, Air Force Office of Scientific Research (AFOSR/RTA); Krzysztof Muszka, AGH University of Science and Technology; Danuta Szeliga, AGH University of Science and Technology

Monday AM Room: D134
September 30, 2019 Location: Oregon Convention Center

Session Chair: Lukasz Madej, AGH University

8:00 AM Analytical Solution to Local Relaxation of Polycrystals Due to Elastic Sliding of Grains: *Shoieb Chowdhury*¹; Hesam Askari¹; ¹University of Rochester

8:20 AM Application of the Concurrent Atomistic-continuum (CAC) Method to Dislocation Reaction Pathway Modeling in FCC Metals.: *Kevin Chu*¹; Dengke Chen¹; Adrian Diaz²; Alex Selimov¹; Youping Chen²; Ting Zhu¹; David McDowell¹; ¹Georgia Institute of Technology; ²University of Florida

8:40 AM

Correlating Macro-scale Fracture Behavior with Microstructural Attributes in Polycrystalline Metals: *Ushasi Roy*¹; Min Zhou¹; ¹Georgia Institute of Technology

9:00 AM

DCPC Measurement of Crack Initiation in Inconel 718: A Large Data Investigation of Creep Noise: *Joel Lindsay*¹; Stefanos Papanikolaou¹; Terence Musho¹; ¹West Virginia University - Evansdale Campus

9:20 AM

Multi-cell Monte Carlo for Phase Prediction: *You Rao*¹; Changning Niu¹; Wolfgang Windl¹; Maryam Ghazisaeidi¹; ¹Ohio State University

9:40 AM

Physical and Numerical Simulation of Surface Modification of Structural Metal Alloys through Ultrasonic Impact Treatment: *Benjamin Adam*¹; Graham Tewksbury¹; Lemmy Meekisho¹; Ryan Smith¹; Tae-Kyu Lee¹; ¹Portland State University

10:00 AM Break

10:20 AM

Combining High-Energy X-ray Diffraction Microscopy Data and Crystal Finite Element Modeling for Macroscale Flow Stress Predictions in Ti-7Al: *Darren Pagan*¹; Nathan Barton²; Paul Shade³; Joel Bernier²; ¹Cornell High Energy Synchrotron Source; ²Lawrence Livermore National Laboratory; ³Air Force Research Laboratory

10:40 AM

Microstructure-sensitive Computational Estimates of Driving Forces for Surface vs. Subsurface Fatigue Crack Formation in Duplex Ti-6Al-4V and Al 7075-T6: *Krzysztof Stopka*¹; David McDowell¹; ¹Georgia Institute of Technology

11:00 AM

Numerical Modelling of Dendritic Grain Formation and Growth during Al-Si Alloy Solidification Process with Varying Physical Parameters-A Phase Field Study: *Kun Dou*¹; ¹Brunel University London

11:20 AM

Phase Field-crystal Plasticity Model for Dynamic Recrystallization: *Yulan Li*¹; Shenyang Hu¹; Erin Barker¹; Suveen Mathaudhu²; ¹Pacific Northwest National Laboratory; ²University of California-Riverside

11:40 AM

Phase Field Simulations of Precipitates in Nickel-based Superalloys: *Markus Holzinger*¹; Felix Schleifer¹; Michael Fleck¹; Uwe Glatzel¹; ¹University Bayreuth

Multifunctional Ceramic- and Metal-matrix Composites: Processing, Microstructure, Properties and Performance — Characterization and Properties of Ceramic and Metal Matrix Composites

Program Organizers: Martin Pech-Canul, Cinvestav IPN Saltillo; Xiaoming Wang, Purdue University; Golam Newaz, Wayne State University

Monday AM
September 30, 2019

Room: C125
Location: Oregon Convention Center

Session Chair: Martin Pech-Canul, Cinvestav IPN Saltillo

8:00 AM

Mechanical Response of Graphene-Loaded Silicon Oxycarbide: *Elizabeth Barrios*¹; Nina Orlovskaya¹; Lei Zhai¹; ¹University of Central Florida

8:20 AM

Nanocarbon-reinforced Metal-matrix Nanocomposites: *Andrea Bachmaier*¹; Andreas Katzensteiner¹; Reinhard Pippan¹; ¹Erich Schmid Institute

8:40 AM

Comparison of In-situ Aluminum Metal Matrix Composite Processes: *Aaron Gladstein*¹; Caleb Reese¹; Alan Taub¹; ¹University of Michigan

9:00 AM

Fabrication and High-temperature Bending Strength of Fully-dense ZrB₂/50vol%B₄C Composites: Ken Hirota¹; *Tung Le*¹; Masaki Kato¹; Hiroyuki Miyamoto¹; Motohiro Yuasa¹; Toshiyuki Nishimura²; ¹Doshisha University; ²National Institute for Materials Science

9:20 AM

Mechanical Strengthening of Aluminosilicate Composites with Graphene Oxide Fillers: Pratish Rao¹; *Madison Sitkiewicz*¹; Krishna Muralidharan¹; Moe Momayez¹; Keith Runge¹; ¹University of Arizona

9:40 AM Invited

Thermally-Conductive, Mechanically-Robust, Net-Shape Ceramic/Metal Composites for High-Temperature Concentrated Solar Power: *Kenneth Sandhage*¹; Mario Caccia¹; Meysam Tabandeh-Khorshi¹; Grigorios Itskos¹; Alex Strayer¹; Adam Caldwell¹; Supattra Singnisai¹; Anthony Schroeder²; Mark Anderson²; Andres Marquez-Rossy³; Edgar Lara-Curzio³; Sandeep Pidaparti⁴; Devesh Ranjan⁴; Andrew Rohskopf⁴; Asegun Henry⁵; ¹Purdue University; ²University of Wisconsin; ³Oak Ridge National Laboratory; ⁴Georgia Institute of Technology; ⁵Massachusetts Institute of Technology

10:00 AM Break

10:20 AM

Fabrication of Stainless Steel Matrix Composite Reinforced with 3D Networked TiN: Seong-Beum Kim¹; Soo-Hyun Kim¹; *Jung-Wook Cho*¹; ¹Postech

10:40 AM

Shear-Assisted Processing and Extrusion: A Novel Solid Phase Processing of Making Bulk Size Metal-matrix-composite without Agglomeration: *Xiao Li*¹; Nathan Canfield¹; Jens Darsell¹; Chen Zhou²; Hongliang Wang²; James Schroth²; Glenn Grant¹; ¹Pacific Northwest National Laboratory; ²General Motors R&D Center

Nanostructured Materials under Extreme Environments — Materials Designed for Radiation Environment I

Program Organizers: Jin Li, Purdue University; Assel Aitkaliyeva, University of Florida; Youxing Chen, University of North Carolina at Charlotte; Yue Liu, Shanghai Jiao Tong University; Shuai Shao, Louisiana State University

Monday AM
September 30, 2019

Room: D133
Location: Oregon Convention Center

Session Chairs: Jin Li, Purdue University; Assel Aitkaliyeva, University of Florida

8:00 AM Invited

Radiation Tolerance and Mechanical Properties of Nanostructured Amorphous-ceramic/metal Composites: *Michael Nastasi*¹; ¹University of Nebraska-Lincoln

8:30 AM Invited

Radiation Response of Nanoporous Metals: *Xinghang Zhang*¹; Jin Li¹; Cuncai Fan¹; Meimei Li²; Haiyan Wang¹; ¹Purdue University; ²Argonne National Laboratory



MONDAY AM

9:00 AM Invited

Mechanically Characterizing Soft Spots in Nanostructured Ferritic Alloy 14YWT: *Jordan Weaver*¹; Eda Aydogan²; Nathan Mara³; David Hoelzer⁴; G. Robert Odette⁵; Stuart Maloy⁶; ¹National Institute of Standards and Technology; ²Sabancı University; ³University of Minnesota-Twin Cities; ⁴Oak Ridge National Laboratory; ⁵University of California, Santa Barbara; ⁶Los Alamos National Laboratory

9:30 AM Invited

Radiation Damage of Tungsten: Nanocrystalline Versus Coarse Grain Microstructures: *Qiuming Wei*¹; Zhe Chen¹; Kaigui Zhu²; ¹University of North Carolina, Charlotte; ²Beihang University

10:00 AM Break

10:20 AM Invited

Nanomechanical Testing of Irradiated Nanostructured and Immiscible Alloys: *Janelle Wharry*¹; Priyam Patki¹; Kayla Yano¹; George Warren¹; Chidubem Enebechi¹; Yash Pachaury¹; Anter El-Azab¹; Yaqiao Wu²; Jatuporn Burns²; ¹Purdue University; ²Boise State University, Center for Advanced Energy Studies

10:50 AM Invited

Heavy Ion Irradiation of 3D Printed 316L Stainless Steels: *Miao Song*¹; Xiaoyuan Lou²; ¹University of Michigan; ²Auburn University

11:20 AM

Effect of Irradiation on Microstructure and Mechanical Properties of Mmetal Matrix Nanocomposite: *Trevor Clark*¹; Arun Devaraj²; Suveen Mathaudhu³; Khalid Hattar¹; ¹Sandia National Laboratories; ²Pacific Northwest National Laboratory; ³University of California Riverside

Next Generation Biomaterials — Next Generation Biomaterials I

Program Organizers: Roger Narayan, University of North Carolina; Federico Rosei, INRS Centre for Energy, Materials and Telecommunications

Monday AM
September 30, 2019

Room: C122
Location: Oregon Convention Center

Session Chairs: Nima Rahbar, Worcester Polytechnic Institute; Vilupanur Ravi, California State Polytechnic University, Pomona

8:00 AM Invited

Biocorrosion and Biocompatibility of Advanced Titanium Alloys: *Vilupanur Ravi*¹; ¹California State Polytechnic University, Pomona

8:20 AM Invited

Biomimetic based Approaches for Design of Engineering Testbeds of Cancer: *Kalpna Katti*¹; Dinesh Katti¹; ¹North Dakota State University

8:40 AM

Therapeutic Ion-releasing Glasses to Enhance Bone Formation: An Overview of the Structure, Solubility, and Biocompatibility: *Sahar Mokhtari*¹; Anthony Wren¹; ¹Alfred University

9:00 AM Invited

Invited: High-Throughput Electrospinning of 3D scaffolds and Sensing Probes: *Pelagia Gouma*¹; ¹The Ohio State University

9:20 AM Invited

Magnetic Nanoparticles for the Specific Targeting of Triple Negative Breast Cancer: *John Obayemi*¹; Jingjie Hu²; Ali Salifu¹; Karen Malatesta³; Winston Soboyejo¹; ¹Worcester Polytechnic Institute (WPI); ²Mayo Clinic; Princeton University; ³Princeton University

9:40 AM Invited

Multi-component Biomolecular Assembly to Harness New Functions at the Interfaces: *Candan Tamerler*¹; ¹University of Kansas

10:00 AM Break

10:20 AM Invited

Silica-calcium Phosphate Composite: A Multifunctional Bioceramic Platform for Innovative Therapy: *Ahmed El-Ghannam*¹; ¹University of North Carolina at Charlotte

10:40 AM Invited

Silicon Oxynitride, a New Antioxidant, Osteokine, and Myokine Pathway Control for MSK Healing: *Venu Varanasi*¹; ¹University of Texas at Arlington

11:00 AM Invited

3D Printed Bioactive Glass Scaffolds: *Aisling Coughlan*¹; ¹The University of Toledo

11:20 AM Invited

Computationally Driven Design of Nanomaterials and Scaffolds for Tissue Regeneration: *Dinesh Katti*¹; Kalpana Katti¹; ¹North Dakota State University

11:40 AM Invited

Bioinspired Design of Next Generation Structural and Thermal Materials: *Nima Rahbar*¹; ¹Worcester Polytechnic Institute

Perspectives for Emerging Materials Professionals — Session I

Program Organizers: Christopher Marvel, Lehigh University; Andrew Frerichs, The NanoSteel Company

Monday AM
September 30, 2019

Room: B110
Location: Oregon Convention Center

Session Chairs: Christopher Marvel, Lehigh University; Jonathan Healy, Naval Surface Warfare Center - Carderock Division

8:40 AM Invited

Between Industry and Academia: *C. Austin Wade*¹; ¹Thermo Fisher Scientific

9:00 AM Invited

What Do I Do Now? Assuming Technical Leadership Roles Immediately After Entering Industry: *Andrew Baker*¹; ¹Boeing

9:20 AM Invited

My Transformation from Graduate Student to Assistant Professor: The Metastable States and the Energy Barriers: *Ashley Paz y Puente*¹; ¹University of Cincinnati

9:40 AM Invited

Decision Making Strategies for Prospective Professors: *Zachary Cordero*¹; ¹Rice University

10:00 AM Break

10:20 AM Invited

Dr. Liu's TKC Theory: Thermodynamics, Kinetics, and Crystallography: *Zi-Kui Liu*¹; ¹Pennsylvania State University

11:00 AM Panel Discussion

Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work – Rustum Roy Symposium — Session I

Program Organizers: Morsi Mahmoud, King Fahd University of Petroleum and Minerals - KFUPM; Dinesh Agrawal, Pennsylvania State University; Guido Link, Karlsruhe Institute of Technology; Motoyasu Sato, Chubu University; Rishi Raj, University of Colorado; Victoria Blair, Army Research Laboratory

Monday AM
September 30, 2019
Room: D139
Location: Oregon Convention Center

Session Chairs: Morsi Mahmoud, King Fahd University of Petroleum and Minerals (KFUPM); Jun Fukushima, Tohoku University

8:00 AM
Radio Frequency and Microwave Heating of Pre-ceramic Polymers and its Application in Silicon Carbide Processing: *Nutan Patil*¹; Miladin Radovic¹; Mohammad Saed²; Micah Green¹; ¹Texas A&M University; ²Texas Tech University

8:20 AM
Effect of Pulsed Electric Current on Metastable Austenitic Steel: *Hye-Jin Jeong*¹; Ju-Won Park¹; Howook Choi¹; Moon-Jo Kim²; Sung-Tae Hong³; Heung Nam Han¹; ¹Seoul National Univ; ²Korea Institute of Industrial Technology; ³University of Ulsan

8:40 AM Invited
Electro-pulse and High Magnetic Field Annealing of Cold-Rolled NiFe: *Ian Baker*¹; Patrice Chantrenne²; Si Chen³; Damien Fabrègue²; Xiaobin Guo¹; Nour Hayek¹; Gerard Ludtka⁴; Bart Murphy⁴; Rachel Osmundsen¹; Yang Ren³; Ty Teodorii¹; Liang Wang⁵; Chao Yang¹; ¹Dartmouth College; ²INSA Lyon; ³Argonne National Laboratory; ⁴Beijing Institute of Technology; ⁵Northern Illinois University; Beijing Institute of Technology

9:00 AM Invited
Microwave Effects in Heterogeneous Materials: A Study on Catalysis: *Christina Wildfire*¹; Dushyant Shekhawat¹; Victor AbdelSayed²; Terence Musho³; ¹NETL; ²Leidos, NETL; ³WVU

9:30 AM Invited
Electric Current Annealing of Zircaloy Alloy and Associated Mechanisms: *Daudi Waryoba*¹; Zahabul Islam¹; Baoming Wang²; Aman Haque¹; ¹Pennsylvania State Univ; ²Massachusetts Institute of Technology (MIT)

10:00 AM Break

10:20 AM Invited
Surface-charge Mobility Theory: An Explanation for Certain “Microwave Effects”: *Edward Ripley*¹; ¹Y-12 National Security Complex

10:40 AM
Advanced In-Line Nanocrystallization of Amorphous Metal Ribbon (AMR) Alloys Through Mechanical and Electromagnetic Fields: *Kevin Byerly*¹; Paul Ohodnicki¹; Michael McHenry²; Michael Lanagan³; Dinesh Agrawal³; ¹National Energy Technology Laboratory; ²Carnegie Mellon University; ³Penn State University

11:00 AM Invited
Effective Permittivity of Metal/Ceramic Composites and Microwave Heating Characteristics: *Noboru Yoshikawa*¹; Sinya Ohgane¹; Naoki Ohgane¹; Takane Watanabe¹; Sergey Komarov¹; ¹Tohoku University

11:30 AM Invited
Locally Activated Solution Processing Would be Preferable Than General Hydrothermal/Solvothermal Processing Using Autoclaves: *Masahiro Yoshimura*¹; ¹National Cheng Kung University

PSDK XIV: Phase Stability and Diffusion Kinetics — Gibbs: Ab Initio and CALPHAD Modeling

Program Organizers: Michael Gao, National Energy Technology Laboratory; Hans Seifert, Karlsruhe Institute of Technology; Zi-Kui Liu, Pennsylvania State University; Fan Zhang, CompuTherm LLC; Richard Otis, Jet Propulsion Laboratory; Aurelien Perron, Lawrence Livermore National Laboratory

Monday AM
September 30, 2019
Room: E144
Location: Oregon Convention Center

Session Chairs: Michael Gao, National Energy Technology Lab; Ursula Kattner, National Institute of Standards and Technology

8:00 AM Keynote
From Phenomenon to Energy: *Patrice Turchi*¹; ¹Formerly at Lawrence Livermore National Laboratory

8:40 AM Invited
Utilization of First Principles Results in the Development of CALPHAD Databases: Hai-Lin Chen¹; Giancarlo Trimarchi¹; Qing Chen¹; *Paul Mason*²; ¹Thermo-Calc Software AB; ²Thermo-Calc Software Inc.

9:00 AM Invited
Phase Stability in Refractory Metal Silicides: *John Perepezko*¹; ¹University of Wisconsin - Madison

9:20 AM Invited
Effects of Extreme Chemical Complexity on the Fundamentals Properties of Multicomponent Concentrated Solid Solution and High Entropy Alloys: *G Malcolm Stocks*¹; Sai Mu¹; German Samolyuk¹; ¹Oak Ridge National Laboratory

9:40 AM Invited
Short-Range Order Effects Related to Mechanical Properties in Concentrated Solid Solutions: *Mark Asta*¹; ¹University of California, Berkeley

10:00 AM Break

10:20 AM Invited
Thermodynamics of High-Entropy Alloys: *Michael Gao*¹; Zongrui Pei¹; Mike Widom²; Jeffrey Hawk¹; David Alman¹; ¹National Energy Technology Laboratory; ²Carnegie Mellon University

10:40 AM Invited
Bayesian Uncertainty Quantification and Information Fusion in CALPHAD-based Thermodynamic Modeling: *Raymundo Arroyave*¹; Pejman Honarmandi¹; Seyefe Fatheme Ghoreishi¹; Thien Duong¹; Douglas Allaire¹; ¹Texas A&M University

11:00 AM Invited
CALPHAD Modeling of the Molar Volume of Co-base Superalloys: *Ursula Kattner*¹; ¹National Institute of Standards and Technology

11:20 AM Invited
Ab Initio Modelling of Planar Defects in M23C6: *Marcel Sluiter*¹; Maaouia Souissi²; Ryoji Sahara²; ¹Tu Delft; ²National Institute for Materials Science



Substrate Protection for Corrosion Prevention — Session I

Program Organizers: Mary Lyn Lim, PPG Industries; Qixin Zhou, The University of Akron; Niamh Hosking, Ford Motor Company; Matthew Asmussen, Pacific Northwestern National Laboratory; Elissa Trueman, NSWC Carderock Division; Cortney Crane, Exponent Failure Analysis Associates; Stephen Raiman, Oak Ridge National Laboratory; Raul Rebak, GE Global Research

Monday AM
September 30, 2019
Room: B118
Location: Oregon Convention Center

Session Chairs: Mary Lyn Lim, PPG; Cortney Crane, Exponent Failure Analysis Associates; Qixin Zhou, The University of Akron

8:00 AM Invited

Characterization of Zinc Phosphate Coatings with Fast Kinetics Activators: *Mark Mcmillen*¹; ¹PPG Industries

8:40 AM

A Corrosion Study of Light Metal Cylinder Head Material in Chloride Containing Engine Coolant Environment: *Anusha Chilukuri*¹; Gaurav Argade¹; Justin Perry¹; Corey Trobaugh¹; Randy Schafer¹; Erica Raisor¹; Jacob Steenhock¹; Glenia Pena Lugo¹; ¹Cummins Inc.

9:00 AM

Comparative Correlation of Advanced Accelerated Corrosion Exposure Tests with Traditional Methods: *Brian Smith*¹; *Mason Schloder*¹; ¹Assured Testing Services

9:20 AM

Enhanced Coating Adhesion through a Nano-structuring Laser-interference Surface Treatment: *Adrian Sabau*¹; Jiheon Jun¹; ¹Oak Ridge National Laboratory

9:40 AM

Anti-corrosion Failure Mechanism Study of Waterborne Isocyanate-free Polyurethane Coatings on Steel Substrate: *Cheng Zhang*¹; ¹University of Akron

10:00 AM Break

10:20 AM

Fluoride Salt Corrosion Resistance of Binder-free Chromium Carbide Layers on Cr Substrates: *Kevin Chan*¹; Preet Singh¹; ¹Georgia Institute of Technology

10:40 AM

Environmentally Friendly Multilayer Coating for Carbon Steel Corrosion Prevention: *Fangming Xiang*¹; David Hopkinson¹; ¹National Energy Technology Laboratory

Surface Properties of Biomaterials — Novel Biomaterials, Devices, and Test Methods

Program Organizers: Ryan Bock, SINTX Technologies; Jason Langhorn, DePuy Synthes Joint Reconstruction; Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University; Mangal Roy, Indian Institute of Technology-Kharagpur; Venu Varanasi, University of Texas at Arlington

Monday AM
September 30, 2019
Room: C121
Location: Oregon Convention Center

Session Chairs: Ryan Bock, SINTX Technologies; Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University

8:00 AM Invited

Goodbye Hospitals Hello Implantable Nanosensors: *Thomas Webster*¹; ¹Northeastern University

8:40 AM Invited

Creating a Clinically Relevant 3rd Body Abrasion Wear Test Protocol: *Jason Langhorn*¹; Elizabeth Hippensreel¹; Rebecca Shaheen¹; Madison Miller¹; Hannah Albert¹; Noah Bonenheim²; Douglas Van Citters²; ¹DePuy Synthes Joint Reconstruction; ²Dartmouth College

9:20 AM Invited

Biophysical Stimulation of Stem Cells on Biomaterials and in Biomicrofluidic Device: In Vitro and in Silico Studies: *Bikramjit Basu*¹; ¹Indian Institute of Science

10:00 AM Break

10:20 AM Invited

Nanomechanical Measurements of Tissue Engineered Materials and Pharmacological Coatings: *Praveena Manimunda*¹; Benjamin Stadnick¹; *Douglas Stauffer*¹; ¹Bruker Nano Inc.

11:00 AM

Zirconia Toughened Alumina Reinforced Ti6Al4V for Articulating Surfaces of Load-bearing Implants: *Jose Avila*¹; Amit Bandyopadhyay¹; Susmita Bose¹; ¹Washington State University

11:20 AM Invited

Refined PEEK/Silicon Nitride Composite Resists Biofilm Formation: *Ryan Bock*¹; Erin Jones¹; Giuseppe Pezzotti²; B. Sonny Bal¹; Bryan McEntire¹; ¹SINTX Technologies; ²Kyoto Institute of Technology

11:40 AM

Effects of Vitamin D3 Release from 3D Printed Calcium Phosphate Scaffolds on the Bone Remodeling Process: *Ashley Vu*¹; Susmita Bose¹; ¹Washington State University

MONDAY AM

Thermodynamics of Materials in Extreme Environments — Thermodynamic Studies of Nuclear Materials I

Program Organizers: Kyle Brinkman, Clemson University; Kristina Lilova, University California Davis; Alexandra Navrotsky, University California Davis; Jake Amoroso, Savannah River National Laboratory; Fei Peng, Clemson University; Xingbo Liu, West Virginia University; Gustavo Costa, NASA; Xiaofeng Guo, Washington State University

Monday AM
September 30, 2019

Room: B119
Location: Oregon Convention Center

Session Chair: Kyle Brinkman, Clemson University

8:00 AM Introductory Comments

8:10 AM Invited

ACerS Navrotsky Award for Experimental Thermodynamics of Solids: A Novel Apparatus for Coulometric Titrations in Lithium Containing Systems: *Alexander Beutl*¹; S. Fürtauer¹; H. Flandorfer¹; ¹University of Vienna

8:55 AM Invited

Novel Insight into Defect Behavior of Irradiated Materials: Combined Neutron Total Scattering and High Temperature Calorimetry Investigation: *Maik Lang*¹; Eric O'Quinn¹; Raul Palomares¹; Cheng-Kai Chung²; Anna Shelyug²; Joerg Neuefeind³; Alexandra Navrotsky²; ¹University of Tennessee; ²University of California, Davis; ³Oak Ridge National Laboratory

9:25 AM Invited

Speciation and Stability of Uranium and Thorium in Hydrothermal Environments: *Hongwu Xu*¹; Artaches Migdisov¹; Hakim Boukhalfal¹; Robert Roback¹; ¹Los Alamos National Laboratory

9:55 AM Break

10:15 AM Invited

Formation of PuSiO₄: Lessons Coming from Chemical Analogues: *Nicolas Dacheux*¹; Paul Estevenon²; Eleonore Welcomme²; Stephanie Szenknect¹; Adel Mesbah¹; Philippe Moisy²; Christophe Poinssot²; ¹University Montpellier; ²CEA / Nuclear Energy Division / DMRC

10:45 AM

Pyrochlore Disorder under Extreme Conditions: *Alexandra Navrotsky*¹; ¹University of California, Davis

11:05 AM

Monazite as a Waste Form for Actinides: From Synthesis to Long-term Behavior: *Nicolas Dacheux*¹; Dawen Qin¹; Clemence Gausse¹; Adel Mesbah¹; Nicolas Clavier¹; Stéphanie Szenknect¹; Renaud Podor¹; ¹University Montpellier

Ultra High Performance Metallic Systems for Aerospace, Defense, and Automotive Applications — Shape Memory Alloys, Bulk Metallic Glasses and Functionally Graded Materials

Program Organizers: Ali Yousefiani, Boeing Research And Technology; Troy Topping, California State University, Sacramento; Robert Dillon, NASA Jet Propulsion Laboratory; Linruo Zhao, National Research Council of Canada

Monday AM
September 30, 2019

Room: D140
Location: Oregon Convention Center

Session Chair: Robert Dillon, Jet Propulsion Laboratory

8:00 AM Invited

Effect of Thermal History on Mechanical and Wear Properties of Bulk Metallic Glass Spacecraft Components: *Punnathat Bordeenithikasetm*¹; Scott Roberts¹; Robert Dillon¹; Michael Sansoucie²; ¹NASA Jet Propulsion Laboratory; ²NASA Marshall Space Flight Center

8:40 AM

Multi Length-scale Mechanical Property Measurements in Ti-based Bulk Metallic Glass-matrix Composites (BMG-MCs): New Insights on Deformation Mechanisms in the Glass Phase: *Ali Khosravan*¹; Naresh Thadhani¹; Surya Kalidindi¹; ¹Georgia Institute of Technology

9:00 AM

Cold Work-Induced Strain Glass States in Ni_{49.5}Ti_{50.5} SMA Plates: *Neha John*¹; Choongyeop Lee¹; Nathan Ley¹; Jesse Smith¹; Robert Wheeler¹; Anit Giri²; Marcus Young¹; ¹University of North Texas; ²Army Research Laboratory

9:20 AM

Effects of Pd Addition to High Strength NiTiHf Shape Memory Alloys: Guher Pelin Toker¹; Soheil Saedi²; Dipak Banerjee²; Haluk Karaca¹; ¹University of Kentucky; ²University of Arkansas at Little Rock

9:40 AM

Damping Capacity of Ultra-high Strength NiTiHfPd Alloys: *Guher Pelin Toker*¹; Soheil Saedi²; Haluk Karaca¹; ¹University of Kentucky; ²University of Arkansas at Little Rock

10:00 AM Break

10:20 AM

Nanoindentation Measurements of Crystal Orientation Anisotropy in Elastic and Plastic Properties of Ti-Pt-Ni-Hf Shape Memory Alloys: *Ali Khosravan*¹; Manu Mohan²; Dipankar Banerjee²; Surya Kalidindi¹; ¹Georgia Institute of Technology; ²Indian Institute of Science

10:40 AM

Macroscopic Ferroelastic Response of Processing-Induced Strain Glass Alloys under Tension, Compression, and Bending: *Robert Wheeler*¹; Jessica Rider¹; Nathan Ley¹; Jesse Smith¹; Anit Giri²; Marcus Young¹; ¹University of North Texas; ²Army Research Laboratory

11:00 AM

Location-Specific Mechanical Property Enhancement of Atomically Ordered Fe-Co-V Soft Magnetic Alloys: *Jeffrey Rodelas*¹; Donald Susan¹; Andrew Kustas¹; Alexander Barr¹; Matthew Vieira¹; ¹Sandia National Laboratories

11:20 AM

Solid Phase Processing of Copper/Graphene Alloys with Ultra-high Conductivity: *Keerti Kappagantula*¹; Xiao Li¹; Chen Zhou²; Hongliang Wang²; James Schroth²; Glenn Grant¹; ¹Pacific Northwest National Laboratory; ²General Motors



Undergraduate Global University — What to Expect Post Bachelor's Degree I

Program Organizers: Kelley Wilkerson, Missouri University of Science and Technology; Dana Goski, Allied Mineral Products; James Hemrick, Reno Refractories Inc.; Eva Hemmer, University of Ottawa

Monday AM Room: A103
September 30, 2019 Location: Oregon Convention Center

Session Chair: Kelley Wilkerson, Missouri University of Science and Technology

8:00 AM Introductory Comments

8:05 AM Invited
A Comparison of Academic Versus Industrial Research Experiences: *James Hemrick*¹; ¹Reno Refractories, Inc.

8:25 AM
Career Options in Refractories and Related Industries: *Dana Goski*¹; ¹Allied Mineral Products Inc

8:45 AM
Engineering Careers in Manufacturing and How They Can Improve the World: *Keith DeCarlo*¹; ¹Blasch Precision Ceramics

9:05 AM
Engineering Graduate Opportunities at Alfred University: *Gabrielle Gaustad*¹; William Carty¹; ¹Alfred University

9:25 AM Invited
Graduate Opportunities at the Colorado School of Mines: *Geoff Brennecke*¹; ¹Colorado School of Mines

9:45 AM
High Temperature Materials: Opportunities in Industry and Academia: *Stefan Schafföner*¹; Lesley Frame¹; Bryan Huey¹; ¹University of Connecticut

10:05 AM Break

10:25 AM Invited
Industrial Support for Undergraduate Research in the PSMRC: *Ronald OMalley*¹; ¹Missouri University of Science and Technology

10:45 AM
Life at a National Laboratory in the Pacific Northwest: *Charmayne Lonergan*¹; ¹Pacific Northwest National Laboratory

11:05 AM
Missouri University of Science and Technology: Graduate School Opportunities: *Greg Hilmas*¹; Kelley Wilkerson¹; ¹Missouri University of Science and Technology

11:25 AM
My Unexpected Path from Ceramic Engineering to Nuclear Waste Immobilization: *Fabienne Johnson*¹; ¹Savannah River National Laboratory

11th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Novel Materials Processing Paradigm II

Program Organizers: Surojit Gupta, University of North Dakota; Yiquan Wu, Alfred University; Hisayuki Suematsu, Nagaoka University of Technology; John Wolodko, University of Alberta; Christopher Taylor, DNV GL; Junichi Tatami, Yokohama National University; Enrico Bernardo, University of Padova; Zhengyi Fu, Wuhan University of Technology; Rajiv Asthana, University of Wisconsin; Allen Apblett, Oklahoma State University; Richard Sisson, Worcester Polytechnic Institute; Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Mritunjay Singh, Ohio Aerospace Institute

Monday PM Room: Portland Ballroom 255
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Manoj Mahapatra, University of Alabama; John Wolodko, University of Alberta; Dipankar Ghosh, Old Dominion University

2:00 PM Invited
Electrochemical Technique for Materials Processing and Manufacturing: *Manoj Mahapatra*¹; Mark King¹; ¹University of Alabama at Birmingham

2:20 PM Invited
Cathode, Anode and Electrolyte for Non-flammable Sodium-ion Cells: *Palani Balaya*¹; ¹National University of Singapore

2:40 PM
A Preliminary Review and Classification of Environmental Life Cycle Impacts for Various Materials: *John Wolodko*¹; Ehsan Vaziri Yeganeh¹; ¹University of Alberta

3:00 PM Invited
Development of Ice-templated Sintered Metal Oxides with Directional Porosity and Understanding Structure-mechanical Property Relationships: *Dipankar Ghosh*¹; Rohan Parai¹; Sashanka Akurati¹; Justine Marin¹; ¹Old Dominion University

3:20 PM Break

3:40 PM Invited
Development of Low Thermal Expansion Cordierite Porcelain Cook Wares: *Lalit Sharma*¹; Kali Singh¹; ¹CSIR-Central Glass & Ceramic Research Institute

4:00 PM
Conductivity Properties of Mg-Al Layer Double Hydroxides: *Keiichiro Maegawa*¹; Qiaxian Johnson²; Mihaela Jitianu²; Atsunori Matsuda¹; Andrei Jitianu³; ¹ToyoHashi University of Technology; ²William Paterson University; ³Lehman College, City University of New York

4:20 PM
Fabrication and Characterization of Metakaolin-based Geopolymers with and Battery and Construction and Demolition (C&D) Waste Content for Potential Shielding Applications: *Raul Florez*¹; Deiber Riascos²; Carlos Castano¹; Henry Colorado²; ¹Missouri University of Science and Technology; ²Universidad de Antioquia

4:40 PM
Optimization of Torrefaction Parameters for High Energetic Yields: *Jamiu Odusote*¹; Adekunle Adeleke¹; Olumuyiwa Lasode¹; M Malathi²; Dayanand Paswan³; ¹University of Ilorin; ²CSIR-National Metallurgical Laboratory; ³CSIR-National Metallurgical Laboratory

MONDAY PM

PORTLAND OREGON

SEPTEMBER 29 – OCTOBER 3, 2019

5:00 PM Invited

Fractal Nature Bridging the Gap within the Space Scale Nano-microstructures-Meso-mega Sizes: *Vojislav Mitic*¹; Goran Lazovic²; Tsong Perng³; Dusan Milosevic⁴; Hans Fecht⁵; Branislav Vlahovic⁶; ¹University Nis, Fac. Electronic Engineering, ITS. S.A.S.A; ²Faculty of Mechanical Engineering University of Belgrade; ³National Tsing Hua University; ⁴Faculty of Electronic Engineering University Nis; ⁵University Ulm; ⁶NCCU, USA

5:20 PM Invited

From Flash Sintering to Water-assisted Flash Sintering and Beyond: Energy and Cost-Saving Materials Processing Technologies: *Jian Luo*¹; ¹University of California, San Diego

ACerS Richard M. Fulrath Award Session

Program Organizer: Jonathan Salem, NASA Glenn Research Center

Monday PM

Room: Portland Ballroom 253

September 30, 2019

Location: Oregon Convention Center

Session Chair: Jonathan Salem, NASA Glenn Research Center

2:00 PM Invited

Engineering Cellular Ceramics with Modulated Pore Configurations: *Manabu Fukushima*¹; ¹National Institute of Advanced Industrial Science and Technology

2:40 PM Invited

Fabrication and Characterization of Nanoscale Dielectrics for the Design of Advanced Ceramic Capacitors: *Keigo Suzuki*¹; ¹Murata Manufacturing Co., Ltd.

3:00 PM Invited

Piezoelectric Thin Film Processing, PiezoMEMS Devices, and an Overview of PRIGM, SHRIMP, & AMEBA Programs: *Ronald Polcawich*¹; ¹Defense Advanced Research Projects Agency (DARPA)

3:20 PM Break

3:40 PM Invited

Dielectric Material Design and Lifetime Prediction for Highly Reliable MLCCs: *Koichiro Morita*¹; ¹Taiyo Yuden Co., Ltd.

4:00 PM Invited

Engineered Ceramic Materials for Energy Storage: *Vilas Pol*¹; ¹Purdue University

Activating Allies: Navigating the Intersectional Landscape of Diversity & Inclusion — Abolishing the “Other” - How Intersectionality Challenges Our Current Approaches to Inclusion of People of Minority Identity

Program Organizers: Thomas Reeve, Lawrence Livermore National Laboratory; Matthew Korey, Purdue University

Monday PM

Room: A104

September 30, 2019

Location: Oregon Convention Center

Session Chairs: Thomas Reeve, Lawrence Livermore National Laboratory; Matthew Korey, Purdue University

2:00 PM Introductory Comments

2:10 PM Invited

Ally, Advocate, Accomplice: How both Knowledge and Action are Vital to Creating Inclusivity within Science: *Decatur Foster*¹; ¹Portland State University

2:40 PM Question and Answer Period

2:45 PM Invited

Way Beyond the Bird-Bee Binary: Why Diversity Can Be an Uncomfortable Topic, Who Needs to Start the Conversation, and How to Do It Right: *K. Cunningham*¹; ¹ATI Specialty Alloys & Components

3:15 PM Question and Answer Period

3:20 PM Break

3:50 PM Invited

Building Sustainable Partnerships between Historically Black Colleges and Universities (HBCUs) and Majority, Research-Intensive Universities: *Shaik Jeelani*¹; Mahesh Hosur²; Melissa Reeves¹; Michael Curry¹; Inez Hua³; Carol Handwerker³; ¹Tuskegee University; ²Texas A&M University-Kingsville; ³Purdue University

4:20 PM Question and Answer Period

Additive Manufacturing Education — Session II

Program Organizers: Somayeh Pasebani, Oregon State University; Hang Yu, Virginia Polytechnic Institute and State University; Amy Elliott, Oak Ridge National Laboratory

Monday PM

Room: B111

September 30, 2019

Location: Oregon Convention Center

Session Chair: Somayeh Pasebani, Oregon State University

2:00 PM

Additive Manufacturing in Making Powder Metallurgy Filters – Student Experiences in Manufacturing Laboratory: *Serdar Tumkor*¹; Jonathan Holman¹; Tanner Badoud¹; ¹University of Pittsburgh

2:20 PM

Developing an Improved Approach for Teaching Additive Manufacturing: *Bandar AlMangour*; ¹

2:40 PM

Free-form Additive Manufacturing Lab: *Craig Johnson*¹; Charles Pringle¹; John Choi¹; ¹Central Washington University

MONDAY PM



Additive Manufacturing of Glass, Ceramics and Composites — Additive Manufacturing of Glass, Ceramics and Composites II

Program Organizers: Tobias Schaedler, Hrl Laboratories Llc; Matthew Dickerson, Air Force Research Laboratory; Rebecca Dylla-Spears, Lawrence Livermore National Laboratory; Chang-Jun Bae, Korea Institute of Materials Science (KIMS)

Monday PM Room: B113
September 30, 2019 Location: Oregon Convention Center

Session Chair: Chang-Jun Bae, Korea Institute Of Materials Science (KIMS)

2:00 PM Invited

Stereolithographic Additive Manufacturing of Ceramic Dendrites Solid Electrolyte: *Soshu Kiriwara*¹; ¹Osaka University

2:30 PM

Multi-component Polycarbosilane Systems for the Additive Manufacturing of Polymer-derived Ceramics: *Matthew Dickerson*¹; Luke Baldwin²; Lisa Rueschhoff²; Hilmar Koerner²; John Bowen²; Connor Wyckoff²; Kara Martin²; ¹Air Force Research Laboratory; ²US Air Force

2:50 PM

Influence of Layer Thickness and Print Orientation on 3D Printed Polymer-derived Ceramics: *Stephan Brinckmann*¹; Carl Frick¹; Ray Fertig¹; ¹University of Wyoming

3:10 PM

3D Printed High Temperature Ceramic Matrix Composites: *Mark O'Masta*¹; Zak Eckel¹; Kayleigh Porter¹; Phuong Bui¹; Ekaterina Stonkevitch¹; Tobias Schaedler¹; ¹HRL Laboratories, LLC

3:30 PM Break

3:50 PM

Direct Ink Writing of Polymer-derived Ceramic Composites: *Brett Compton*¹; ¹University of Tennessee

4:10 PM

Additive Manufacturing of Ductile, Ultra-Strong Polymer-derived Nanoceramics: Jens Bauer¹; Cameron Crook¹; *Anna Guell Izard*¹; Zak Eckel²; Tobias Schaedler²; Lorenzo Valdevit¹; ¹University of California, Irvine; ²HRL Laboratories Llc

4:30 PM

Additive Manufacturing of Ceramic Matrix Composite Microlattices: *Raphael Thiraux*¹; Lorenzo Valdevit¹; ¹University of California, Irvine

4:50 PM

Impact of Process Control on Product Quality by Ceramic Robocasting Technique: Zhaolong Zhang¹; *Richard Sisson*¹; Jianyu Liang¹; ¹Worcester Polytechnic Institute

Additive Manufacturing of Metals: Microstructure and Material Properties of Nickel-based Alloys — Characterization of Microstructure of AM Ni-based Alloys

Program Organizers: Andrzej Wojcieszynski, ATI Specialty Materials; Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Sudarsanam Babu, University of Tennessee, Knoxville

Monday PM Room: B117
September 30, 2019 Location: Oregon Convention Center

Session Chair: Ulf Ackelid, Freemelt Company

2:00 PM

Combining In-Situ/Ex-Situ Characterization and Solidification Modeling to Understand Microstructure Selection in Additively Manufactured Ni-based Alloys: *Jonah Klemm-Toole*¹; Alec Saville¹; C. Becker¹; Benjamin Ellyson¹; Yaofeng Guo¹; Chloe Johnson¹; Brian Milligan¹; Andrew Polonsky²; Kira Pusch²; Kester Clarke¹; Damien Turret³; Niranjana Parab⁴; Kamel Fezzaa⁴; Tao Sun⁴; Tresa Pollock²; Amy Clarke¹; ¹Colorado School of Mines; ²University of California, Santa Barbara; ³IMDEA Materials Institute; ⁴Advanced Photon Source

2:20 PM

Fluid Dynamics Effects on Microstructure Prediction for the Single-track Laser Additive Manufacturing Process: *Adrian Sabau*¹; Lang Yuang²; Narendran Raghavan¹; John Turner¹; Vipul Gupta³; ¹Oak Ridge National Laboratory; ²University South Carolina; ³General Electric Global Research Center

2:40 PM

Effect of Post-printing Heat Treatment on the Microstructure, Hardness and Phase Formation in Laser Powder Bed Fusion Inconel 718 Cuboids: *Amir Mostafaei*¹; Runbo Jiang¹; Joseph Pauza¹; Scott Santoro¹; Anthony Rollett¹; ¹Carnegie Mellon University

3:00 PM

Crystallographic Characterization of Nickel-based Alloys by Optical Microscopy: *Mallory Wittwer*¹; Ekta Jain¹; Yeoh Yong-Chen¹; Bernard Gaskey¹; Matteo Seita¹; ¹Nanyang Technological University (NTU)

3:20 PM Break

3:40 PM

Experimental Characterization and Modeling of Solidification Cracking in Gamma-prime Strengthened Ni-based Superalloys: *Colleen Hilla*¹; Michael Mills¹; Wei Zhang¹; Andrew Wessman²; Hyeyun Song³; Alber Sadek³; ¹Ohio State University; ²GE Additive; ³EWI

4:00 PM

Microstructure and Mechanical Properties Characterization of Crack-free Hastelloy X Fabricated by Laser Powder Bed Fusion: *Oscar Sanchez-Mata*¹; Xianglong Wang¹; Jose Alberto Muñoz-Lerma¹; Mohammad Attarian Shandiz¹; Sila Atabay¹; Mathieu Brochu¹; ¹McGill University

MONDAY PM

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Additive Manufacturing of Al-based Alloys

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Specialty Materials; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Monday PM Room: B115
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Zhi Wang, South China University of Technology; Prashanth Konda Gokuldoss, Tallinn University of Technology

2:00 PM Invited

Additive Manufacturing: Precipitation Hardening of Alloys: *Prashanth Konda Gokuldoss*¹; ¹Tallinn University of Technology

2:30 PM

Laser Powder Bed Fusion of Aluminium Copper Alloys: *Amy Nommeots-Nomm*¹; S Tumulu¹; Mathieu Brochu¹; ¹McGill University

2:50 PM

Microstructural Characterization of an Additively Manufactured AL-FE-SI-V Alloy: *Terry Holesinger*¹; Matthew Schneider¹; Matthew Janish¹; Mark Ortega¹; Michael Brand¹; Colt Montgomery¹; Thomas Lienert²; ¹Los Alamos National Laboratory; ²T.J. Lienert Consulting, LLC

3:10 PM

Relationship between Microstructure and Laser Powder Bed Fusion Parameters in Al-6Zn-2Mg and Al-6Zn-2Mg-1(Sc+Zr) Alloys: *Le Zhou*¹; Sharon Park¹; Brandon McWilliams²; Kyu Cho²; Yongho Sohn¹; ¹University of Central Florida; ²US Army Research Laboratory

3:30 PM Break

3:50 PM

Using Nanofunctionalization to Additively Manufacture High Strength Aluminum: *Mark O'Masta*¹; John Martin¹; Brennan Yahata¹; Julie Miller¹; Jacob Hundley¹; Tobias Schaedler¹; ¹HRL Laboratories

4:10 PM

Additive Manufacturing of Aluminum Matrix Composites: *William Harrigan*¹; Yuzheng Zhang¹; ¹Gamma Alloys

4:30 PM

In-situ Alloying of Aluminium Based Composites Reinforced by Multi-walled Carbon Nanotubes Using Selective Laser Melting: Process and Microstructure: *Nesma Aboulkhair*¹; Marco Simonelli¹; Ehab Salama²; Graham Rance¹; Nigel Neate¹; Christopher Tuck¹; Amal Esawi²; Richard Hague¹; ¹University of Nottingham; ²The American University in Cairo

Additive Manufacturing: Effective Production, Characterization, and Recycling of Powder Materials — Characterization

Program Organizers: James Paramore, U.S. Army Research Laboratory; Ulf Ackelid, Freemelt AB; Sudarsanam Babu, University of Tennessee, Knoxville; Brady Butler, U.S. Army Research Laboratory; Zhigang Fang, University of Utah; Ola Harrysson, North Carolina State University; Don Li, Arconic Titanium & Engineered Products; Andrzej Wojcieszynski, ATI Specialty Materials

Monday PM Room: B116
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Ulf Ackelid, Freemelt AB; Sudarsanam Babu, The University of Tennessee, Knoxville

2:00 PM Invited

Synchrotron X-ray CT of AM Feedstock Metal Powder: A Validation of Metallographic Porosity Measurements: *Timothy Prost*¹; Chih-Pin Chuang²; Dileep Singh²; Emma White¹; Iver Anderson¹; ¹Ames Laboratory; ²Argonne National Laboratory

2:30 PM

Understanding Surface Area Measurement for Improved Powder Characterization: *Jack Saad*¹; ¹Micromeritics

2:50 PM

Characterization of Gas Atomized Aluminum Alloy Powder for Additive Manufacturing Applications: *Kyle Tsaknopoulos*¹; Victor Champagne²; Danielle Cote¹; ¹Worcester Polytechnic Institute; ²Army Research Lab

3:10 PM

Surface Area as a Powder Morphology Probe: *Dave van der Wiel*¹; ¹NSL Analytical

3:30 PM Break

3:50 PM Invited

Powder Specification Needs for Steels in the LPBF Process: *Elias Jelis*¹; Michael Hespel¹; Matthew Clemente¹; Ryan Carpenter¹; ¹U.S. Army ARDEC-Picatinny Arsenal

4:20 PM

Characterization of Nickel-base Superalloy MAR-M247 Powders by Synchrotron X-ray Computed Tomography: *Lianghua Xiong*¹; Andrew Chuang¹; Peter Kenesei¹; Jonathan Almer¹; Dileep Singh¹; ¹Argonne National Laboratory

4:40 PM

Understanding Powder Morphology and Its Effect on Flowability through Computer Vision and Machine Learning in Additive Manufacturing: *Srujana Rao Yarasi*¹; Andrew Kitahara¹; Anthony Rollett¹; Elizabeth Holm¹; ¹Carnegie Mellon University

5:00 PM

Potentials and Risks in Hybrid Manufacturing: Miriam Huber¹; Marie Jurisch²; Sebastian Matthes¹; *Felix Gemse*¹; ¹ifw Jena; ²Fraunhofer IFAM

5:20 PM

Determination of Viscosity of Metal Melts by High Temperature Rheometry: Christopher Giehl¹; Mario Kleindienst¹; *Daniela Ehgartner*¹; ¹Anton Paar



Additive Manufacturing: In-situ Process Monitoring and Control — Miscellaneous Methods

Program Organizers: Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Powder Metals; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Monday PM Room: B112
September 30, 2019 Location: Oregon Convention Center

Session Chair: Andrzej Wojcieszynski, ATI Powder Metals

2:00 PM

Correlation of Porosity Defects with In-situ Pyrometry in AM 316L Stainless Steel: *Thomas Ivanoff*¹; John Mitchell¹; Jonathan Madison¹; Joshua Koepke¹; Daryl Dagel¹; Bradley Jared¹; ¹Sandia National Laboratories

2:20 PM

Defect Detection in Additively Manufactured 304L and Ti-6-4 via Low Frame Rate Pyrometry: *Tom Stockman*¹; John Carpenter¹; Brian Patterson¹; ¹Los Alamos National Laboratory

2:40 PM

Direct Process Feedback in Extrusion-based Additive Manufacturing Using Learning Control: *Ashley Armstrong*¹; Andrew Alleyne¹; Amy Wagoner Johnson¹; ¹University of Illinois Urbana-Champaign

3:00 PM

Implementation of Nonlinear Ultrasonic Techniques for In-situ Monitoring of Defect Formation in Additively Manufactured Inconel 718: *Anna Hayes*¹; Susana Castillo¹; Umar Amjad¹; Tribikram Kundu¹; Gregory Colvin²; BG Potter¹; Krishna Muralidharan¹; ¹The University of Arizona; ²Honeywell Aerospace

3:20 PM Break

3:40 PM

In-situ Cooling Dynamics of Ti-6Al-4V Additive Manufacturing and Its Relation to Microstructure and Properties: *Anthony Fong*¹; Vivek Thampy¹; Ottman Tertuliano²; Kevin Stone¹; Johanna Weker¹; Matthew Kramer³; Ryan Ott³; Wei Cai²; Christopher Tassone¹; ¹SLAC National Accelerator Laboratory; ²Stanford University; ³Ames Laboratory

4:00 PM

Real-time Layer-by-layer Ultrasonic Peening Treatment during Additive Manufacturing to Improve Fatigue Properties of 17-4 SS Alloy: *Rasool Sebdani*¹; Ajit Achuthan¹; ¹Clarkson University

4:20 PM

Selective Laser Melting Monitored by Acoustic Emission and Tomography Characterization: *Rita Drissi Daoudi*¹; ¹EPFL

4:40 PM

Effect of Powder Bed Fusion Processing Parameters on Optical Emission during Single-track Deposits and the Implications for Quality Assurance and Control: *Christopher Stutzman*¹; Abdalla Nassar¹; ¹The Pennsylvania State University

Additive Manufacturing: Solid-state and Other Nonbeam-based Technologies for the Manufacturing of Metallic Parts — AM by Methods Requiring a Sinter Step

Program Organizers: Olaf Andersen, Fraunhofer Society; J. Brian Jordon, University of Alabama; Orlando Rios, Oak Ridge National Laboratory; Paul Allison, University of Alabama; Mark Norfolk, Fabrisonic LLC; Luke Brewer, University of Alabama

Monday PM Room: B114
September 30, 2019 Location: Oregon Convention Center

Session Chairs: J. Brian Jordon, University of Alabama; Markus Chmielus, University of Pittsburgh

2:00 PM Invited

Steel Parts Produced by Material Extrusion Additive Manufacturing, Solvent Debinding and Sintering: *Joamin Gonzalez-Gutierrez*¹; Yvonne Thompson²; Santiago Cano¹; Peter Felfer²; Christian Kukla¹; Clemens Holzer¹; ¹Montanuniversitaet Leoben; ²Friedrich-Alexander-Universitaet Erlangen Nuernberg

2:30 PM

Metal-loaded Polymer Filament for FDM: *Stephanie Choquette*¹; Wesley Everhart¹; ¹Kansas City National Security Campus

2:50 PM

Metal Fused Filament Fabrication (MF3) 3D Printing with Powder-Polymer Mixtures: Paramjot Singh¹; Kavish Sudan¹; *Kunal Kate*¹; Sundar Atre¹; Vamsi Balla¹; ¹University of Louisville

3:10 PM Invited

Sintering and Infiltration of Binder Jet Printed Parts for Applications in Tooling and Energy: *Amy Elliott*¹; ¹Oak Ridge National Laboratory

3:30 PM Break

3:50 PM

3D Screen Printing of Medical Parts: Thomas Studnitzky¹; Kay Reuter¹; *Olaf Andersen*¹; Guido Stiebritz²; Stefan Wirth³; ¹Fraunhofer Society; ²H.C. Starck Hermsdorf GmbH; ³Siemens Healthineers

4:10 PM Invited

The Effect of Printing and Post-processing on Microstructure and Properties of Binder Jet 3D Printed Materials: Runbo Jiang¹; Katerina Kimes¹; Pierangeli Rodriguez De Vecchis¹; Amir Mostafaei²; *Markus Chmielus*¹; ¹University of Pittsburgh; ²Carnegie Mellon University

4:30 PM

Densification Kinetics in Binder jet 3D Printed Co-Cr Biomaterials: *Amir Mostafaei*¹; Sidi Feng¹; Nihal Sivakumar¹; Runbo Jiang²; Pierangeli Rodriguez De Vecchis²; Markus Chmielus²; Anthony Rollett¹; ¹Carnegie Mellon University; ²University of Pittsburgh

4:50 PM

On the Sintering Behavior of Binder Jet Additive Manufactured 316L Stainless Steel Components: *Saereh Mirzababaei*¹; Sriram Manoharan¹; Brian Paul¹; Somayeh Pasebani¹; ¹Oregon State University

5:10 PM

Packing Defects and Microstructure Evolution during Sintering of Binder-jet Printed 625 Nickel Based Superalloy: Chuyuan Zheng¹; Amir Mostafaei²; Pierangeli Rodriguez De Vecchis¹; *Ian Nettleship*¹; Markus Chmielus¹; ¹University of Pittsburgh; ²Carnegie Mellon University

MONDAY PM

Advanced Biomaterials for Biomedical Implants and Biosensing Devices — Session II

Program Organizers: Tolou Shokuhfar, University of Illinois at Chicago; Sahar Vahabzadeh, Northern Illinois University

Monday PM Room: C120
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Tolou Shokuhfar, University of Illinois at Chicago; Sahar Vahabzadeh, Northern Illinois University

2:00 PM

Improving the Biocompatibility and Corrosion Resistance of AZ31 Mg Alloy for Biomedical Applications: *Adedotun Adetunla*¹; *Esther Akinlabi*¹; ¹University of Johannesburg

2:20 PM

Extraction, Characterization and Properties of Chitin and Chitosan of Nigerian Origin: *Chiosa Odili*¹; *Oluwashinor Gbenedor*¹; *Olatunde Sekunowo*¹; *Oluropo Adeosun*¹; ¹University of Lagos

2:40 PM

From Porous to Dense Nanostructured β -Ti Alloys through High-pressure Torsion: Advanced Characterization: *Conrado Afonso*¹; *Angelica Amigó*²; *Vladimir Stolyarov*³; *Raúl Arenal*⁴; *Vicente Amigó*²; ¹Universidade Federal de São Carlos (UFSCar); ²Universitat Politècnica de València (UPV); ³Moscow Engineering Physics Institute; ⁴Universidad de Zaragoza

3:00 PM

Zinc Doping Controlled In Vivo Degradability of Magnesium Phosphate Bioceramic: *Kaushik Sarkar*¹; *Vinod Kumar*²; *Samit Nandi*²; *Mangal Roy*¹; ¹Indian Institute of Technology; ²West Bengal University of Animal & Fishery Sciences

3:20 PM Break

3:40 PM

Plasma sprayed In-situ Formed TiB-TiN Reinforced Ti6Al4V Alloy Composite Coatings: Tribocorrosion Evaluation: *Akrity Anand*¹; *Mitun Das*¹; *Biswanath Kundu*¹; *Subhadip Bodhak*¹; *Gangadharan S*¹; *Vamsi Balla*²; ¹CSIR-Central Glass & Ceramic Research Institute; ²University of Louisville

4:00 PM

Effect of Heat Treatment and Forging on In Vitro Corrosion and Cytocompatibility of Mg-Zr-Sr-Ce Alloy: *Sourav Dutta*¹; *Sanjay Gupta*¹; *Mangal Roy*¹; ¹Indian Institute of Technology Kharagpur

Advanced Materials for Harsh Environments — Session II

Program Organizers: Navin Manjoran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Monday PM Room: C126
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Hang Yu, Virginia Polytechnic Institute and State University; Gary Pickrell, Virginia Tech; Navin Manjoran, Solve Technology and Research, Inc.

2:00 PM Keynote

Interface Corrosion of Glass Seals with Crofer 22 APU/YSZ for the Planar Solid Oxide Fuel Cells: *Gurbinder Kaur*

2:40 PM

High-temperature Oxidation of Ni-based Alloys in CO₂ Containing Combustion Impurities: *Richard Oleksak*¹; *Joseph Tylczak*¹; *Gordon Holcomb*¹; *Ömer Dogan*¹; ¹National Energy Technology Laboratory

3:00 PM

Effect of Welds and Crevices on Oxidation in High Temperature Supercritical Carbon Dioxide: *Florent Bocher*¹; ¹Southwest Research Institute

3:20 PM

Enhancing the Tribocorrosion Resistance of Al and Mg Alloys via Microstructure Design: *Wenjun Cai*¹; ¹Virginia Tech

3:40 PM Break

4:00 PM

Electroceraic-based Passive Wireless Sensors for Monitoring High Temperature Systems: *Kavin Sivaneri Varadharajan Idhaaim*¹; *Lawrence Redinger*¹; *Katarzyna Sabolsky*¹; *Edward Sabolsky*¹; *Konstantinos Sierros*¹; *Harish Palakurthi*¹; *Daryl Reynolds*¹; ¹West Virginia University

4:20 PM

Early Stage Oxidation of UNS N06230 and UNS N07214 in Dry and Humid Conditions: *Nicholas Ury*¹; *Annette Wagner*¹; *Vinay Deodeshmukh*²; *Vilupanur Ravi*¹; ¹Cal Poly Pomona; ²Haynes International

4:40 PM

Effect of Chromium on Corrosion Resistance of Stainless Steels in Supercritical CO₂ Direct Power Cycle Environments: *Reyixiati Repukaiti*¹; *Lucas Teeter*¹; *Margaret Ziomek-Moroz*¹; *Omer Dogan*¹; *Richard Oleksak*¹; *Randal Thomas*¹; *John Baltrus*¹; *Julie Tucker*²; ¹National Energy Technology Laboratory; ²Oregon State University

5:00 PM

Dielectric, Electromechanical Properties and Photo-catalytic Activity of Na_{0.5}Bi_{0.5}TiO₃-BaTiO₃-K_{0.5}Bi_{0.5}TiO₃ Lead-free Ceramics: *Mohammed Mesrar*¹; ¹Signaux Systèmes et Composants (Fés (Maroc)

5:20 PM Concluding Comments

Advances in Dielectric Materials and Electronic Devices — Dielectrics and Piezoelectrics: Session II Synthesis and Growth

Program Organizers: Amar Bhalla, University of Texas; Ruyan Guo, University of Texas at San Antonio; Rick Ubc, Boise State University; Danilo Suvorov, Jožef Stefan Institute

Monday PM Room: A105
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Danilo Suvorov, Jožef Stefan Institute; Rick Ubc, Boise State University

2:00 PM Invited

Upside-down Piezoelectric Composites without Sintering - Towards Sensor Applications: *Tuomo Siponkoski*¹; *Mikko Nelo*¹; *Heli Jantunen*¹; *Jari Juuti*¹; ¹University of Oulu

2:20 PM Invited

New Ferroelectric Perovskite Ceramics with Low Losses for Applications in Microwave Antennas: *Claire Le Paven*¹; *Mohamad Haydoura*¹; *Ratiba Benzerga*¹; *Vincent Laur*²; *Florent Marlec*¹; *Laurent Le Gendre*¹; *Yang Bai*³; *Heli Jantunen*¹; *Alexis Chevalier*²; *Ala Sharaiha*¹; ¹University of Rennes, IETR; ²University of Brest, LABSTICC; ³University of Oulu, MRU



MONDAY PM

2:40 PM Invited

Compositional Design of LTCC Materials with Different Dielectric Permittivities for Microwave Applications: *J.J. Bian*¹; ¹Shanghai University

3:00 PM Invited

Perspectives on Dielectric and Magnetic Ceramic Materials for Use in 5G Wireless Communication: *Michael Hill*¹; David Cruickshank²; Iain MacFarlane²; Dave Firor¹; ¹Skyworks RF Ceramics; ²Wireless Communications Consultant

3:20 PM Break

3:40 PM Invited

High k Microwave Dielectric Ceramics Suitable for Low Temperature Co-fired Ceramics Technology: *Di Zhou*¹; ¹Xi'an Jiaotong University

4:00 PM

Microwave Dielectric Materials Fabricated by Cold Sintering Process: *Jing Guo*¹; Hong Wang²; Clive Randall³; ¹Xi'an Jiaotong University, Pennsylvania State University; ²Southern University of Science and Technology; ³Pennsylvania State University

4:20 PM

In situ Characterization during Crystallization of Highly Textured Sr_xBa_{1-x}Nb₂O₆ Thin Films from Aqueous Chemical Solution Deposition: *Anders Blichfeld*¹; Kristine Bakken¹; Donald Evans¹; Julia Glaum¹; Tor Grande¹; Mari-Ann Einarsrud¹; ¹NTNU Norwegian University of Science and Technology

4:40 PM Invited

State-of-the-art Microwave Measurements of Materials: *Nathan Orloff*¹; ¹National Institute of Standards and Technology

5:00 PM

Processing Effects on Dielectrics Produced via Aerosol Deposition: *Eric Patterson*¹; Scooter Johnson¹; Edward Gorzkowski¹; ¹U.S. Naval Research Lab

5:20 PM

The Interplay of Electronic and Magnetic Functionalities in Entropy-stabilized Oxides: *Peter Meisenheimer*¹; Sieun Chae¹; Emmanouil Kioupakis¹; John Heron¹; ¹University of Michigan

Advances in Zinc-coated Sheet Steel Processing and Properties — Advances in Zinc-coated Sheet Steel Processing and Properties

Program Organizers: Frank Goodwin, ILZRO; Joseph McDermid, McMaster University

Monday PM
September 30, 2019

Room: C125
Location: Oregon Convention Center

Session Chair: Frank Goodwin, ILZRO

2:00 PM Invited

Investigation on the Coating Adhesion of Galvanized AHSS Treated by Oxidation-reduction Process: *Xinyan Jin*¹; Jiajie Chen²; Guangkui Hu¹; Li Wang¹; ¹Baoshan Iron & Steel Co., Ltd.; ²Pan Asia Technical Automotive Center Co., Ltd.

2:40 PM

Development of a New Grade of Galvanized Direct Hot Press Hardenable Steel: *Chris Thomsen*¹; Joseph McDermid¹; Frank Goodwin²; ¹McMaster University; ²International Zinc Association

3:00 PM

The Effect of Coating Process on Liquid Zn-assisted Embrittlement of TRIP Steel: *Doyub Kim*¹; Jee-Hyun Kang²; Du-Youl Choi³; Sung-Joon Kim¹; ¹POSTECH GIFT; ²Yeungnam University; ³POSCO

3:20 PM

Effect of Liquid Metal Embrittlement on Mechanical Behavior of Advanced High Strength Steel Spot Welds at Ambient and Low Temperatures: *Kayla Molnar*¹; Matthew Zappulla¹; John Speer¹; Kip Findley¹; ¹Colorado School of Mines

3:40 PM Break

4:00 PM

The Influence of Electrode Geometry on the Liquid Metal Embrittlement Cracking in Resistance Spot Welding of Advanced High Strength Steel: *Yeongdo Park*¹; Siva Prasad Murugan¹; ¹Dong-Eui University

4:20 PM

Application of Machine Learning to the Development of New Zn-based Coatings with Low Melting Temperature for Automotive Steels: *Rohit Bardapurkar*¹; Sridhar Seetharaman¹; John Speer¹; Chris Borg²; Malcolm Davidson²; ¹Colorado School of Mines; ²Citrine Informatics

4:40 PM

Influence of Treatment Regimes in the Conditions of SHS on the Development of Steel: *Borys Sereda*¹; Dmytro Sereda¹; ¹Dneprovsky State Technical University

Alpha Sigma Mu Lecture

Monday PM
September 30, 2019

Room: Portland Ballroom 254
Location: Oregon Convention Center

2:30 PM Invited

The Role of Additive Manufacturing in Industry 4.0: From Integrated Design and Fabrication to Structural Performance and Qualification: *Diana Lados*¹; ¹Worcester Polytechnic Institute

Ceramic and Crystal Materials for Optics and Photonics — Session II

Program Organizers: Yiquan Wu, Alfred University; Jas Sanghera, Naval Research Laboratory; Akio Ikesue, World-Lab. Co., Ltd; Mark Dubinskiy, Army Research Laboratory; Randall Hay, U.S. Air Force Research Laboratory; Xiang-Hua Zhang, Université de Rennes 1; Michael Squillante, RMD, Inc; Long Zhang, Chinese Academy of Sciences; Takunori Taira, National Institutes of Natural Science

Monday PM
September 30, 2019

Room: A107
Location: Oregon Convention Center

Session Chairs: Ivar Reimanis, Colorado School of Mines; Hyunjun Kim, UES Inc.

2:00 PM

Development of Single Crystal Fiber Lasers: *Shyam Bayya*¹; Woohong Kim¹; Brandon Shaw¹; Syed Qadri¹; Daniel Gibson¹; Jason Myers¹; Daniel Rhonhouse¹; Guillermo Villalobos¹; Michael Hunt¹; John Peele²; Ishwar Aggarwal²; Joseph Kolis³; Brad Stadleman³; Jas Sanghera¹; ¹Naval Research Laboratory; ²KeyW Corp; ³Clemson University

2:40 PM Invited

Intriguing Optical Phenomena in Garnet Transparent Ceramic: *Farida Selim*¹; Sahil Agarwal¹; Le Zhang²; Yiquan Wu³; ¹Bowling Green State University; ²Jiangsu Normal University; ³New York State College of Ceramics, Alfred University

3:00 PM Invited

Investigation of Host Glasses for BaCl₂:Eu²⁺ Layered Thin Films for Medical Imaging: *Jacqueline Johnson*¹; Charles Bond¹; Russell Leonard¹; Anthony Lubinsky²; Yu Jin³; Amanda Petford-Long⁴; ¹University of Tennessee Space Institute; ²SUNY Stony Brook; ³Northwestern University; ⁴Argonne National Laboratory

3:20 PM Break

3:40 PM Invited

Synthesis and Processing of Zinc Chalcogenides Optical Materials: *Shengquan Yi*¹; Yiyu Yi¹; Yiquan Wu¹; ¹Alfred University

4:00 PM Invited

Transparent Ceramic for Extreme Environment: *WooHong (Rick) Kim*¹; Shyam Bayya¹; Guillermo Villalobos¹; Michael Hunt¹; Fritz Miklos¹; Bryan Sadowski¹; Jasbinder Sanghera¹; ¹Naval Research Laboratory

4:20 PM Invited

Mixed-anion Ceramic Phosphors with Asymmetric Ligand Field for Rare-earth: *Setsumi Tanabe*¹; ¹Kyoto University

Ceramics and Glasses Simulations and Machine Learning — Multi-scale Simulations of Ceramics and Glasses

Program Organizers: Mathieu Bauchy, University of California, Los Angeles; Peter Kroll, University of Texas; Efrain Hernandez, Army Research Laboratory

Monday PM
September 30, 2019

Room: A109
Location: Oregon Convention Center

Session Chair: Peter Kroll, University of Texas Arlington

2:00 PM Invited

Peridynamics Modeling of Impact-induced Crack Patterns in Glass: *N. M. Anoop Krishnan*¹; Jonathan Berjikian²; Mathieu Bauchy²; Jared Rivera²; ¹Indian Institute of Technology Delhi; ²University of California, Los Angeles

2:40 PM

Impact of Carbon Morphology on Mechanical Properties of SiCO Ceramics: *Shariq Haseen*¹; Peter Kroll¹; ¹University of Texas at Arlington

3:00 PM

Reactive MD Simulations of Polysiloxanes: Modeling the Polymer-to-Ceramic Route towards Silicon Oxycarbide Ceramics: *Iliia Ponomarev*¹; Peter Kroll¹; ¹University of Texas at Arlington

3:20 PM Break

3:40 PM

Atomistic Modeling of Fundamental Deformation Mechanisms in MAX Phases: *Gabriel Plummer*¹; Garritt Tucker¹; ¹Colorado School of Mines

4:00 PM

Development of Boron Oxide Potentials for Computer Simulations of Multi-component Oxide Glasses: *Lu Deng*¹; Jincheng Du¹; ¹University of North Texas

4:20 PM

Force-Enhanced Refinement of the Atomic Structure of Silicate Glasses: *Qi Zhou*¹; *Mathieu Bauchy*¹; ¹University of California, Los Angeles

Characterization and Modeling of Metal Whisker Formation — Whisker Ubiquity and Mitigation

Program Organizers: Philip Eisenlohr, Michigan State University; Eric Chason, Brown University; Carol Handwerker, Purdue University

Monday PM
September 30, 2019

Room: E142
Location: Oregon Convention Center

Session Chair: Susmita Das Mahapatra, Intel Corporation

2:00 PM Keynote

Spontaneous Metal Whisker Growth on MAX Phases and Beyond: *ZhengMing Sun*¹; ¹Southeast University

2:40 PM

Characterization of Cadmium Plating Microstructure and Whiskers: *Zahra Ghanbari*¹; Donald Susan¹; Jamin Pillars¹; Joseph Michael¹; Sara Dickens¹; Damion Cummings¹; ¹Sandia National Laboratories

3:00 PM

Cadmium Whisker Growth on Cd-plated Steel Fastener Hardware: *Donald Susan*¹; Zahra Ghanbari¹; Jamin Pillars¹; Bonnie McKenzie¹; Joseph Michael¹; Sara Dickens¹; ¹Sandia National Laboratories

3:20 PM Invited

Whisker Mitigation in Indium Doped Tin Electroplating: *Bhaskar Majumdar*¹; Indranath Dutta²; Sherin Bhassyvasantha³; Susmita Das Mahapatra⁴; ¹New Mexico Institute of Mining and Technology; ²Washington State University; ³Molex, LLC; ⁴Intel Corporation

Characterization of Materials and Properties through Metallography, Mechanical Testing and Analysis - From Fundamentals to the Cutting Edge —

Microstructural Characterization and the Correlation of Microstructure to Mechanical Properties I

Program Organizer: Michael Keeble, Buehler

Monday PM
September 30, 2019

Room: F152
Location: Oregon Convention Center

Session Chairs: Frank Mücklich, Universität des Saarlandes; Michael Connelly, Casey Products (retired); Laura Moyer, Lehigh University

2:00 PM

How to Measure the Homogeneity of Microstructures – A New Tool for a Quantitative Determination of Object- and Region Homogeneity: *Dominik Britz*¹; Ulrich Sonntag²; Johannes Webel¹; Sven Ebner¹; Michael Engstler³; Frank Muecklich¹; ¹Material Engineering Center Saarland; ²Society for the Advancement of Applied Computer Science; ³Saarland University

2:20 PM

A Systematic Procedure for Phase Fraction Measurements from Backscattered Images Using the Rolling Ball Algorithm: *Mariana Rodrigues*¹; Matthias Militzer¹; ¹The University of British Columbia

2:40 PM

A Comparison between Anodizing and EBSD Techniques for Primary Particle Size Measurement: *Shahrooz Nafisi*¹; Anthony Roccisano²; Reza Ghomashchi²; George Vander Voort³; ¹The University of Adelaide, University of Alberta, Consolidated Metco; ²The University of Adelaide; ³Consultant - Struers Inc., USA



MONDAY PM

3:00 PM

Revealing Prior Austenite Grain Size using the Oxidation, McQuaid – Ehn, and Saturated Picric Acid Methods: *Gabriel Lucas*¹; Brian Battle¹; ¹Scot Forge Company

3:20 PM Break

3:40 PM Invited

The Effect of Tensile Test Speed Control on Mechanical Properties of Metal: Daniel Dennies¹; *Jaret Frafford*²; ¹DMS Inc; ²IMR Test Labs - Portland

4:00 PM Invited

Results of an Interlaboratory Test Program to Assess the Precision of Inclusion Ratings Using ASTM E 45: *George Vander Voort*¹; ¹Vander Voort Consulting L.L.C.

4:20 PM Invited

Panel Session on Interpretation and Implementation of ASTM Standards in Metallography: *Michael Keeble*¹; ¹Buehler

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — Metal and Semiconductor Nanostructures

Program Organizers: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Tech; Edward Gorzkowski, Naval Research Laboratory ; Jian Shi, Rensselaer Polytechnic Institute; Kejie Zhao, Purdue University ; Michael Naguib, Tulane University

Monday PM
September 30, 2019

Room: C123
Location: Oregon Convention Center

Session Chairs: Jian Shi, Rensselaer Polytechnic Institute; Haitao Zhang, University of North Carolina at Charlotte

2:00 PM Invited

Synthesis and Processing of Quantum Dots for Improved Photoluminescence Quantum Yields: *Gregory Herman*¹; ¹Oregon State University

2:30 PM Invited

Assembly and Integration of Multisegment Nanowires for Electronics and Sensor Applications: *Zhiyong Gu*¹; ¹University of Massachusetts Lowell

3:00 PM

A Novel Synthesis Method for Independent Control of Grain Size, Dispersion and Phase Composition of Thin Films: *Paul Rasmussen*¹; Rohit Sarkar¹; Jagannathan Rajagopalan¹; ¹Arizona State University

3:20 PM Break

3:40 PM

Synthesis of Metallic Films with Precisely Tailored Multimodal Architectures: *Rohit Berlia*¹; Jagannathan Rajagopalan¹; ¹Arizona State University

4:00 PM

Phase-field Modeling of Self-organization in Physical Vapor-deposited Alloy Films with Coherent Elastic Misfit: *Rahul Raghavan*¹; Kumar Ankit¹; ¹School for Engineering of Matter, Transport and Energy, Arizona State University

4:20 PM Invited

In-situ Synthesis of CdS Nanowire Photosensor for Chemiluminescent Immunoassays: *Jae-Chul Pyun*¹; ¹Yonsei University

4:50 PM

Boron Nitride Nanotubes with High Purity for Thermal Management: Mahmoud Amin¹; David Kranbuehl¹; *Hannes Schniepp*¹; ¹The College of William & Mary

5:10 PM

Synthesis of PbSe Colloidal Quantum Dots Using a Batch Microwave Reactor: *Tyler McCrear*¹; Stebby John¹; Derek Dardzinski¹; Erik Wislinsky¹; Joseph Bergevin¹; Haori Yang¹; Gregory Herman¹; ¹Oregon State University

Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the Way): The Elizabeth Judson Memorial Symposium — Improving Materials Education

Program Organizers: Gregg Janowski, University of Alabama at Birmingham; Devarajan Venugopalan, University of Wisconsin-Milwaukee; Jeffrey Fergus, Auburn University; Janelle Wharry, Purdue University; Tonya Stone, Mississippi State University; Thomas Bieler, Michigan State University; Ronald Gibala, University of Michigan

Monday PM
September 30, 2019

Room: A108
Location: Oregon Convention Center

Session Chairs: Tonya Stone, Mississippi State University; Janelle Wharry, Purdue University; Gregg Janowski, University of Alabama at Birmingham; Jeffrey Fergus, Auburn University

2:00 PM

Addressing the Updated Engineering Design Definition in MSE Programs: *Kaitlin Tyler*¹; ¹ANSYS Granta

2:20 PM

The Enrollment Floodgates Are Open – Best Practices in Materials Science and Engineering Undergraduate Education for Rising Enrollments: Workshop Findings: *Robert Kimel*¹; Susan Sinnott¹; ¹Penn State University

2:40 PM

Mentoring Best Practices for Interns: Panel Discussion: *Jonathan Zimmerman*¹; Yi Liu²; Tonya Stone³; Su Gupta⁴; ¹Sandia National Laboratories (Moderator); ²Fiat Chrysler Automobiles US; ³Mississippi State University; ⁴University of Alabama. The panel includes: Jonathan Zimmerman, Sandia National Laboratories (Moderator); Simona Hunyadi Murph, Savannah River National Laboratory; Clarissa Yablinsky, Los Alamos National Laboratory (staff and former intern); Chris San Marchi, Sandia National Laboratories; Rachel Seibert, Oak Ridge National Laboratory (former intern); Paul Prichard, Kennametal; Bill Clark, Intel (former intern at Hitachi Global Storage Technology); Garritt Tucker, Colorado School of Mines (former SNL intern).

Data Science for Material Property Interpretation — Dimensionality Reduction and Insight Generation from Materials Data

Program Organizers: Alex Belianinov, Oak Ridge National Laboratory; Ichiro Takeuchi, University of Maryland; Jeff Simmons, Wright Patterson Air Force Research Laboratory; Jason Hattrick-Simpers, National Institute of Standards and Technology

Monday PM
September 30, 2019

Room: E145
Location: Oregon Convention Center

Session Chair: Alex Belianinov, Oak Ridge National Laboratory

2:00 PM Invited

Deep Learning and MC-X ray, toward Automatic Sample Segmentation: Samantha Rudinsky¹; Yu Yuan¹; Raynald Gauvin¹; Mike Marsh²; Benjamin Provencher²; *Nicolas Piché*²; ¹McGill University; ²Object Research Systems

2:40 PM

Phase Field Regularization for Optimal Grain Reconstruction of Noisy Images: *Jeff Simmons*¹; Amir Ziabari²; Lawrence Drummy¹; Charles Bouman³; Jeffrey Rickman⁴; ¹US Air Force Research Laboratory; ²Oak Ridge National Laboratory; ³Purdue University; ⁴Lehigh University

3:00 PM Invited

Model-based Reconstruction Algorithms for Time-of-Flight Neutron Tomography: *Singanallur Venkatakrishnan*¹; Luc Dessieux²; Philip Bingham¹; ¹Oak Ridge National Laboratory; ²University of Tennessee Knoxville

3:40 PM Break

3:55 PM

Multi-modal Data Fusion and 3D Reconstruction of Serial Sectioning Data: *Megna Shah*¹; Sean Donegan¹; Michael Uchic¹; ¹Air Force Research Laboratory

4:15 PM

Modeling and Simulation of Rare Events in Multidimensional Spaces: *Mary Comer*¹; ¹Purdue University

4:35 PM

Digital Protocols for Statistical Quantification of Microstructure Features in Polycrystalline Nickel-based Superalloys: *Hyung Nun Kim*¹; Surya Kalidindi¹; Xuan Liu²; Max Kaplan²; ¹Georgia Institute of Technology; ²Pratt & Whitney

4:55 PM

Human-in-the-loop Strategies for Dimensionality Reduction and Optimization in Materials Design: *Christopher Adair*¹; S. Ryan Adair²; Seth Holladay¹; Derek Hansen¹; Oliver Johnson¹; ¹Brigham Young University; ²Southern Utah University

5:15 PM

Application of a Statistical Analysis Technique for Characterizing the Deformation Behavior of the Material under Dynamic Impact Loading: *Md Salah Uddin*¹; Brahmananda Pramanik¹; ¹Montana Technological University

Emergent Materials under Extremes and Decisive In-situ Characterizations — Decisive In-situ Characterizations

Program Organizers: Xujie Lu, Center for High Pressure Science & Technology Advanced Research; Judith Driscoll, Cambridge University; Xiaofeng Guo, Washington State University; Hua Zhou, Argonne National Laboratory

Monday PM Room: D137
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Wenge Yang, Center for High Pressure Science & Technology Advanced Research; Hua Zhou, Argonne National Laboratory

2:00 PM Invited

Materials Structure Evolution in Laser Additive Manufacturing Revealed by Synchrotron X-ray Imaging and Diffraction: *Tao Sun*¹; Chih-Pin Chuang¹; Lianyi Chen²; Anthony Rollett³; ¹Argonne National Laboratory; ²Missouri University of Science and Technology; ³Carnegie Mellon University

2:30 PM

In-situ and Time Resolved Characterization of Materials Using Liquid MetalJet X-ray Source: *Anasuya Adibhatla*¹; B. Hansson²; M. Otendal²; P. Takman²; E. Espes²; T. Tuohimaa²; ¹Excillum Inc; ²Excillum AB

2:50 PM

In-situ SEM Characterization of Phase Transformation in Metals and Alloys at High Temperatures: *James Ranney*¹; Azin Akbari¹; ¹Thermo Fisher Scientific

3:10 PM

Operando X-ray PDF Study of Na and K Ion Intercalation in MnO₂ Nanosheet Electrodes: Madeleine Flint¹; Peter Metz¹; Robert Koch¹; Peng Gao¹; Alec Ladonis¹; *Scott Misture*¹; ¹Alfred University

3:40 PM Break

4:00 PM

In-situ Aerodynamic Levitation Pair Distribution Function Studies: Alkali Silicate Crystallization and Sulfate-halide Liquids: *Emily Nienhuis*¹; Natalie Smith-Gray¹; John McCloy¹; ¹Washington State University

4:20 PM

In-situ Study of Multi-scale Deformation in Two-photon Polymerized Microlattices: *Pranjali Nautiyal*¹; Victoria Wiedorn²; Jennifer Bustillos¹; Nicole Bacca¹; Xiaolong Lu¹; Sharon Fleischer³; Gordana Vunjak-Novacovic²; Alice White²; Arvind Agarwal¹; ¹Florida International University; ²Boston University; ³Columbia University

4:40 PM Panel Discussion

Failure Analysis & Characterization — Fatigue & Failure I

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Monday PM Room: F150
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Erhan Ulvan, Acuren Group Inc.; Robert O'Shea, Engineering Systems Inc; Daniel Baker, General Motors; Pierre Dupont, Schaeffler Belgium Sprl/bvba

2:00 PM Invited

Case Study Involving Failure Sequence Determination of Machinery: *Ronald Parrington*¹; Steven Counts¹; ¹Engineering Systems Inc.

2:20 PM

Rolling Contact Fatigue Failure Analysis of Ball Bearing in Gear Box: *Piyas Palit*¹; ¹Tata Steel Ltd

2:40 PM

Failure Analysis of a Separator Shaft: *Emily Bardugon*¹; ¹Applied Technical Services Inc

3:00 PM

Failure Analysis of Racing Engine Components in Large Displacement V-8 Engines: Kyle Ventura¹; Hugo Ortega¹; Kathryn Harris¹; David Rule¹; Michael Pulver¹; *Gerhard Fuchs*¹; ¹University of Florida

3:20 PM Break

3:40 PM

Faulty Metallurgy and Maintenance Causing Bolt Failures in Oil and Gas Industry: *Waleed Khalifa*¹; Iman El-Mahallawi¹; ¹Cairo University

4:00 PM

The Root Cause of a Plant Fire: Bearing Defects and Pump Cavitation: *Michael Hoerner*¹; Linda Robinson¹; Pooja Sheth¹; Farzam Mortazavi¹; ¹KnightHawk Engineering



4:20 PM

Initiation and Propagation of Rolling Contact Fatigue Cracks Observed by Laminography Using Ultra-bright Synchrotron Radiation X-ray: *Yoshikazu Nakai*¹; *Daiki Shiozawa*¹; *Shoichi Kikuchi*²; *Takashi Nishina*¹; *Hiroshi Kobayashi*¹; *Masanori Kurahashi*¹; *Taizo Makino*³; *Yutaka Neishi*³; ¹Kobe University; ²Shizuoka University; ³Nippon Steel & Sumitomo Metal Corporation

4:40 PM

Combatting Failures of Grate Bar in Sinter Plant and Pellet Plant: *Ankita Roy*¹; ¹Tata Steel

Failure Analysis: Industry Specific Failures — Non-Metallic Failures

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Monday PM

Room: F151

September 30, 2019

Location: Oregon Convention Center

Session Chairs: Jonathan Morales, GE Aviation; Dennis McGarry, SEA Limited; Gregory Chojecki, SEA Limited; Ronald Parrington, ESI

2:00 PM

Failure of Underground ABS Dry Compressed Air Piping: *Joseph Lemberg*¹; *Jared Schwartz*¹; *Steven MacLean*¹; ¹Exponent, Inc.

2:20 PM

Why Threaded Plastic Couplings Fail in Service: *Dennis McGarry*¹; *Greg Chojecki*¹; *David Riegner*¹; ¹SEA Ltd

2:40 PM

Polymer Failures: Case Histories: *Fahmida Hossain*¹; *Veda-Anne Ulcickas*¹; ¹Massachusetts Materials Research, Inc.

3:00 PM

The Identification of Plastic Additives in a Failure Analysis Investigation: *Amy Wells*¹; *Bill Carden*¹; *Richard McSwain*¹; ¹McSwain Engineering, Inc

3:20 PM Break

3:40 PM

Carbonyl Index Depth Profiling via Micro FTIR and FPA Detection: *Jason Babcock*¹; *Mark Weiss*¹; *Donald Duvall*¹; *Dale Edwards*¹; *Andy Shah*¹; ¹Engineering Systems Inc.

4:00 PM

Coating Cases: Failure & Prevention: *Andrew Havics*¹; ¹PH2 LLC

4:20 PM

Failure Analysis of a Ceramic Seal in a Fluid Rotary Joint for an Aerospace Application: *Kevin Chasse*¹; *John Dahill*¹; *Aaron West*¹; *Daniel Zivi*¹; *Michael Bednarczyk*¹; ¹Northrop Grumman Corporation

Glasses, Optical Materials, and Devices: Current Issues in Science & Technology — Modeling and Simulations of Glass Materials

Program Organizers: Jincheng Du, University of North Texas; S. Sundaram, Alfred University

Monday PM

Room: A106

September 30, 2019

Location: Oregon Convention Center

Session Chairs: Jincheng Du, University of North Texas; Carlo Massobrio, ¹Institut de Physique et Chimie des Matériaux de Strasbourg (IPCMS)

2:00 PM Invited

Melting Mechanisms in Alkali Metasilicates: *Alastair Cormack*¹; ¹Alfred University

2:30 PM Invited

Glassy Materials via First-principles Molecular Dynamics: Recent Results: *Carlo Massobrio*¹; ¹IPCMS-CNRS

3:00 PM

Reactive Potential based Simulations of Sodium Silicate Glasses: *Lu Deng*¹; *Shingo Urata*²; *Yasuyuki Takimoto*²; *Tatsuya Miyajima*²; *Seung Ho Hahn*³; *Adri C. T. van Duin*³; *Jincheng Du*¹; ¹University of North Texas; ²AGC Inc.; ³The Pennsylvania State University

3:20 PM Break

3:40 PM Invited

Machine Learning for Glass Science and Engineering: *Mathieu Bauchy*¹; ¹University of California, Los Angeles

4:10 PM Invited

Quantitative Structural Property Relationship Analysis of Multicomponent Silicate Glasses: *Jincheng Du*¹; ¹University of North Texas

4:40 PM

Role of Exchange-correlation Functionals and Dispersion Forces in Determining the Structural Properties of Glasses: *Carlo Massobrio*¹; ¹IPCMS-CNRS

5:00 PM

Cooling Rate Effects on the Structure of 45S5 Bioglass: *Yashasvi Maurya*¹; *Pratik Bhaskar*¹; *Rajesh Kumar*¹; *N. M. Anoop Krishnan*¹; ¹Indian Institute of Technology Delhi

MONDAY PM

Grain Boundaries, Interfaces, and Surfaces in Functional Materials: Fundamental Structure-Property-Performance Relationships — Ferroelectricity/ Nanocrystalline and Nanoparticulate Materials

Program Organizers: Ming Tang, Rice University; Shen Dillon, University of Illinois, Urbana-Champaign; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute of Technology

Monday PM Room: E143
September 30, 2019 Location: Oregon Convention Center

Session Chairs: John Blendell, Purdue University; Catherine Bishop, University of Canterbury

2:00 PM Invited

Ferroelectricity in Methylammonium Lead Iodide Perovskite Solar Cells: Holger Röhm¹; Tobias Leonhard¹; Alexander Schulz¹; Susanne Wagner¹; Michael Hoffmann¹; *Alexander Colsmann*¹; ¹Karlsruhe Institute of Technology (KIT)

2:30 PM Invited

3-D Resolved Ferroelectric Domains via Tomographic AFM: *Jingfeng Song*¹; James Steffes¹; Michael Martin¹; Yen Lin Huang²; Spencer Matonis¹; Ramamoorthy Ramesh²; Bryan Huey¹; ¹University of Connecticut; ²Materials Science and Engineering, UC Berkeley

3:00 PM

Stress, Strain, and Rotation Mapping of Ferroelectric Domains in BaTiO₃ Using Electron Backscatter Diffraction: Jane Howell¹; Mark Vaudin¹; *Lawrence Friedman*¹; Robert Cook¹; ¹National Institute of Standards and Technology

3:20 PM Break

3:40 PM Invited

TTT Relations for Ferroelectrics Near the Polymorphic Phase Boundary: Insights from a New Model for BZT-BCT: *Catherine Bishop*¹; Oscar Torres-Matheus¹; R. Garcia²; ¹University of Canterbury; ²Purdue University

4:10 PM Invited

Chemical Partitioning Behavior in Grain Boundaries: Pt(Au) Nanocrystalline Grains: Xuyang Zhou¹; Brad Boyce²; Blythe Clark³; *Gregory Thompson*¹; ¹The University of Alabama; ²Sandia National Laboratory ; ³Sandia National Laboratory

4:40 PM

Investigating The Role of Grain Boundary Segregation v/s Precipitation on the Thermo-mechanical Stability of Nanocrystalline Alloys: *Ankit Gupta*¹; Xuyang Zhou²; Gregory Thompson²; Garritt Tucker¹; ¹Colorado School of Mines; ²University of Alabama

5:00 PM

Elucidating Structure-property Relationships for the Rational Design of Strongly Interacting Nanoparticles on Lanthanide Perovskites: *Kandis Abdul-Aziz*¹; Soham Shah¹; Tu Nguyen¹; ¹University of California, Riverside

5:20 PM

Developing New Grain Boundary Structure-property Relations through Higher-Order Atomic Descriptors: *Jacob Tavenner*¹; Branden Kappes¹; Garritt Tucker¹; ¹Colorado School of Mines

Hydrogen Effects on Materials Performance — Hydrogen Effects on High Entropy Alloys and Superalloys

Program Organizers: Samantha Lawrence, Los Alamos National Laboratory; Kip Findley, Colorado School of Mines; Megan Cordill, Erich Schmid Institute for Materials Science

Monday PM Room: E146
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Samantha Lawrence, Los Alamos National Laboratory; Joseph Ronevich, Sandia National Laboratories

2:00 PM Invited

Hydrogen Embrittlement in fcc High Entropy Alloys: *Xiao Zhou*¹; Ali Tehrani²; William Curtin¹; ¹EPFL; ²Max-Planck-Institut für Eisenforschung GmbH

2:30 PM

Mechanical Behavior of High-entropy Alloys Hydrogenated under Different Conditions: Yakai Zhao¹; Jeong-Min Park²; Dong-Hyun Lee³; Jin-Yoo Suh⁴; Upadrasta Ramamurthy¹; *Jae-il Jang*²; ¹Nanyang Technological University; ²Hanyang University; ³Max-Planck-Institut für Eisenforschung ; ⁴Korea Institute of Science and Technology

2:50 PM

Impact of Hydrogen on the Mechanical Properties of a Severely Deformed Equimolar CrMnFeCoNi High-entropy Alloy: *Anna Ebner*¹; Helmut Clemens¹; Reinhard Pippan²; Verena Maier-Kiener¹; ¹Montanuniversität Leoben; ²Austrian Academy of Sciences

3:10 PM Question and Answer Period

3:20 PM Break

3:40 PM

A Simulation Model for Cold Cracking In High Strength Steel Welds Based on the Local Stress Distribution and Hydrogen Accumulation: *Yuya Sato*¹; Nobuyuki Ishikawa¹; ¹JFE Steel Corporation

4:00 PM Invited

A Review of Microstructure Effects on Hydrogen Induced Crack Growth Susceptibility of a High Strength Iron Based Superalloy: *Neville Moody*¹; Warren Garrison²; Steven Robinson¹; Mark Perra¹; William Gerberich³; ¹Sandia National Laboratories (Retired); ²Carnegie Mellon University; ³University of Minnesota

4:30 PM

Effect of Stress State on Hydrogen Embrittlement in Alloy718: William Hickey¹; *John Macha*¹; Brian Somerday¹; ¹Southwest Research Institute

4:50 PM

Effects of Alloy 718 Microstructure on Hydrogen Embrittlement: *Brian Kagay*¹; Kip Findley¹; Steve Coryell²; ¹Colorado School of Mines; ²Special Metals Corporation

5:10 PM

Resistance of Ni and Its Alloys to Hydrogen Embrittlement: Effects of Alloying and Heat Treatment: *Vsevolod Razumovskiy*¹; Shuang He¹; Daniel Sheiber¹; Reinhard Pippan²; Werner Ecker¹; ¹Materials Center Leoben Forschung GmbH; ²Erich Schmid Institut of Materials Science



Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales — Session II

Program Organizers: M Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen's University; Josh Kacher, Georgia Institute of Technology; Caizhi Zhou, Missouri University of Science and Technology; Lei Cao, University of Nevada, Reno

Monday PM
September 30, 2019

Room: G132
Location: Oregon Convention Center

Session Chairs: Samrat Choudhury, University of Idaho; Kelvin Xie, Texas A&M University College of Engineering

2:00 PM Invited

Integrated Computational Materials Engineering of hydrogen embrittlement in High-Hardness-Steel: *Sara Adibi*¹; Doyl Dickel¹; Luke Peterson¹; Nayeon Lee¹; Mun Sungkwang¹; Bradley Huddleston¹; Yubraj Paudel¹; Anand Balu¹; Raj Prabhu¹; Youssef Hammi¹; Douglas Bammann¹; ¹Center for Advanced Vehicular Systems

2:30 PM Invited

Machine Learning of Phase-field Simulated Microstructures: *Samrat Choudhury*¹; Isaac Curtis¹; Abhishek Thakur¹; Vishnu Boddeti²; ¹University of Idaho; ²Michigan State University

3:00 PM

Investigating the Mechanical Response of 122 Compounds Utilizing Experiments and Modeling: *Christopher Weinberger*¹; Ian Bakst¹; John Sypek²; Keith Duseo²; Hang Yu³; Paul Canfield⁴; Keara Frawley²; Sriram Vijayan²; Mark Aindow²; Seok-Woo Lee³; ¹Colorado State University; ²University of Connecticut; ³Drexel University; ⁴Iowa State University

3:20 PM Break

3:40 PM Invited

3D TEM Characterization of Nano-precipitates in a Ni-Ti-Hf Shape Memory Alloy: *Kelvin Xie*¹; Dexin Zhao¹; ¹Texas A&M University

4:10 PM Invited

Decoupling Thermal, Mechanical, and Irradiation Stability Mechanisms in Nanocrystalline Pt Alloys: *Khalid Hattar*¹; Christopher Barr¹; Nathan Heckman¹; Brad Boyce²; Stephen Foiles¹; Fadi Abdeljawad²; ¹Sandia National Laboratories; ²Clemson University

4:40 PM

Large Scale Molecular Dynamics Simulations of Rapid Directional Solidification of Aluminum Alloys: *Mohsen Asle Zaeem*¹; Avik Mahata²; ¹Colorado School of Mines; ²Missouri University of Science and Technology

5:00 PM Invited

Direct Imaging of Chemical Short-range Order and Its Impact on Deformation in Metal Alloys: *Ruopeng Zhang*¹; Shiteng Zhao¹; Colin Ophus²; Yu Deng³; Shradha Vachhani⁴; Burak Ozdol²; Rachel Traylor¹; Jun Ding⁵; Karen Bustillo²; John Morris¹; Daryl Chrzan¹; Mark Asta¹; Robert Ritchie¹; Andrew Minor¹; ¹UC Berkeley; ²National Center for Electron Microscopy, Molecular Foundry, Lawrence Berkeley National Laboratory; ³Center of Modern Analysis, Nanjing University; ⁴Bruker Nano Surfaces; ⁵Materials Sciences Division, Lawrence Berkeley National Laboratory

Joining of Advanced and Specialty Materials XXI — Friction and Friction Stir Welding II / Welding Processes

Program Organizers: Mathieu Brochu, McGill University; Anming Hu, University of Tennessee; Hiroaki Mori, Osaka University; Yuri Hovanski, Brigham Young University; Darren Barborak, WeldQC Inc; Akio Hirose, Osaka University; Peng He, Harbin Institute of Technology; Zhiyong Gu, University of Massachusetts Lowell; Zhenzhen Yu, Colorado School of Mines

Monday PM
September 30, 2019

Room: Portland Ballroom 252
Location: Oregon Convention Center

Session Chairs: Judy Schneider, University of Alabama at Huntsville; Carolin Fink, Ohio State University

2:00 PM

Thermal Modeling of Continuous Drive Friction Welding for Al6061: *Mohammed Tashkandi*¹; ¹Northern Border University

2:20 PM

Reducing Cycle Time of Refill Friction Stir Spot Welding: *Yuri Hovanski*¹; Brigham Larsen¹; Arnold Wright¹; Michael Miles¹; ¹Brigham Young University

2:40 PM

Material Properties of Friction Stir Spot Welded Joint of Steel and Heat-treatable Aluminum Alloys: *Kun Gao*¹; Mounarik Mondal¹; Hrishikesh Das¹; Mi Na Jeong¹; Sung-Tae Hong¹; ¹University of Ulsan

3:00 PM

Joining of Magnesium to Carbon Fiber Reinforced Polymers Using Friction Stir Interlocking Technique: *Tianhao Wang*¹; Piyush Upadhyay¹; Scott Whalen¹; Keerti Kappagantula¹; ¹Pacific Northwest National Laboratory

3:20 PM

Joining of Carbon Fiber Reinforced Composites to AZ31B using Friction Self-piercing Riveting: *Yong Chae Lim*¹; Charles Warren¹; Jian Chen¹; Jiheon Jun¹; Zhili Feng¹; ¹Oak Ridge National Laboratory

3:40 PM Break

4:00 PM

Machine Learning Application for Active Exploration of Weld Sequence Scenarios: *Mahyar Asadi*¹; Mohammad Mohseni¹; Majid Tanbakuei Kashani¹; Michael Fernandez¹; Mathew Smith¹; ¹SKC Engineering (An Applus Company)

4:20 PM

Theoretical Analysis of Keyhole Dynamics Based on Calculation of Coupled Multiphase Transfer during Laser Beam Welding for Aluminum: *Hiroaki Mori*¹; Qiaofeng Zhou¹; Fumikazu Miyasaka¹; ¹Osaka University

4:40 PM

The Effects of Pre-pulse & Profile Force on Nugget Growth and Weldability for Resistance Spot Welding of A6014 Alloy: *Changwook Ji*¹; Joo-Yong Cheon¹; Jae-Hoon Kim¹; Jun Hyun Uk¹; ¹Korea Institute of Industrial Technology

5:00 PM

Investigations on Welding Characteristics of Additively Manufactured Ti6Al4V and SS304: *Timothy Pasang*¹; Sreenidhi Roshinkumar¹; Zainab Manasawala¹; Jia-Chang Wang²; Cho-Pei Jiang²; Alex Kirchner³; ¹Auckland Technical University; ²National Taipei University of Technology; ³Fraunhofer - Institute for Advanced Materials

MONDAY PM

Materials for Nuclear Applications — Nuclear Fuels and Cladding

Program Organizers: Philip Edmondson, Oak Ridge National Laboratory; Yutai Katoh, Oak Ridge National Laboratory; Jake Amoroso, Savannah River National Laboratory; Levi Gardner, University of Utah; Amy Gandy, University of Sheffield; Karl Whittle, University of Liverpool; Monica Ferraris, Politecnico di Torino

Monday PM
September 30, 2019 Room: E148
Location: Oregon Convention Center

Session Chair: Karl Whittle, University of Liverpool

2:00 PM

Compatibility of U3Si2 fuel with FeCrAl and SiC/SiC Based Cladding: Denise Lopes¹; *Vancho Kocovski*¹; Theodore Besmann¹; ¹University of South Carolina

2:20 PM Invited

Uranium Nitride and High Temperature Irradiation Resistant Thermocouples towards Accident Tolerant Nuclear Fuel: *Ember Sikorski*¹; Lan Li¹; ¹Boise State University

3:00 PM

Characterization of the Impact of Fission Product Inclusion on Phase Development in U₃Si₂ Fuel: *Kaitlin Johnson*¹; Denise Lopes²; Tashiema Wilson¹; Theodore Besmann¹; ¹University of South Carolina; ²Westinghouse Electric Co., LLC

3:20 PM

Steam Oxidation and Microstructural Characterization of U₃Si₂ alloyed with Al, Cr, Nb, Y, and Zr: *Elizabeth Sooby Wood*¹; Cole Moczygemba¹; Geronimo Robles¹; Christopher Grote²; Lu Cai³; Peng Xu³; Edward Lahoda³; ¹The University of Texas at San Antonio; ²Los Alamos National Laboratory; ³Westinghouse Electric Company

3:40 PM Break

4:00 PM

Design of Alloy Chemistry to Mitigate Fuel-Cladding Chemical Interactions in Uranium-based Metallic Fuels: Rabi Khanal¹; Nathan Jerred¹; Indrajit Charit¹; Michael Benson²; Robert Mariani²; *Samrat Choudhury*¹; ¹University of Idaho; ²Idaho National Laboratory

4:20 PM

Anisotropic Thermal Transport in Uranium Dioxide Induced by Dislocation: *Suvash Ghimire*¹; Bowen Deng¹; ¹Montana Technological University

4:40 PM

Spectral Thermal Conductivity Predictions in UO₂ with Xe Inclusions: *Jackson Harter*¹; Aria Hosseini²; Todd Palmer¹; Alex Greaney²; ¹Oregon State University; ²University of California - Riverside

5:00 PM

Materials for Capture of Uranium for Nuclear Fuel from Fertilizer: *Allen Ablett*¹; Cory Perkins²; ¹Oklahoma State University; ²Oregon State University

5:20 PM

PVD Coating of Surrogate Fuels for Deep Space Nuclear Thermal Propulsion: Maanas Togaru¹; Thomas Koenig¹; *Gregory Thompson*¹; ¹The University of Alabama

Materials Issues in Nuclear Waste Management — Materials Issues in Nuclear Waste Technology II: Properties of Nuclear Waste Forms: Modeling, Experiments, and Applications

Program Organizers: Jake Amoroso, Savannah River National Laboratory; Kyle Brinkman, Clemson University; Kevin Fox, Savannah River National Laboratory; Cory Trivelpiece, Savannah River National Laboratory; Jarrod Crum, Pacific Northwest National Laboratory

Monday PM
September 30, 2019 Room: E147
Location: Oregon Convention Center

Session Chairs: Cory Trivelpiece, Savannah River National Laboratory; Josef Matyas, Pacific Northwest National Laboratory

2:00 PM Invited

Aerogels with Enhanced Gas Permeability and Mechanical Strength for Use as Membranes in Radioiodine Capture: *Krista Carlson*¹; ¹University of Utah

2:40 PM

The Influence of Reducing Conditions on the Stabilization of Iodine Containing Solid Secondary Wastes: *Matthew Asmussen*¹; Sarah Saslow¹; James Neeway¹; Joseph Westsik¹; Gary Smith¹; ¹Pacific Northwestern National Laboratory

3:00 PM

Dechlorination Methods and Ceramic Waste Forms for the Immobilization of Electrorefiner Salt: *Levi Gardner*¹; ¹University of Utah

3:20 PM Break

3:40 PM

Effect of Solution Chemistry on the Release Mechanism of Iodine from Iodoapatite Waste Form in Aqueous Environments: *Zelong Zhang*¹; Jianwei Wang¹; ¹Louisiana State University

4:00 PM

Observations of Crystal Settling Behavior in a Full-Scale HLW Melter Mock-Up: *Kevin Fox*¹; Mark Fowley¹; Albert Kruger²; ¹Savannah River National Laboratory; ²U.S. Department of Energy Office of River Protection

4:20 PM

Impact of Redox on Crystallization Behavior of Spinel Crystals in HLW Borosilicate Glasses: *Josef Matyas*¹; ¹Pacific Northwest National Laboratory

4:40 PM

Optimization of Frit Composition for Coupled Operation of the Defense Waste Processing Facility and Salt Waste Processing Facility at the Savannah River Site: *Fabienne Johnson*¹; Thomas Edwards¹; ¹Savannah River National Laboratory

5:00 PM Invited

Melt-Cast Ceramic Waste Forms: Laboratory Development and Scaled Demonstrations: *Jake Amoroso*¹; ¹Savannah River National Laboratory



Materials vs Minerals: Bridging the Gap between Materials Science and Earth and Planetary Science — Session II

Program Organizers: Jessica Rimsza, Sandia National Laboratories; Krishna Muralidharan, University of Arizona; Thomas Zega, University of Arizona

Monday PM Room: F149
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Krishna Muralidharan, University of Arizona; Jessica Rimsza, Sandia National Laboratories

2:00 PM Invited
Unraveling the Mechanisms of Pore Space Cementation in Quartz Sandstone: A 3D Phase-field Approach: *Kumar Ankit*¹; ¹Arizona State University

2:30 PM
Energetics of the Interfacial Interactions between Oil Molecules, Calcite and Kerogen – Implication for Hydrocarbon Transport and Storage in Shale: *Zelong Zhang*¹; Jianwei Wang¹; ¹Louisiana State University

2:50 PM
Surface Structure and Energetics at the Salt-Brine Interface: *Jessica Rimsza*¹; Kristopher Kuhlman¹; ¹Sandia National Laboratories

3:10 PM Concluding Comments

Mechanochemical Synthesis and Reactions in Materials Science IV — Session II

Program Organizers: Antonio Fuentes, Cinvestav Unidad Saltillo; Laszlo Takacs, University of Maryland Baltimore County; Challapalli Suryanarayana, University of Central Florida; Jacques Huot, Université du Québec a Trois-Rivieres

Monday PM Room: E141
September 30, 2019 Location: Oregon Convention Center

Session Chair: Jürgen Eckert, Montanuniversität Leoben

2:00 PM Invited
Mechanically Alloyed Nanostructured Steels: *Challapalli Suryanarayana*¹; Ahmed Al-Joubori¹; ¹University of Central Florida

2:40 PM Invited
Nanocrystalline Maraging Steel Powder Fabricated by Mechanical Milling and their Thermal Stability: Ganesh Varma Thotakura¹; *Tanjore Jayaraman*¹; ¹University of Michigan-Dearborn

3:20 PM Break

3:40 PM
First Hydrogenation Characteristic of TiFe + 4wt% Zr + 2wt% Mn Alloy after Air Exposure and Reactivation by Mechanical Treatment: Joydev Manna¹; *Huot Jacques*¹; ¹University Du Quebec A Trois Rivieres

4:10 PM
Easy Access to Copper-antimony Mixed Sulfides (CuxSbySz): Mechanochemical Synthesis, and Structural and Surface Analysis: *Antonio Fuentes*¹; Francisco López-Cota¹; Isidro González-Panzo²; José Díaz-Guillén³; Joelis Rodríguez-Hernández⁴; Patricia Quintana²; ¹Cinvestav Unidad Saltillo; ²Cinvestav Unidad Mérida; ³Instituto Tecnológico de Saltillo; ⁴Centro de Investigación en Química Aplicada

4:40 PM Invited
Metallic Glasses Reinforced Al Alloy Matrix Composites: *Zhi Wang*¹; ¹South China University of Technology

Metal and Polymer Matrix Composites IV — Polymer Matrix Composites II

Program Organizers: Nikhil Gupta, New York University; Tomoko Sano, U.S. Army Research Laboratory

Monday PM Room: D136
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Daniel Merkel, Pacific Northwest National Laboratory; Jonathan Ligda, US Army Research Laboratory

2:00 PM
Shape Memory Behavior and Mechanical Properties of Graphene Foam-Based Epoxy Composites: *Adeyinka Idowu*¹; Pranjal Nautiyal¹; Jennifer Bustillos¹; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University

2:20 PM
Probing Local Mechanical Properties in Polymer-ceramic Hybrid Acetabular Sockets using Sphreical Indentation Stress-strain Protocols: *Hyung Nun Kim*¹; Surya Kalidindi¹; Sourav Mandal²; Bikramjit Basu²; ¹Georgia Institute of Technology; ²Indian Institute of Science

2:40 PM
Artificial Neural Network Based Machine Learning Methods in Characterization of Composite Materials: Xianbo Xu¹; *Nikhil Gupta*¹; ¹New York University

3:00 PM
Material Challenges for Cryogenic Hydrogen Storage Technologies: *Daniel Merkel*¹; Kevin Simmons¹; ¹Pacific Northwest National Laboratory

3:20 PM Break

3:40 PM
Quantitative Investigation of Fracture in Brittle/Quasi-Brittle Solids: *Carl Cady*¹; Cheng Liu¹; ¹Los Alamos National Laboratory

4:00 PM
Lateral Constraint Effects on Flat Punch Nanoindentation: *Nathan Bailey*¹; ¹Exponent, Inc.

Metamorphic Manufacturing – Incremental Deformation Processing for Agile, High-quality Metallic Component Production — Metamorphic Manufacturing II: Microstructures by Design

Program Organizers: Kester Clarke, Colorado School of Mines; Glenn Daehn, Ohio State University

Monday PM Room: D136
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Glenn Daehn, The Ohio State University; Kester Clarke, Colorado School of Mines

2:00 PM Invited
Lagrangian Finite Element Simulation of Metamorphic Manufacturing: *Michael Miles*¹; ¹Brigham Young University

MONDAY PM

2:40 PM

Metamorphic Manufacturing: Processing Pathways to Manufacture Custom Geometry Components with Tailored Microstructures: *Kester Clarke*¹; Amy Clarke¹; ¹Colorado School of Mines

3:00 PM

Multimodal Atomic Scale Characterization of Structural and Compositional Changes During Shear Deformation of Materials: *Bharat Gwalani*¹; Tiffany Kaspar¹; Yang He¹; Tamas Varga¹; Chongmin Wang¹; Peter Sushko¹; Arun Devaraj¹; ¹Pacific Northwest National Laboratory

3:20 PM Break

3:40 PM Invited

Setting Component Properties in Incremental Forming: *Fabian Maass*¹; Mateus Dobecki²; Marlon Hahn¹; A. Tekkaya¹; Walter Reimers²; ¹Institute of Forming Technology and Lightweight Components (IUL), TU Dortmund; ²Institute for Materials Science and Technology - Metallic Materials, TU Berlin

4:20 PM Invited

Complexity & Functionality of Automotive Structural Components with Tailored Properties: *Paul Belanger*¹; Lindsay Golem¹; Manuel Lopez Lage²; Laura Galaceran²; ¹Gestamp Research & Development North America; ²Gestamp Research & Development Barcelona

5:00 PM

Solid Phase Processing of AA6XXX and AA7XXX Alloys via Shape Approach: *Keerti Kappagantula*¹; Jens Darsell¹; Rajib Kalsar¹; Scott Whalen¹; Glenn Grant¹; Darrell Herling¹; Vineet Joshi¹; ¹Pacific Northwest National Laboratory

Modeling Variability of Mechanical Behavior through ICME Techniques with Emphasis on Verification, Validation & Uncertainty Quantification — Data Science

Program Organizers: Jacob Hochhalter, University of Utah; Michael Sangid, Purdue University; Corbett Battaile, Sandia National Laboratories; Barron Bichon, Southwest Research Institute

Monday PM

Room: D134

September 30, 2019

Location: Oregon Convention Center

Session Chairs: Michael Sangid, Purdue University; Corbett Battaile, Sandia

2:00 PM Invited

Data Analytics for ICME: *Anthony Rollett*¹; Christopher Kantzos¹; Joseph Pauza¹; Sudipto Mandal²; Ziheng Wu¹; Robert Suter¹; Seunghee Oh¹; Wesley Tayon³; Tao Sun⁴; Niranjan Parab⁴; Cang Zhao⁴; Po-Ju Chiang¹; ¹Carnegie Mellon University; ²Intel; ³NASA; ⁴Argonne National Laboratory

2:40 PM Invited

Information Fusion-based Microstructure Sensitive Materials Design: *Raymundo Arroyave*¹; Abhilash Molkeri¹; Richard Couperthwaite¹; Seyefe Fatheme Ghoreishi¹; Ankit Srivastava¹; Douglas Allaire¹; ¹Texas A&M University

3:00 PM

Modern Data Analytics Approach to Predict the Yield Strength of 9Cr Steels: *Jian Peng*¹; Dongwon Shin¹; Yukinori Yamamoto¹; Jeffrey Hawk²; Edgar Lara-Curzio¹; ¹Oak Ridge National Laboratory; ²National Energy Technology Laboratory

3:20 PM

Neural Network Potential for Al and Zn: *Mashroor Nitol*¹; Doyl Dickel²; Christopher Barrett¹; ¹Mississippi State University; ²Center of Advanced Vehicular System

3:40 PM Break

4:00 PM Invited

An Experimental Perspective on Computational Validation for Dynamic Mechanical Behavior: *Benjamin Morrow*¹; Francis Addessio¹; Curt Bronkhorst²; Ellen Cerreta¹; Biao Feng¹; David Jones¹; Ricardo Lebensohn¹; ¹Los Alamos National Laboratory; ²University of Wisconsin-Madison

4:40 PM Invited

Predicting the Effects of Microstructure on Matrix Cracking Evolution in Fiber Reinforced CMCs via Machine Learning: *Dipen Patel*¹; Triplicane Parthasarathy¹; Craig Przybyla²; ¹Air Force Research Laboratory/UES, Inc.; ²Air Force Research Laboratory

5:00 PM

Integrated Computational Materials Engineering (ICME) Techniques to Enable a Material-Informed Digital Twin Prototype for Marine Structures: *Charles Fisher*¹; Alysson Mondoro¹; Young Hwang¹; Ken Nahshon¹; ¹Naval Surface Warfare Center - Carderock

Multi-scale Modeling of Microstructure Deformation in Material Processing — Multi-scale Modeling of Microstructure Deformation in Material Processing II

Program Organizers: Lukasz Madej, AGH University of Science and Technology; Jaimie Tiley, Air Force Office of Scientific Research (AFOSR/RTA); Krzysztof Muszka, AGH University of Science and Technology; Danuta Szeliga, AGH University of Science and Technology

Monday PM

Room: D134

September 30, 2019

Location: Oregon Convention Center

Session Chair: Krzysztof Muszka, AGH University of Science and Technology

2:00 PM

Mechanism of Wetting of a Nano-suspension Droplet: Insights from MD Simulations: *Baiou Shi*¹; Viet Le¹; ¹Penn State Erie

2:20 PM

Probing Twin Nucleation in Ti with Nudged Elastic Band Method: *Deepesh Giri*¹; Christopher Barrett¹; Haitham El Kadiri¹; ¹Mississippi State University

2:40 PM

Reactive Molecular Dynamics Modeling of the Compression of Two-Phase Composites of Cement Paste: *Ingrid Padilla Espinosa*¹; Ram Mohan¹; ¹North Carolina A&T State University

3:00 PM

Texture Evolution in Materials with Layered Crystal Structures: *Vamsi Krishna Vempati*¹; Raghavan Srinivasan¹; ¹Wright State University

3:20 PM Break

3:40 PM

Handling of the Micro-Macro Models Communication in the Fully-coupled Multiscale Approach: *Adam Legwand*¹; Lukasz Madej¹; ¹AGH University of Science and Technology

4:00 PM

Numerical Simulation of Molten Steel Flow and Inclusion Capture during Slab Continuously Casting: *Yanbin Yin*¹; Jiongming Zhang¹; ¹University of Science and Technology, Beijing

4:20 PM

Recrystallization and Grain Growth Simulations for Multiple-Pass Rolling and Annealing of U-10Mo: *William Frazier*¹; Chao Wang¹; Shenyang Hu¹; Zhijie Xu¹; Vineet Joshi¹; ¹PNNL



4:40 PM

Study of Interface Microstructure of Bi-metal Plates Prepared Cold Rolling:
*Choong-un Kim*¹; Manasi Puranik¹; ¹University of Texas at Arlington

Nanostructured Materials under Extreme Environments — Mechanisms, Microstructure Evolution, and Mechanical Properties of Nanostructured Materials I

Program Organizers: Jin Li, Purdue University; Assel Aitkaliyeva, University of Florida; Youxing Chen, University of North Carolina at Charlotte; Yue Liu, Shanghai Jiao Tong University; Shuai Shao, Louisiana State University

Monday PM Room: D133
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Youxing Chen, University of North Carolina at Charlotte; Jin Li, Purdue University

2:00 PM Invited

Modeling and Experiments of Small Scale Fracture Toughness to 1073 K:
*William Gerberich*¹; Kevin Schmalbach¹; Nathan Mara¹; ¹University of Minnesota

2:30 PM Invited

Roles of Heady Deformation on Microstructure and Properties on Nitrided Ferritic Steels: *Tadashi Furuhashi*¹; Fanhui Meng²; Goro Miyamoto¹; Yoshikazu Todaka³; ¹Tohoku University; ²Hitachi Construction Machinery Co., Ltd; ³Toyohashi University of Technology

3:00 PM

Effect of Cyclic Deformation on the Evolution of Microstructures and Residual Stresses in Nanostructured Ti-6Al-4V: *Fuqian Yang*¹; ¹University of Kentucky

3:20 PM Break

3:40 PM Invited

Strengthening and Work Hardening in Gradient Nanotwinned Metals: *Lei Lu*¹; ¹Chinese Academy of Sciences

4:10 PM Invited

Deformation and Microstructural Evolution of Nanocrystalline Metals: *Izabela Szlufarska*¹; Hubin Luo²; Yeqi Shi¹; ¹University of Wisconsin - Madison; ²Ningbo Institute of Materials Technology & Engineering

4:40 PM Invited

Nanomechanical Measurements in Cold Environments: *Douglas Stauffer*¹; ¹Bruker Nano Inc.

5:10 PM

Microstructural Evolution and Mechanical Behavior of Gradient Nanostructured TWIP Steel: *Jie Ding*¹; Zhongxia Shang¹; Jin Li¹; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry — Session I

Program Organizers: Navin Manjooran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Monday PM Room: C124
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Navin Manjooran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

2:00 PM Keynote

Nanoengineered Materials for Energy and BioMedical Systems (NEMS):
*Sudipta Seal*¹; ¹University of Central Florida

2:40 PM Invited

c-VACNT, New Nano-to-Macro Material Platform with a Rich Application Potential: *Karlheinz Strobl*¹; Sandra Gainey¹; ¹CVD Equipment Corporation

3:00 PM

Agglomeration of Ultra-fine Particles in Media by Acoustic Wave: *Hyo-Soo Lee*¹; Hai-Joong Lee¹; Hyung-Won Shin¹; ¹Korea Institute of Industrial Technology

3:20 PM

Challenges & Solutions: New Nano-materials For Renewable Energy Applications: *Shabana Parvin Shaikh*¹; ¹SP Pune University

3:40 PM Break

4:00 PM

Characterization of Nanophase Carbon Infused Copper Alloys and Thin Films: *Beihai Ma*¹; Uthamalingam Balachandran¹; Stephen Dorris¹; Tae Lee¹; Jie Wang¹; Jianguo Wen¹; Jonathan Poplawsky²; Adam Rondinone²; ¹Argonne National Laboratory; ²Oak Ridge National Laboratory

4:20 PM

Dialysate Regeneration by Efficient Urea Decomposition with TiO2 Nanowire Photoelectrochemical Cell: *Guozheng Shao*¹; Yushi Zang¹; Bruce Hinds¹; ¹University of Washington, Seattle

4:40 PM

Direct Contact Membrane Distillation (DCMD) using a Composite PVDF Electrospun Nanofiber Membrane for Water Desalination Application: *Mahmoud Baniyadi*¹; Momena Monwar¹; Nicholas Sutton¹; ¹Georgia Southern University

5:00 PM Concluding Comments

Next Generation Biomaterials — Next Generation Biomaterials II

Program Organizers: Roger Narayan, University of North Carolina; Federico Rosei, INRS Centre for Energy, Materials and Telecommunications

Monday PM Room: C122
September 30, 2019 Location: Oregon Convention Center

Session Chairs: Artemis Stamboulis, University of Birmingham; Carlos Elias, Military Institute of Engineering

2:00 PM Invited

Exposure Models in Biomedical Applications: *David Saylor*¹; ¹U.S. Food and Drug Administration

MONDAY PM

PORTLAND OREGON

SEPTEMBER 29 – OCTOBER 3, 2019

2:20 PM

Bijels-derived Polymer-Hydrogel Hybrids for Cell Delivery: *Min Wang*¹; Haoran Sun¹; ¹The University of Hong Kong

2:40 PM Invited

Additive Manufacturing of Ti-6Al-4V Dental Implant: *Carlos Elias*¹; Francielly Soares¹; ¹Military Institute of Engineering

3:00 PM Invited

Design, Synthesis and Use of New Theranostics for the Detection and Treatment of Cancer: *Min Wang*¹; ¹The University of Hong Kong

3:20 PM Break

3:40 PM Invited

Development of Novel Antimicrobial Orthopaedic Medical Surfaces: *Artemis Stamboulis*¹; ¹University of Birmingham

4:00 PM Invited

Lanthanide Reinforced Hydroxyapatite Composites: Next Generation Biomaterials: *Sooraj Nandyala*¹; Pedro Gomes²; Graham Hungerford³; L Grenho²; Maria Fernandes²; Andrew Carrod¹; Zoe Pikramenou¹; Artemis Stamboulis¹; ¹University of Birmingham; ²University of Porto; ³HORIBA Jobin Yvon IBH Ltd

4:20 PM

Mechanically Strong and Functionalized Scaffolds Incorporated with Mesenchymal Stem Cells for Tissue Regeneration: *Huihua Li*¹; *Min Wang*¹; ¹The University of Hong Kong

4:40 PM Invited

Recycling in Laser Powder Bed Fusion (Additive Manufacturing): *Ankit Saharan*¹; ¹EOS North America

Perspectives for Emerging Materials Professionals — Session II

Program Organizers: Christopher Marvel, Lehigh University; Andrew Frerichs, The NanoSteel Company

Monday PM

Room: B110

September 30, 2019

Location: Oregon Convention Center

Session Chairs: Christopher Marvel, Lehigh University; Jonathan Healy, Naval Surface Warfare Center - Carderock Division

2:00 PM Invited

Millions in Metallography: Artifacts and Misinterpretations: *Frederick Schmidt*¹; ¹Advanced APPLIED Services, Inc

2:20 PM

The Greatest Failure: Finding Opportunity Where You Least Expect It: *Christopher Shumeyko*¹; ¹US Army Research Lab

2:40 PM Invited

Increasing Retention in Women in STEM Professions: *Danielle Cote*¹; ¹Worcester Polytechnic Institute

3:00 PM Invited

Career Navigation through Effective Communication, Utilizing Resources, and Building Your Emotional Intelligence: *Nina Abani*¹; ¹Nissan Technical Center North America

3:20 PM Break

3:40 PM Invited

The Anathema of Networking: How Corporations and Professional Societies Have Lost Their Way: *Daniel Denis*¹; ¹Pratt & Whitney

4:00 PM Invited

The Digital Skills Revolution in Materials Science: *Kristen Brosnan*¹; ¹GE Global Research

4:20 PM Invited

NIST and the Materials Genome: A Personal Perspective: *James Warren*¹; ¹National Institute of Standards and Technology

Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work – Rustum Roy Symposium — Session II

Program Organizers: Morsi Mahmoud, King Fahd University of Petroleum and Minerals - KFUPM; Dinesh Agrawal, Pennsylvania State University; Guido Link, Karlsruhe Institute of Technology; Motoyasu Sato, Chubu University; Rishi Raj, University of Colorado; Victoria Blair, Army Research Laboratory

Monday PM

Room: D139

September 30, 2019

Location: Oregon Convention Center

Session Chairs: Noboru Yoshikawa, Tohoku University; Daudi R. Waryoba, Penn State DuBois

2:00 PM Invited

An Irreversible Thermodynamic Perspective on Chemical Reaction Kinetics in Ceramic Processing under Resonant Microwave-fields: *Boon Wong*¹

2:30 PM

Magnetic Field-assisted Electrodeposition of Nickel Composite Coatings: *Denise Yin*¹; Heather Murdoch¹; Efraín Hernández-Rivera¹; Anit Giri¹; ¹Army Research Laboratory

2:50 PM Invited

Ultrasonic and Vibration Enhanced Materials Processing: *William LaCourse*¹; Kade McGarrity¹; Brian Topper¹; Holly Shulman¹; Amit Maha¹; Volker Geyer¹; ¹Alfred University

3:20 PM Break

3:40 PM Invited

Effect of Alternating Electromagnetic Field on Extracellular Polymeric Substances Derived from Biofilms and Its Mechanism: *Hideyuki Kanematsu*¹; Hidekazu Miura²; Dana Barry³; Stefan Zimmermann⁴; ¹National Institute of Technology (KOSEN), Suzuka College; ²Suzuka University of Medical Science; ³Clarkson University / SUNY Canton; ⁴Leibniz Universität, Hannover

4:10 PM Invited

Characterization of the Native Thin Oxide Layer of Copper Metal Powder Sintered via Microwaves: *Morsi Mahmoud*¹; ¹King Fahd University of Petroleum and Minerals

4:40 PM

Effect of Plasma Heating on the Molten Steel in Tundish: *Mengjing Zhao*¹; Shufeng Yang¹; Jingshe Li¹; Xiaojun Xi¹; Xueliang Zhang¹; Yihang Wang¹; Yongfeng Chen²; ¹University of Science and Technology Beijing; ²Wuhu Xinxing Ductile Iron Pipes Co.,Ltd.

5:00 PM

Field-Assisted Processing of SiC-Diamond Composite Blends: *Michael Kornecki*¹; Selva Raju²; Raymond Brennan¹; ¹U.S. Army Research Laboratory; ²ORAU

MONDAY PM

PSDK XIV: Phase Stability and Diffusion Kinetics — Gibbs: Phase Equilibria, Diffusion and Materials Design

Program Organizers: Michael Gao, National Energy Technology Laboratory; Hans Seifert, Karlsruhe Institute of Technology; Zi-Kui Liu, Pennsylvania State University; Fan Zhang, CompuTherm LLC; Richard Otis, Jet Propulsion Laboratory; Aurelien Perron, Lawrence Livermore National Laboratory

Monday PM
September 30, 2019

Room: E144
Location: Oregon Convention Center

Session Chairs: Aurelien Perron, Lawrence Livermore National Laboratory; Wei Xiong, University of Pittsburgh

2:00 PM Invited

Genomic Materials Design: From CALPHAD to Flight: *Gregory Olson*¹; ¹Northwestern University

2:20 PM Invited

CALPHAD-based ICME Design for Additive Manufacturing: Case Studies with Success and Challenges: *Wei Xiong*¹; Albert To¹; ¹University of Pittsburgh

2:40 PM Invited

Thermodynamic Modeling of Al-Ce Alloys: Predicting Phase Stability for Alloy Design: *Emily Moore*¹; Aurélien Perron¹; ¹Lawrence Livermore National Laboratory

3:00 PM Invited

Metastable Dendrite Morphologies in Impulse Atomized Droplets of Al-alloys: *Hani Henein*¹; Jonas Vallotton¹; Abdoul-Aziz Bogno¹; ¹University of Alberta

3:20 PM Invited

Estimation of Measurement Uncertainty in Solid State Diffusion: *Jeffrey LaCombe*¹; ¹University of Nevada

3:40 PM Break

4:00 PM Invited

Phase Equilibria and Interfacial Migration in Palladium Hydrogen Alloys: Nicholas Weadock¹; *Peter Voorhees*²; Brent Fultz¹; ¹California Institute of Technology; ²Northwestern University

4:20 PM Invited

Accelerated Design of Gamma-TiAl Alloys by High Throughput Calculation: *Fan Zhang*¹; Jun Zhu¹; Chuan Zhang¹; John Foltz¹; ¹CompuTherm LLC

4:40 PM Invited

Using CALPHAD Approaches to Control Additive Manufactured Microstructures and Properties: *Carelyn Campbell*¹; ¹National Institute of Standards & Technology

5:00 PM Invited

Plutonium Phase Diagrams in the New Edition of the Plutonium Handbook: Experiments and Theory: *Aurelien Perron*¹; Patrice Turchi¹; ¹Lawrence Livermore National Laboratory

Substrate Protection for Corrosion Prevention — Session II

Program Organizers: Mary Lyn Lim, PPG Industries; Qixin Zhou, The University of Akron; Niamh Hosking, Ford Motor Company; Matthew Asmussen, Pacific Northwestern National Laboratory; Elissa Trueman, NSWC Carderock Division; Cortney Crane, Exponent Failure Analysis Associates; Stephen Raiman, Oak Ridge National Laboratory; Raul Rebak, GE Global Research

Monday PM
September 30, 2019

Room: B118
Location: Oregon Convention Center

Session Chairs: Mary Lyn Lim, PPG; Cortney Crane, Exponent Failure Analysis Associates; Qixin Zhou, The University of Akron

2:00 PM

Noise Introduced by Polishing Effects on Corrosion Potential — An Optimization by Robust Design: *Evan Huang*¹; Fred Goodwin¹; ¹BASF Construction Chemicals

2:20 PM

Characterization of Recycled High Density Polyethylene (HDPE) Coating on Mild Steel: *AHM Rahman*¹; Issam Abu-Mahfouz¹; Ma'moun Abu-Ayyad¹; Joshua Bachert¹; ¹Pennsylvania State University, Harrisburg

2:40 PM

Effect of Shot-peening on Oxidation of Stainless Steel 304H in Steam: *James Kurley*¹; Bruce Pint¹; ¹Oak Ridge National Laboratory

3:00 PM

Evolution of Pretreatment Technology for Light-Weighting and Environmentally Friendly Substrate Protection: *Julia Heigl*¹; PPG

3:20 PM Break

3:40 PM

Investigation of Modified Cardanol as Reactive Diluents for Zinc Phosphate Pigmented Alkyd Coating: *Haoran Wang*¹; Qixin Zhou¹; ¹University of Akron

4:00 PM

An Assessment on the Effects of Lecaniodiscus Cupaniodes Extract and Normalizing Temperature in Corrosion Behaviour of Mild Steel in 0.5 M HCL: *Olufunmilayo Joseph*¹; Olugbenga Omotosho¹; Modupe Ojewumi¹; Roland Lotol¹; ¹Covenant University

Surface Properties of Biomaterials — Cell-Biomaterial Interactions

Program Organizers: Ryan Bock, SINTX Technologies; Jason Langhorn, DePuy Synthes Joint Reconstruction; Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University; Mangal Roy, Indian Institute of Technology-Kharagpur; Venu Varanasi, University of Texas at Arlington

Monday PM
September 30, 2019

Room: C121
Location: Oregon Convention Center

Session Chairs: Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University; Ryan Bock, SINTX Technologies

2:00 PM Invited

Biological Applications of Nanoscale Janus Particles with Dual Biofunctionalization: *Michael Maas*¹; Reshma Kadam¹; Kurosch Rezwan¹; ¹University of Bremen

2:40 PM Invited

Interaction between Graphene Surfaces and Extracellular Polymeric Substances of Biofilms: *Hideyuki Kanematsu*¹; Ryoichi Nakagawa¹; Dana Barry²; Katsuhiko Sano³; Masatou Ishihara⁴; Masahito Ban⁵; Noriyuki Wada¹; Nobumitsu Hirai¹; Akiko Ogawa¹; Takeshi Kogo¹; Daisuke Kuroda¹; ¹National Institute of Technology (KOSEN), Suzuka College; ²Clarkson University / SUNY Canton; ³D & D Corporation; ⁴National Institute of Advanced Industrial Science and Technology, Tsukuba, Japan; ⁵Nippon Institute of Technology

3:20 PM Break

3:40 PM

The Importance of Base Plate to Barnacle Adhesion: *Heonjune Ryou*¹; Andrew Geltmacher²; Richard Everett³; James Wollmershauser²; Kathryn Wahl²; ¹ASEE Postdoc cited at US Naval Research Laboratory; ²US Naval Research Laboratory; ³University of Maryland Baltimore County

4:00 PM

Time Lapse in Vitro Vibrational Spectroscopic Assessment of Antibacterial Activity of Oxide and Nitride Bioceramics Used in Implantable Medical Devices: Francesco Boschetto¹; *Ryan Bock*²; Bryan McEntire²; Tetsuya Adachi³; Elia Marin³; Wenliang Zhu⁴; Osam Mazda³; B. Sonny Bal²; Giuseppe Pezzotti¹; ¹Kyoto Institute of Technology; ²SINTX Technologies; ³Kyoto Prefectural University of Medicine; ⁴Osaka University

4:20 PM

Fe-Mn-Cu Alloy as a Novel Antibacterial Biodegradable Material: *Santanu Mandal*¹; Mangal Roy¹; ¹Metallurgical and Materials Engineering Department, IIT Kharagpur

4:40 PM

Preparation of Anatase-type Titanium Dioxide Having Strong Antibacterial Activity under Dark Conditions: Ken Hirota¹; *Phuong Nguyen*¹; Masaki Kato¹; Kazuhiko Tsukagoshi¹; Atsuki Terabe²; Hideto Mizutani²; ¹Doshisha University; ²Sakai Chemical Industry Co., Ltd.

5:00 PM

Effect of Transition Metal Doping Sites on Biological Properties of Hydroxyapatite: Arjak Bhattacharjee¹; Anshul Gupta¹; Madhu Verma¹; Prem Murugan¹; *Pradyut Sengupta*²; Saravanan Matheshwaran¹; Indranil Manna³; Kantesh Balani¹; ¹IIT Kanpur; ²CSIR-IMMT; ³IIT Kharagpur

Thermodynamics of Materials in Extreme Environments — Thermodynamic Studies of Nuclear Materials II

Program Organizers: Kyle Brinkman, Clemson University; Kristina Lilova, University California Davis; Alexandra Navrotsky, University California Davis; Jake Amoroso, Savannah River National Laboratory; Fei Peng, Clemson University; Xingbo Liu, West Virginia University; Gustavo Costa, NASA; Xiaofeng Guo, Washington State University

Monday PM Room: B119
September 30, 2019 Location: Oregon Convention Center

Session Chair: Xiaofeng Guo, Washington State University

2:00 PM Invited

Measurement of Molten Salt Properties at Operationally Relevant Temperatures: *Wilson Chiu*¹; ¹University Of Connecticut

2:30 PM Invited

Molecular Modeling and Simulation of Molten Salts: Progress from the Molten Salts in Extreme Environments (MSEE) Energy Frontier Research Center: *Edward Maginn*¹; Vyacheslav Bryantsev²; Matthew Emerson³; Claudio Margulis³; Santanu Roy²; Shobha Sharma³; Haimeng Wang¹; Fei Wu³; Yong Zhang¹; ¹University of Notre Dame; ²Oak Ridge National Laboratory; ³University of Iowa

3:00 PM Invited

Determination of Thermodynamic Data at High Temperatures with Knudsen Effusion Mass Spectrometry: *Torsten Markus*¹; David Henriques¹; Hochschule Mannheim

3:30 PM Break

3:50 PM

Phase Equilibria for Uranium- Silicide Nuclear Fuel: *Tashiema Wilson*¹; Denise Lopes¹; Theodore Besmann¹; Joshua White²; Sven Vogel²; ¹University of South Carolina; ²Los Alamos National Laboratory

4:10 PM

Chemical Short-Range Order Stabilizes Hollandite Phases for Nuclear Waste Form Applications: Robert Koch¹; Deepak Patil¹; Jake Amoroso²; Kyle Brinkman³; Mingyang Zhao³; *Scott Mixture*¹; ¹Alfred University; ²Savannah River National Laboratory; ³Clemson University

4:30 PM

The Impact of Cs Stoichiometry on Structural Features and Thermodynamic Stability of (BaxCsy)(M,Ti)8O16 (M = Zn2+, Al3+, Ga3+, and Fe3+) Hollandite-based Ceramic Waste Forms: *Mingyang Zhao*¹; Jake Amoroso²; Rob Grote¹; Kyle Brinkman¹; ¹Clemson University; ²Savannah River National Laboratory

Ultra High Performance Metallic Systems for Aerospace, Defense, and Automotive Applications — Titanium, Aluminum and Hierarchical Materials

Program Organizers: Ali Yousefiani, Boeing Research And Technology; Troy Topping, California State University, Sacramento; Robert Dillon, NASA Jet Propulsion Laboratory; Linruo Zhao, National Research Council of Canada

Monday PM Room: D140
September 30, 2019 Location: Oregon Convention Center

Session Chair: Troy Topping, California State University, Sacramento

2:00 PM Invited

Hierarchical Nanoporous Metals: *Kaka Ma*¹; ¹Colorado State University

2:40 PM

Titanium Alloys with Radially Distributed Porosity and Structural Hierarchy: *Alexander Preston*¹; Kaka Ma¹; ¹Colorado State University

3:00 PM

In-situ Studies of Strain Rate Effects on Phase Transformations and Microstructural Evolution in β -Titanium: *Benjamin Ellyson*¹; Amy Clarke¹; Jonah Klemm-Toole¹; Yaofeng Guo¹; Jinling Gao²; Wayne Chen²; Niranjana Parab³; Kamel Fezzaa³; Tao Sun³; ¹Colorado School of Mines; ²Purdue; ³Advanced Photon Source

3:20 PM Break

3:40 PM

Role of Cu Content in Determining the Mechanical Behavior of Cast Al-Cu-Mn-Zr Alloys: *Sumit Bahl*¹; Jiahao Cheng¹; Xiaohua Hu¹; Allen Haynes¹; Amit Shyam¹; ¹Oak Ridge National Laboratory



4:00 PM

Development of Novel Castable Structural Aluminum Alloys for Elevated Temperature Applications: *Joseph Jankowski*¹; Jonathan Miorelli¹; Malavikha Rajivmoorthy¹; Mark Eberhart¹; Amy Clarke¹; Michael Kaufman¹; Paul Wilson²; Krish Krishnamurthy³; ¹Colorado School of Mines; ²Boeing; ³Honeywell

4:20 PM

Outstanding Fracture Toughness and Fatigue Strength of a Cast Al-Cu Alloy Promoted by Nanoparticles: *Qinglong Zhao*¹; Xiao Liu¹; Qichuan Jiang¹; ¹Jilin University

Undergraduate Global University — What to Expect Post Bachelor's Degree II

Program Organizers: Kelley Wilkerson, Missouri University of Science and Technology; Dana Goski, Allied Mineral Products; James Hemrick, Reno Refractories Inc.; Eva Hemmer, University of Ottawa

Monday PM
September 30, 2019

Room: A103
Location: Oregon Convention Center

Session Chair: Kelley Wilkerson, Missouri University of Science and Technology

2:00 PM Introductory Comments

2:20 PM Panel Discussion

MS&T19 Plenary Session

Tuesday AM
October 1, 2019

Room: Portland Ballroom 251/257/258
Location: Oregon Convention Center

8:00 AM Introductory Comments

8:10 AM Plenary
ASM/TMS Distinguished Lectureship in Materials and Society: The Challenge of 100 Year Service-life Requirement: *Carolyn Hansson*¹; ¹University of Waterloo

8:50 AM Award Presentation

8:55 AM Introductory Comments

9:00 AM Plenary
ACerS Edward Orton, Jr. Memorial Lecture: Glass and Water: Fast Surface Relaxation: *Minoru Tomozawa*¹; ¹Rensselaer Polytechnic Institute

9:40 AM Award Presentation

9:45 AM Introductory Comments

9:50 AM Plenary
AIST Adolf Martens Memorial Steel Lecture: The Fascinating Variety of New Manganese Alloyed Steels: *Wolfgang Bleck*¹; ¹IEHK Steel Institute of RWTH Aachen University

10:30 AM Award Presentation

11th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Novel Materials Design for Sustainable Society

Program Organizers: Surojit Gupta, University of North Dakota; Yiquan Wu, Alfred University; Hisayuki Suematsu, Nagaoka University of Technology; John Wolodko, University of Alberta; Christopher Taylor, DNV GL; Junichi Tatami, Yokohama National University; Enrico Bernardo, University of Padova; Zhengyi Fu, Wuhan University of Technology; Rajiv Asthana, University of Wisconsin; Allen Applett, Oklahoma State University; Richard Sisson, Worcester Polytechnic Institute; Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Mritunjay Singh, Ohio Aerospace Institute

Tuesday PM
October 1, 2019

Room: Portland Ballroom 255
Location: Oregon Convention Center

Session Chairs: Surojit Gupta, University of North Dakota; Manabu Fukushima, National Institute of Advanced Industrial Science and Technology

2:00 PM Invited
Why Soft Processing(=Low-Energy Production) of Advanced Materials is Difficult but Necessary for Sustainable Society?: *Masahiro Yoshimura*¹; ¹National Cheng Kung University

2:30 PM Invited
Carbonate Ceramics for the Reduction of Global Carbon Footprint: *Richard Riman*¹; Daniel Kopp¹; ¹Rutgers, The State University of New Jersey

3:00 PM
Toward Reclamation of Fibrous Waste Stream Materials: *Marlann Patterson*¹; ¹University of Wisconsin, Stout

3:20 PM Invited
Explore Bio-inspired Cement Using Large-scale Computational Modeling: *Wai-Yim Ching*¹; ¹University of Missouri

3:40 PM
Precipitating Rare Earths from Industrial Solutions: *Paul Kim*¹; Angela Arpino¹; Gaurav Das²; Malgorzata Lencka²; Andre Anderko²; Richard Riman¹; ¹Rutgers University; ²OLI Systems, Inc.

4:00 PM
Translating Design Strategies from Permaculture to Materials Manufacturing and Processing: *Christopher Taylor*¹; Sarah Taylor²; ¹Dnv GL; ²Jedidiah Farm and Studio

ACerS Frontiers of Science and Society - Rustum Roy Lecture

Tuesday PM
October 1, 2019

Room: Portland Ballroom 253
Location: Oregon Convention Center

1:00 PM Invited
Printing Architected Matter in Three Dimensions: *Jennifer Lewis*¹; ¹Harvard University

Actinide and Lanthanide Materials III — Fuels

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Ryan Stillwell, Lawrence Livermore National Laboratory; Kester Clarke, Colorado School of Mines; Clinique Brundidge, Naval Nuclear Laboratory; Adam Farrow, Los Alamos National Laboratory; Curt Lavender, Battelle - Pacific Northwest National Laboratory; Douglas Burkes, Pacific Northwest National Laboratory

Tuesday PM
October 1, 2019

Room: C120
Location: Oregon Convention Center

Session Chairs: Clarissa Yablinsky, Los Alamos National Laboratory; Ryan Stillwell, Lawrence Livermore National Laboratory

2:00 PM Invited

Constituent Redistribution and Lanthanide Migration in Neutron Irradiated Uranium Zirconium Fuel: *Maria Okuniewski¹; Jonova Thomas¹; Walter Williams¹; Lingfeng He²; Xiang Liu²; ¹Purdue University; ²Idaho National Laboratory*

2:30 PM

Carbon Uptake during the Processing of Uranium: *Kara Luitjohan¹; Seth Imhoff¹; ¹Los Alamos National Laboratory*

2:50 PM

Influence of Divergency and Initiation Site on Kinetics of Cellular Growth and Coarsening in Aged U-Nb Alloys: *Robert Hackenberg¹; Megan Emigh¹; Pallas Papin¹; Ann Kelly¹; Robert Forsyth¹; Tim Tucker¹; Kester Clarke²; ¹Los Alamos National Laboratory; ²Colorado School of Mines*

3:10 PM

Developing Internal Friction Capabilities for Defect Characterization in Actinides: *Taylor Jacobs¹; Clarissa Yablinsky¹; Meghan Gibbs¹; Franz Freibert¹; Tarik Saleh¹; ¹Los Alamos National Laboratory*

3:30 PM

High-resolution Temperature-Dependent Elastic Property Measurements of Nuclear Fuels using Resonant Ultrasound Spectroscopy: *Jordan Evans¹; Ursula Carvajal¹; Jonathan Betts¹; Joshua White¹; Tarik Saleh¹; David Frazer¹; Boris Maiorov¹; ¹Los Alamos National Laboratory*

3:50 PM

Moduli Measurements of Various Fuel and Nuclear Materials Measured at Ambient Temperatures: *Tarik Saleh¹; Stephen Parker¹; Aditya Shivprasad¹; David Frazer¹; Ursula Carvajal-Nunez¹; Meghan Gibbs¹; John Dunwoody¹; Joshua White¹; ¹Los Alamos National Laboratory*

4:10 PM

A6W4Al43 : A New Caged-host for U and Pu: *Kevin Huang¹; William Nelson²; Alexander Chemey³; Thomas Albrecht-Schmitt³; Ryan Baumbach²; ¹Lawrence Livermore National Laboratory; ²National High Magnetic Field Laboratory; ³Florida State University*

Additive Manufacturing of Glass, Ceramics and Composites — Additive Manufacturing of Glass, Ceramics and Composites III

Program Organizers: Tobias Schaedler, Hrl Laboratories Llc; Matthew Dickerson, Air Force Research Laboratory; Rebecca Dylla-Spears, Lawrence Livermore National Laboratory; Chang-Jun Bae, Korea Institute of Materials Science (KIMS)

Tuesday PM
October 1, 2019

Room: B113
Location: Oregon Convention Center

Session Chair: Rebecca Dylla-Spears, Lawrence Livermore National Laboratory

2:00 PM Invited

Additive Manufacturing as an Enabler for Complex, Multi-scale Ceramic Armors: *Lionel Vargas-Gonzalez¹; Nicholas Ku¹; Joshua Pelz²; Andrew Rosenberger¹; Carli Marsico³; Ryan Dunn¹; ¹Army Research Laboratory; ²University of California San Diego; ³University of Washington*

2:30 PM

Multi-material Additive Manufacturing for Functional Design in Next-generation Ceramic Composites: *Joshua Pelz¹; Nicholas Ku²; Taylor Shoulders²; Lionel Vargas Gonzalez²; Marc Meyers¹; ¹University of California, San Diego; ²US Army Research Laboratory*

2:50 PM

Unlocking Ceramic Microstructure Control through Additive Manufacturing: *Andrew Rosenberger¹; Nicholas Ku¹; Lionel Vargas-Gonzalez¹; ¹Army Futures Command*

3:10 PM

Additive Manufacturing of Silicon Carbide via a Continuous Extrusion Method: *Adam Bratten¹; Maalavan Arivu¹; Haiming Wen¹; Ming Leu¹; ¹Missouri University of Science & Technology*

3:30 PM

Ceramic Spinodal Nanoarchitectures with Superior Energy Absorption Capability: *Anna Guell Izard¹; Cameron Crook¹; Jens Bauer¹; Lorenzo Valdevit¹; ¹University of California, Irvine*

3:50 PM

3D-printing of Oxide-based Ceramic Porous Material Using Stereolithography: *Axel Dieraert¹; Bruno Pintault¹; Clement Sanchez²; Philippe Belleville¹; ¹CEA Le Ripault; ²Université Pierre et Marie Curie (Paris VI)*

4:10 PM

Complex Porous Ceramic Architectures Produced by Additive Manufacturing: Design, Production, Testing and Applications: *Alberto Ortona¹; ¹University of Applied Sciences and Arts of Southern Switzerland*

4:30 PM

Aerosol Deposition Method: Influence of Deposition Velocity on SiC Film Density: *Derek Davies¹; Desiderio Kovar¹; Michael Becker¹; John Keto¹; ¹University of Texas at Austin*

4:50 PM

Forming of Net-shape, Porous Zirconia Structures for Shape Memory Applications: *Corson Cramer¹; Peeyush Nandwana¹; Beth Armstrong¹; Patrick Geoghegan¹; ¹Oak Ridge National Laboratory*



Additive Manufacturing of Metals: Microstructure and Material Properties of Nickel-based Alloys — Microstructure and Properties of Alloy 718

Program Organizers: Andrzej Wojcieszynski, ATI Specialty Materials; Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Sudarsanam Babu, University of Tennessee, Knoxville

Tuesday PM Room: B117
October 1, 2019 Location: Oregon Convention Center

Session Chair: Timothy Horn, North Carolina State University

2:00 PM

Multiscale Characterization of Microstructures and Mechanical Properties of Inconel 718 Fabricated by Selective Laser Melting: *Sharniece Holland*¹; Xiaoqing Wang²; Jia Chen³; Wenjun Cai³; Feng Yan⁴; Lin Li⁴; ¹Auburn University; ²Jacksonville State University; ³Virginia Polytechnic Institute and State University; ⁴The University of Alabama

2:20 PM

Microstructure Stability of Inconel 718 in the Laser Powder Bed Fusion Process as a Function of Geometrical Features and Process Parameters: *John Sions*¹; Melissa Tsui¹; Kyle Snyder¹; Richard Martukanitz¹; Cameron Gygi¹; ¹Commonwealth Center for Advanced Manufacturing

2:40 PM

Microstructural Evolution of IN718 Alloy Manufactured by Selective Laser Melting under Different Stress Conditions: *Zhen Xu*¹; Chuan Guo¹; Zhengrong Yu¹; Xin Li¹; Xiaogang Hu¹; Qiang Zhu¹; ¹Southern University of Science and Technology

3:00 PM

Parametric Study of Microstructure Formation of Quasi-Continuous-Wave Laser Additive Manufactured Inconel 718: *Zhaoyang Liu*¹; Qiang Zhu¹; Lijun Song¹; ¹Southern University of Science and Technology

3:20 PM

Phase Field Model Development for Prediction of Microstructure in IN718 Alloy during Additive Manufacturing and Heat Treatment: Balasubramaniam Radhakrishnan¹; *Ranadip Acharya*²; ¹Oak Ridge National Laboratory; ²United Technologies Research Center

3:40 PM

Influence of Pulsing Rate on the Solidification Behaviour and Microstructure in Direct Laser Deposition of IN718: *Stano Imbrogno*¹; Abdullah Alhuzaim¹; Moataz Attallah¹; ¹University of Birmingham

4:00 PM

Influence of Contour Parameters on the Surface Characteristics and Geometrical Accuracy of EB-PBF Built Alloy 718: *Paria Karimi*¹; Christopher Schnur¹; Esmail Sadeghi¹; Joakim Ålgårdh¹; Joel Andersson¹; ¹University West

4:20 PM

Multiscale Modeling Framework for the Selective Laser Melting Process Applied to Inconel 718: *Scott Peters*¹; Arshad Chowdhury¹; Antoinette Maniatty¹; Steve Rock¹; Daniel Lewis¹; ¹Rensselaer Polytechnic Institute

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Additive Manufacturing of Novel Materials

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Specialty Materials; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Tuesday PM Room: B115
October 1, 2019 Location: Oregon Convention Center

Session Chair: Ulf Ackelid, Freemelt AB

2:00 PM Invited

Selective Laser Melting of Co-Cr-Mo Alloys: *Zhi Wang*¹; ¹South China University of Technology

2:30 PM

In-situ Alloying of FeNiCrCoMn High Entropy Alloy Using Selective Laser Melting: *Peng Chen*¹; Moataz Attallah¹; Ming Yang²; ¹University of Birmingham; ²South China University of Technology (Sustech)

2:50 PM

Anisotropic Mechanical Response of Equiatomic CoCrFeMnNi High-entropy Alloy Additively Manufactured by Selective Laser Melting: *Young-Kyun Kim*¹; Jung-ho Choe²; Kee-Ahn Lee¹; ¹Inha University; ²Korea Institute of Materials Science (KIMS)

3:10 PM

Direct Laser Deposition of Cobalt-free High-entropy Alloys: *Maalavan Arivu*¹; Matthew Luebke¹; Wenyuan Cui¹; Frank Liou¹; Haiming Wen¹; ¹Missouri University of Science and Technology

3:30 PM

Developing a High Throughput Screening Method for Mg-based Metallic Glasses: *Janine Erickson*¹; Dan Thoma¹; John Perepezko¹; ¹University of Wisconsin-Madison

3:50 PM

Design of Novel Fe-based BMGs for Improved Additive Manufacturing Processability: *Zaynab Mahbooba*¹; Abhinav Saboo¹; Jiayi Yan²; Martin Walbruhl¹; Ida Berglund¹; ¹QuesTek Innovations; ²QuesTek Europe

4:10 PM

Molybdenum-titanium Alloy Development for Directed Energy Deposition Additive Manufacturing: *Michael Niezgod*¹; Dan Thoma¹; John Perepezko¹; ¹University of Wisconsin - Madison

4:30 PM

Microstructural Characterization of Laser Powder Bed Fused WE43 Magnesium Alloy: *Holden Hyer*¹; Le Zhou¹; Brandon McWilliams²; Kyu Cho²; Yongho Sohn¹; ¹University of Central Florida; ²US Army Research Laboratory

4:50 PM

Predictive Process Parameter Selection for Laser Powder Bed Fusion Manufacturing: Applications to High Thermal Conductivity Alloys: *Priyanshu Bajaj*¹; Jonathan Wright²; Iain Todd²; Eric Jaegle¹; ¹Max-Planck-Institut für Eisenforschung GmbH; ²The University of Sheffield

TUESDAY PM

Additive Manufacturing of Metals: Post Processing — HIP and Heat Treatment I

Program Organizers: Ola Harrysson, North Carolina State University; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Metals; Sudarsanam Babu, University of Tennessee, Knoxville

Tuesday PM Room: B110
October 1, 2019 Location: Oregon Convention Center

Session Chair: Ola Harrysson, North Carolina State University

2:00 PM

Use of Hot Isostatic Pressing Treatments to Manipulate Defect Content, Microstructure, Tensile Properties and Fracture Toughness in Additively Manufactured Ti-6Al-4V Parts: *Jake Benzing*¹; *Nik Hrabe*¹; *Enrico Lucon*¹; *Ryan White*¹; *Magnus Ahlfors*²; ¹National Institute of Standards and Technology; ²Quintus Technologies

2:40 PM

Influence of Thermal Treatments on Microstructure, Hardness and Mechanical Properties of AlSi10Mg Alloy Processed by Selective Laser Melting: *Elisa Padovano*¹; *Anna Pantarelli*¹; *Fabio D'Aiuto*²; *Claudio Badini*¹; ¹Politecnico di Torino; ²Centro Ricerche Fiat

3:00 PM

Microstructure and Properties of Additive Laser Powder Bed Fusion Processed and Heat-treated IN625 Alloy: *Aruneshwar Somasundaram*¹; *Jie Song*¹; *Micheal Kattoura*¹; *Seetha Rammiah Mannava*¹; *Vijay Vasudevan*¹; ¹University of Cincinnati

3:20 PM

The Role of Nitrogen in Laser-powder Bed Fusion (L-PBF) and Hot-isostatic Pressing (HIP) of High-alloyed Austenitic Stainless Steels: *Johannes Boes*¹; *Arne Röttger*¹; *Werner Theisen*¹; ¹Ruhr University Bochum

3:40 PM

Effect of HIP & Heat Treatment on the Stitched Zones of Inconel 718 Printed by Multi Laser PBF-L: *Jacob Rindler*¹; *Connor Slone*¹; *Edward Herderick*¹; *Antonio Ramirez*¹; ¹Ohio State University

Additive Manufacturing: In-situ Process Monitoring and Control — Modeling Methods

Program Organizers: Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Powder Metals; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Tuesday PM Room: B112
October 1, 2019 Location: Oregon Convention Center

Session Chair: Sudarsanam Babu, University of Tennessee, Knoxville

2:00 PM

A Framework and Demonstration for Machine-agnostic Feedforward Control on Commercial Powder Bed Fusion Systems: *Christopher Stutzman*¹; *Abdalla Nassar*¹; *Jeffrey Irwin*¹; *Qian Wang*¹; *Panagiotis Michaleris*²; ¹The Pennsylvania State University; ²Autodesk

2:20 PM

Active Monitoring of the Selective Laser Melting Process Using an Artificial Neural Net Classifier on Layer-by-layer Surface Profile Data: *Benjamin Terry*¹; *Brandon Baucher*²; *Anil Chaudhury*²; *Subhadeep Chakraborty*¹; ¹University of Tennessee; ²Applied Optimization

2:40 PM

AM Process Control Using a Machine Learning Approach: *Kilian Wasmer*¹; ¹Empa

3:00 PM

Multiscale and Multiphysics Certification in Additive Manufacturing Using Real-time Sensor Data and Simulation Outcomes: *Deepankar Pal*¹; *Madhu Keshavamurthy*¹; ¹ANSYS

3:20 PM

Process Control for Additive Manufacturing of Metallic Functionally Graded Materials: *Frederick Lia*¹; *Jayme Keist*¹; *Sanjay Joshi*¹; *Rich Martukanitz*²; ¹Penn State; ²Commonwealth Center for Advanced Manufacturing (CCAM)

3:40 PM

Process Monitoring and Closed Loop Control of Robotized Laser Powder Directed Energy Deposition: *Meysam Akbari*¹; *Radovan Kovacevic*¹; ¹Southern Methodist University

4:00 PM

Spatial Statistical Methods for Real-time Crystallographic Grain Growth Reconstruction in Rapidly Solidified Alloys: *Nathan Johnson*¹; *Branden Kappes*¹; *Don Brown*²; *John Carpenter*²; *Aaron Stebner*¹; ¹Colorado School of Mines; ²Los Alamos National Laboratory

Additive Manufacturing: Microstructure and Material Properties of Titanium-based Alloys — Laser Powder Bed Fusion - Session I

Program Organizers: Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Powder Metals; Ola Harrysson, North Carolina State University; Sudarsanam Babu, University of Tennessee, Knoxville

Tuesday PM Room: B116
October 1, 2019 Location: Oregon Convention Center

Session Chair: Ola Harrysson, North Carolina State University

2:00 PM

Analysis of Hatch-contour Interfacial Angle Influence on Defect Formation in Ti-6Al-4V: *Brett Diehl*¹; *Abdalla Nassar*¹; *Anil Chaudhary*²; *Brandon Baucher*²; ¹Pennsylvania State University; ²Applied Optimization

2:20 PM

Laser Powder Bed Fusion of Hydride-Dehydride Ti-6Al-4V Powder: *Amir Mostafaei*¹; *Ziheng Wu*¹; *Nihal Sivakumar*¹; *Anthony Rollett*¹; ¹Carnegie Mellon University

2:40 PM

Modeling Rapid Solidification Microstructures in Laser-melted TiNb Alloys: *Joel Berry*¹; *Aurelien Perron*¹; *Jean-Luc Fattebert*²; *Joseph Mckeown*¹; *Manyalibo Matthews*¹; ¹Lawrence Livermore National Laboratory; ²Oak Ridge National Laboratory

3:00 PM

Multiple Strategies for Microstructural Control during Selective Laser Melting of a Beta Titanium Alloy: *Chunlei Qiu*¹; ¹Beihang University

3:20 PM

Comparing Spherical and Irregular Powders in the Selective Laser Melting of Ti-53%Nb Alloy: *Jhoan Sebastian Guzman Hernandez*¹; *Rafael Nobre*¹; *Enzo Nunes*¹; *Daniel Bayerlein*²; *Railson Falcão*²; *Edwin Leva*²; *João Ferreira Neto*³; *Henrique Oliveira*⁴; *Victor Chastinet*⁴; *Fernando Gomes Landgraf*⁵; ¹University of Sao Paulo; ²Institute for Technological Research; ³Brazilian Metallurgy and Mining Company; ⁴National Service for Industrial Training

Additive Manufacturing: Solid-state and Other Nonbeam-based Technologies for the Manufacturing of Metallic Parts — AM by Wire Arc and Plasma Melting Methods

Program Organizers: Olaf Andersen, Fraunhofer Society; J. Brian Jordon, University of Alabama; Orlando Rios, Oak Ridge National Laboratory; Paul Allison, University of Alabama; Mark Norfolk, Fabrisonic LLC; Luke Brewer, University of Alabama

Tuesday PM Room: B114
October 1, 2019 Location: Oregon Convention Center

Session Chair: Paul Allison, University of Alabama

2:00 PM Invited
Manipulating Mechanical Properties of WAAM Deposited ER70S-6 Steel by Forced Cooling: *Michael Maughan*¹; Andre Corpus¹; ¹University of Idaho

2:20 PM
Investigating the Mechanical, Micro-structural, Corrosion and Fracture Performances of a New Steel Composition, Produced by Tandem WAAM Mixing of (2.25Cr-1Mo and MoNiCr) Type Steel Wires: *Osahon Ehigiator*¹; Supriyo Ganguly¹; Filomeno Martina¹; ¹Cranfield University

2:40 PM Invited
Optimization of Mg-Zn-Ca WAAM Process Parameters by Machine Learning: *Raja A*¹; Nishtha Vaidya¹; Jayaganthan R¹; Murugaiyan Amirthalingam¹; Abhishek Tiwari¹; ¹Indian Institute of Technology Madras

3:00 PM
Aluminum-cerium Alloy Bead Shape Retention in Direct Metal Write Additive Manufacturing: *Max Neveau*¹; Michael Kesler¹; Hunter Henderson¹; Tian Li²; Andrew Pascal²; Zachary Sims¹; Michael Thompson¹; William Carter¹; Scott McCall²; Orlando Rios¹; ¹Oak Ridge National Laboratory; ²Lawrence Livermore National Laboratory

3:20 PM
Jetting of High Temperature Metals Using the Novel Droplet-on-demand Technology “MetalJet”: Interfaces between Dissimilar Materials in Multi-material Printing: *Nesma Aboulkhair*¹; Marco Simonelli¹; Mark East¹; Richard Hague¹; ¹University of Nottingham

Advanced Coatings for Wear and Corrosion Protection — Advanced Coatings for Wear and Corrosion Protection I

Program Organizers: Evelina Vogli, LM Group Holdings Inc.; Fei Tang, DNV GL; Arif Mubarak, PPG; Mary Lyn Lim, PPG Industries

Tuesday PM Room: B118
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Evelina Vogli, LM Group Holdings Inc.; Fei Tang, DNV GL USA, Inc.

2:00 PM Invited
Structurally Integrated Damage Tolerant Thermal Spray Coatings: *Sanjay Sampath*¹; ¹Stony Brook University

2:40 PM
Functional Martensitic Stainless Steel Coatings by Cold Spray: *Jonghyun Lee*¹; Cal Wong¹; Morotolaoluwa Alabi²; Christian Widner³; Dennis Helfritch⁴; Victor Champagne⁴; ¹Iowa State University; ²South Dakota School of Mines and Technology; ³VRC Metal Systems; ⁴The U.S. Army Research Laboratory

3:00 PM
Microstructure Evaluation and Corrosion Behavior of Cold Spray Deposited Tantalum Coating: *Pankaj Kumar*¹; Bhaskar Vadlamani¹; Arpith Siddaiah¹; Prasad Kalvala¹; Pradeep Menezes¹; Reza Daroonparvar²; Charles Kay²; Mano Misra¹; ¹University of Nevada, Reno; ²ASB Industries, Inc.

3:20 PM
Novel HVOF-Deposited Coating Using Recycled WC Powders: *Johanna Meier*¹; Gary Fisher¹; ¹InnoTech Alberta

3:40 PM
Process-induced Variability in the Corrosion Response of Thermally Sprayed Coatings: *Edward Gildersleeve*¹; Sanjay Sampath¹; ¹Center for Thermal Spray Research

4:00 PM
Development of Environmentally-friendly Corrosion Coatings: *Christophe Grenier*¹; Tsukasa Mizuhara¹; ¹PPG Industries

4:20 PM
Corrosion Behaviour and Microstructural Study of TiZnNi Laser Deposited on Titanium Alloy: *Olawale Fatoba*¹; Stephen Akinlabi¹; Esther Akinlabi¹; ¹University of Johannesburg

Advanced High Strength Steels / From Design to End Users — Steel Processing & Applications

Program Organizers: Alla Sergueeva, NanoSteel Company Inc.; Daniel Branagan, The NanoSteel Company

Tuesday PM Room: C124
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Lawrence Cho, National Institute of Standards and Technology; Alla Sergueeva, NanoSteel Company Inc.

2:00 PM Keynote
Strengthening of 3rd Generation AHSS during Cold Stamping: *Daniel Branagan*¹; Craig Parsons¹; Tad Machrowicz¹; Jonathan Cischke¹; Andrew Frerichs¹; Brian Meacham¹; Sheng Cheng¹; Alla Sergueeva¹; ¹NanoSteel Company Inc

2:40 PM
Approach for Developing Ultra High Strength Fastener Steel for Automotive Application: *Byung in Jung*¹; ¹POSCO

3:00 PM
Stronger than Titanium, Lighter than Aluminum, Stops Blast/Bullets: Readily Weldable 1500-2000MPa Armor Technology for Lightweight Structure and Stampings: *Gary Cola*¹; ¹Flash Steelworks

3:20 PM
Microstructure and Mechanical Properties of Intercritical Annealed 7 Mn Steels with Additional Warm-rolling: *Mei Zhang*¹; ¹Shanghai University

3:40 PM Invited
3rd Generation AHSS by Thin Slab Technology: *Christian Klinkenberg*¹; ¹SMS group

4:20 PM
Effect of Retained Austenite Control with Multi-step Heat treatment on the Microstructure Evolution and Mechanical Properties of Direct Quenched High Hardness Armor (HHA) Steel: *Min-Seok Baek*¹; Young-Kyun Kim¹; Tae-Won Park²; Jinhee Ham²; Kee-Ahn Lee¹; ¹Inha University; ²Agency for Defense Development (ADD)

4:40 PM

Creation of Wearproof Eutecticum Composition Materials for the Details of the High Temperature Dynamic Systems: *Volodymyr Tsyganov*¹; Leonid Ivschenko¹; Harold Byalik¹; Richard Mokhnach¹; Nataliia Sakhniuk¹; ¹Zaporizhy National Technical University

Advanced Materials for Harsh Environments — Session III

Program Organizers: Navin Manjorran, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Tuesday PM
October 1, 2019

Room: C126
Location: Oregon Convention Center

Session Chairs: Gurbinder Kaur; Gary Pickrell, Virginia Tech; Navin Manjorran, Solve Technology and Research, Inc.

2:00 PM Keynote

Role of Thermodynamics and Kinetics to Design for Passivation: *Michele Manuel*¹; ¹University of Florida

2:40 PM

High-temperature Oxidation of Transient-liquid Phase Bonded Ni-based Alloys in 1 Bar and 200 Bar Carbon Dioxide: *Casey Carney*¹; Richard Oleksak¹; Gordon Holcomb²; Omer Dogan²; ¹Leidos Research Support Team; ²National Energy Technology Laboratory

3:00 PM

Understanding Weathering Stability of Solar-reflective Composite Silicate Coatings: *Taisiya Skorina*¹; Rebecca Everman¹; Jean Tangeman¹; Kent Budd¹; Robert Brown¹; Adam Brodd¹; ¹3M

3:20 PM

Manufacturing Technology and Application of Cooling Stave in Blast Furnace: *Yong Deng*¹; Qing Lv¹; Jianliang Zhang²; Kexin Jiao²; ¹North China University of Science and Technology; ²University of Science and Technology Beijing

3:40 PM

Inclusion Modification and Corrosion Resistance Optimization of 304 Stainless Steel Containing Cerium: *XiaoJun Xi*¹; Maolin Ye¹; Shufeng Yang¹; Jingshe Li¹; ¹University of Science and Technology Beijing

4:00 PM

Wear-corrosion Synergism Behavior of Molybdenum-Rhenium-Tellurium Alloys for Structural Application in Molten Salt Reactor: *Pankaj Kumar*¹; Arpith Siddaiah¹; Jun Du²; Pradeep Menezes¹; Mano Misra¹; ¹University of Nevada, Reno; ²University of Utah

4:20 PM

Galvanic Corrosion Resistance of Mixed-material Joints Fabricated by Resistance Spot Riveting™: *Paul Krell*¹; Jenifer Locke¹; ¹Ohio State University

5:00 PM Concluding Comments

Advanced Materials for Oil and Gas Applications - Performance and Degradation — Advanced Materials for Oil and Gas Applications - Performance and Degradation

Program Organizers: Yellapu Murty, MC Technologies LLC; Riad Asfahani, U. S. Steel

Tuesday PM
October 1, 2019

Room: B111
Location: Oregon Convention Center

Session Chair: Yellapu Murty, MC Technologies

2:00 PM

Translational Atomistic Models for Design and Prediction of Corrosion Resistant Alloys for Extreme Environments: *Christopher Taylor*¹; Huibin Ke²; Ramgopal Thodla¹; ¹Dnv GI; ²Ohio State University

2:30 PM

Molecular Dynamics Simulation of Partially Hydrolyzed Polyacrylamide in Saline Solutions: *Qitong Liu*¹; Wang Bu¹; ¹University of Wisconsin Madison

2:50 PM

Effect of Cr and Mo on the Corrosion Behavior of High Strength Steel in CO₂/H₂S Environment: Keiichi Kondo¹; *Yoon-Seok Choi*²; Srdjan Nestic²; Taro Ohe¹; Jun Nakamura¹; Hiroki Kamitani¹; Hisashi Amaya¹; ¹Nippon Steel Corporation; ²Ohio University

3:10 PM

Effects of Nb and Mo Addition for Strengthening on Corrosion Resistance of 13%Cr Steels: *Shuji Hashizume*¹; ¹TenarisNKK Tubes

3:30 PM

Austenite Reversion during Tempering of Martensitic-ferritic Stainless Steel: *Tatiane Santos*¹; Ricardo Carvalho¹; Marília Lima¹; Luciana Lima¹; Adriana Rocha¹; Vicente Bueno¹; ¹Vallourec Soluções Tubulares do Brasil

3:50 PM

Application of Biobased Corrosion Inhibitors for Oil and Gas Pipelines in Contaminated Environments: *Behzad Bavarian*¹; Boris Miksic¹; ¹California State University

4:10 PM

In-service Microstructure Evolution and Reliability Implications in High Gamma-prime Ni-based Superalloy Turbine Blades: *Patxi Fernandez-Zelaia*¹; Michael Kirka¹; Sebastien Dreyepont¹; Yousub Lee¹; Anand Kulkarni²; Kyle Stoodt²; Jason Weissman²; Santosh Narasimhachary²; ¹Oak Ridge National Laboratory; ²Siemens Corporation Corporate Technology

Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder — Interface Stability in Advanced Interconnects

Program Organizers: Tae-Kyu Lee, Portland State University; Darrel Frear, Freescale Semiconductor; David Yan, San Jose State University; Albert T. Wu, National Central University

Tuesday PM Room: A108
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Tae-Kyu Lee, Portland State University; Darrel Frear, NXP

2:00 PM Invited
Interfacial Reactions in Co/Ag-Cu, Ni/Ag-Cu, Co/Ag-Sb and Ni/Ag-Sb Couples: *Sinn-wen Chen*¹; ¹National Tsing Hua University

2:30 PM
Corrosion Behavior of Electroplated and Electroless Plating Ni/Pd/Au Surface Finish on Automobile Printed Circuit Board: *Albert T. Wu*¹; Yi Ting Shen¹; Chih Yuan Hsiao²; Freeze Wang²; Nico Li²; ¹National Central University; ²Taiwan Uyemura Co Ltd

2:50 PM
Instability Detection in Press-fit Connector Pin Interconnects after Thermo-mechanical Cycling: *Yeonjin Baek*¹; Li Li²; Tae-Kyu Lee¹; ¹Portland State University; ²Cisco Systems

3:10 PM
A Model Study of Microstructure Evolution and Bi Diffusion in Sn-Bi Low Temperature Soldering Systems: *Yaohui Fan*¹; John Blendell¹; Carol Handwerker¹; ¹Purdue University

3:30 PM
Effect of Thermal Annealing on Structural Integrity of Cu-filled-through Si Via (TSV): *Dipali Sonawane*¹; Praveen Kumar¹; ¹IISc

Advances in Dielectric Materials and Electronic Devices — Ferroics and Multiferroics: Session I

Program Organizers: Amar Bhalla, University of Texas; Ruyan Guo, University of Texas at San Antonio; Rick Ubic, Boise State University; Danilo Suvorov, Jožef Stefan Institute

Tuesday PM Room: A105
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Ruyan Guo, University of Texas at San Antonio; Ducinei Garcia, Federal University of Sao Carlos

2:00 PM Invited
Effects of Percolation and Ferroelectric-to-Relaxor-to-Dielectric Crossover in Lead-free Perovskite Solid Solutions: *Zuo-Guang Ye*¹; Jian Zhuang²; Alexei Bokov¹; Wei Ren²; ¹Simon Fraser University; ²Xi'an Jiaotong University

2:20 PM Invited
Origin of Relaxor Behavior in Ba-based Perovskites by Raman Spectroscopy and First Principles Calculations: *Jürgen Spitaler*¹; Maxim Popov¹; Vignaswaran Veerapandian¹; Giovanna Canu²; Eric Bousquet³; Pedro Groszewicz⁴; Markus Kratzer⁵; Christian Teichert⁶; Marek Pasciak⁶; Jiri Hlinka⁶; Vincenzo Buscaglia²; Marco Deluca¹; ¹Materials Center Leoben Forschung GmbH; ²CNR-ICMATE; ³University of Liege; ⁴Technical University of Darmstadt; ⁵Institute of Physics, Montanuniversität Leoben; ⁶Institute of Physics of the Czech Academy of Sciences

2:40 PM Invited
High-temperature Lead-free Multilayer Ceramic Capacitors with Ultrahigh Energy Density and Efficiency via Two-step Sintering: *Xiaohui Wang*¹; Ziming Cai¹; ¹Tsinghua University

3:00 PM Invited
Synchrotron X-ray Absorption Spectroscopy Investigation on Temperature- and Field-dependent Local Structure in BTO and PZT Perovskite Materials: Rojnapa Tharamas¹; Phanupong Phaktapha¹; Saroj Rujirawat¹; *Rattikorn Yimmirun*²; ¹Suranaree University of Technology; ²Vidyasirimedhi Institute of Science and Technology (VISTEC)

3:20 PM Invited
High Piezoelectricity in Relaxor-PT based Materials with Local Structural Heterogeneity: *Shujun Zhang*¹; F. Li²; M.J. Cabral³; Elizabeth Dickey³; James LeBeau³; Long-Qing Chen⁴; T. Shrout⁴; ¹University of Wollongong; ²Xi'an Jiaotong University; ³North Carolina State University; ⁴Pennsylvania State University

3:40 PM Invited
Structure-property Relationships in BaCexTi1-xO3 Ceramics and Comparison with Other BaMxTi1-xO3 Systems: *Giovanna Canu*¹; Lavinia Curecheriu²; Maria Teresa Buscaglia¹; Giorgia Confalonieri³; Marco Deluca⁴; Monica Dapiaggi⁵; Liliana Mitoseriu²; Vincenzo Buscaglia¹; ¹CNR-ICMATE, Institute of Condensed Matter Chemistry and Technologies for Energy; ²Department of Physics, Alexandru Ioan Cuza University; ³Department of Chemical and Geological Sciences, University of Modena and Reggio Emilia; ⁴Materials Center Leoben Forschung GmbH; ⁵Department of Earth Sciences "Ardito Desio", University of Milan

4:00 PM Invited
Relaxor Dielectrics for Multilayer Capacitors with Temperature-stable Permittivity Up to 250°C: *Jörg Töpfer*¹; Thomas Schulz¹; Beate Capraro²; Heike Bartsch³; ¹University of Applied Sciences Jena; ²Fraunhofer IKTS; ³TU Ilmenau

4:20 PM
Effect of ZnO-doping on the Electric Properties of High Coercive Field PIN-PZN-PT Ceramics: *Michael Brova*¹; Beecher Watson¹; Rebecca Walton¹; Elizabeth Kupp¹; Mark Fanton¹; Richard Meyer¹; Gary Messing¹; ¹Pennsylvania State University

4:40 PM
Piezoelectric Response of Magnetolectric Particulate Composites to the Application of a DC Magnetic Field during Electric Poling: Flavio Milton¹; Adélia Rodrigues¹; Carlos de Castro Neto¹; Leonardo Lemes¹; Washington Santa Rosa¹; Fábio Zabotto¹; *Ducinei Garcia*¹; ¹Federal University of Sao Carlos

ASM Edward DeMille Campbell Memorial Lecture

Tuesday PM Room: Portland Ballroom 254
October 1, 2019 Location: Oregon Convention Center

12:45 PM Invited
Breaking Old Barriers: New Opportunities in Brittle Fracture: *Katherine Faber*¹; ¹California Institute of Technology

Boron Based Materials and Coatings: Structure, Properties, Processing, and Applications — Boron Based Materials and Coatings: Structure, Properties, Processing, and Applications

Program Organizers: Jens Kunstmann, Td Dresden; Roumiana Petrova, New Jersey Institute of Technology; Scott Beckman, Washington State University

Tuesday PM Room: E141
October 1, 2019 Location: Oregon Convention Center

Session Chair: Roumiana Petrova, New Jersey Institute of Technology

2:00 PM Invited

Understanding the Driving Forces behind Lanthanum Hexaboride Lattice Formation: *Tracy Mattox*¹; Jeffrey Urban¹; ¹Lawrence Berkeley National Laboratory

2:40 PM

Design of Novel MoAlB based Compositions: *Maharshi Dey*¹; Surojit Gupta¹; ¹University of North Dakota

Ceramic and Crystal Materials for Optics and Photonics — Session III

Program Organizers: Yiquan Wu, Alfred University; Jas Sanghera, Naval Research Laboratory; Akio Ikesue, World-Lab. Co., Ltd; Mark Dubinskiy, Army Research Laboratory; Randall Hay, U.S. Air Force Research Laboratory; Xiang-Hua Zhang, Université de Rennes 1; Michael Squillante, RMD, Inc; Long Zhang, Chinese Academy of Sciences; Takunori Taira, National Institutes of Natural Science

Tuesday PM Room: A107
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Woohong (Rick) Kim, Naval Research Laboratory; Shyam Bayya, Naval Research Laboratory

2:00 PM Invited

Grain Size Dependent Properties Trends in Nanocrystalline Ceramics for Optical Applications: *James Wollmershauser*¹; Boris Feigelson¹; Kevin Anderson²; John Drazin³; Mason Wolak¹; Heonjune Ryou¹; Edward Gorzkowski¹; ¹Naval Research Laboratory; ²National Research Council Postdoctoral Research Fellow sited at U.S. Naval Research Laboratory; ³Washington State University

2:40 PM Invited

Magneto-optic Ceramics for High-power Laser Applications: *Ryo Yasuhara*¹; ¹National Institute for Fusion Science

3:00 PM

Manufacturing of CaLa2S4 Transparent Ceramics by Pressure-assisted Sintering Techniques: *Guillaume Durand*¹; Christophe Coureau²; Philippe Adam³; Xiang-Hua Zhang¹; Odile Merdrignac-Conanec¹; ¹Université de Rennes 1 - UMR-CNRS 6226 ISCR; ²Solcera Advanced Material; ³DGA-MRIS

3:20 PM Invited

Non-uniform Yb-doped Ceramic Laser Gain Media: Shaping and Performance: *Jan Hostaša*¹; Valentina Biasini¹; Andreana Piancastelli¹; Guido Toci²; Angela Pirri³; Laura Esposito¹; ¹CNR ISTECC, Institute of Science and Technology for Ceramics; ²CNR INO, National Institute of Optics; ³CNR IFAC, Institute of Applied Physics “Nello Carrara”

3:40 PM Invited

Sintering of Nanocrystalline Transparent Zinc Aluminate: Chenguang Yang¹; Andrew Thron¹; *Ricardo Castro*¹; ¹University of California, Davis

4:00 PM

Recent Development in Spinel Processing: *Shyam Bayya*¹; Guillermo Villalobos¹; Woohong Kim¹; Michael Hunt¹; Syed Qadri¹; Lynda Busse¹; Jesse Frantz¹; Brandon Shaw¹; Ishwar Aggarwal²; Chris Wilson²; Fritz Miklos³; Bryan Sadowski³; Jas Sanghera¹; ¹Naval Research Laboratory; ²University of North Carolina at Charlotte; ³KeyW Corporation

Ceramics and Glasses Simulations and Machine Learning — First Principle Simulations of Ceramics and Glasses

Program Organizers: Mathieu Bauchy, University of California, Los Angeles; Peter Kroll, University of Texas; Efrain Hernandez, Army Research Laboratory

Tuesday PM Room: A109
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Mathieu Bauchy, University of California, Los Angeles; N. M. Anoop Krishnan, IIT Delhi

2:00 PM

Genesis of “Free” Carbon in Silicon Oxycarbide Ceramics: *Peter Kroll*¹; ¹University of Texas at Arlington

2:20 PM

Predicting Nuclear Magnetic Resonance Parameters in Ceramics Using Density Functional Theory: *Ryan McCarty*¹; Arthur Pyuskulyan¹; Jingda Zhang²; Kieron Burke¹; ¹University of California, Irvine; ²Nankai University

2:40 PM

The Stability, Structure and Properties of the Zeta Phase in the Transition Metal Carbides: *Christopher Weinberger*¹; Hang Yu²; Xiao-Xiang Yu³; Gregory Thompson⁴; ¹Colorado State University; ²Drexel University; ³Northwestern University; ⁴University of Alabama

3:00 PM

Thermal Conductivity of a Glass Material by First-principles Molecular Dynamics: The Case of GeTe₄: *Evelyne Martin*¹; Carlo Massobrio²; ¹IEMN; ²IPCMS

3:20 PM

Role of Multi-state Hydrogen during Mayenite Electride Formation by First-principles Calculation: *Zheng Yu*¹; Bu Wang¹; ¹University of Wisconsin, Madison

3:40 PM

The Thermophysical Properties of TcO₂: *Hong Zhong*¹; Jason Lonergan²; John McCloy¹; Scott Beckman¹; ¹Washington State University; ²Pacific Northwest National Laboratory

4:00 PM

Tuning Electronic Properties in II-IV-V₂ Semiconductors via Sub-lattice Configurational Disorder: *Jacob Cordell*¹; Jie Pan²; Stephan Lany²; Garritt Tucker¹; ¹Colorado School of Mines; ²National Renewable Energy Laboratory

Characterization of Materials and Properties through Metallography, Mechanical Testing and Analysis - From Fundamentals to the Cutting Edge — Quantification, Classification and Simulation of Microstructures and Properties I

Program Organizer: Michael Keeble, Buehler

Tuesday PM Room: F152
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Daniel Dennies, DMS, Inc; Gabriel Lucas, Scot Forge Company; Jaret Frafjord, IMR Test Labs

2:00 PM Invited

ASM-IMS Henry Clifton Sorby Lecture: Development and Characterization of High-performance Materials by Means of Cross-scale Metallography and Complementary Methods: *Helmut Clemens*¹; ¹Montanuniversitaet Leoben

3:00 PM Question and Answer Period

3:20 PM Invited

Fascinating New Surfaces by Advanced Laser Structuring? – Metallography and Mechanical Testing of Periodic Micro-patterned Surfaces for Reduced Friction and Contact Resistance: *Frank Muecklich*¹; Leander Reinert²; Andres Lasagni³; ¹University of Saarland; ²Material Engineering Center Saarland; ³TU Dresden

3:40 PM

Phase Identification and Mechanical Properties of a Ti-20Fe-20Co Alloy: *Song Cai*¹; ¹Fort Wayne Metals

4:00 PM Invited

Characterizing Inclusion Populations in Superelastic Nitinol and Correlation to Mechanical Behavior: *Janet Gbur*¹; John Lewandowski¹; ¹Case Western Reserve University

4:20 PM Invited

Microstructure of Iron-based Historical Specimens: *George Vander Voort*¹; ¹Vander Voort Consulting L.L.C.

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — Rational Design and Synthesis of Nanostructures

Program Organizers: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Tech; Edward Gorzkowski, Naval Research Laboratory ; Jian Shi, Rensselaer Polytechnic Institute; Kejie Zhao, Purdue University ; Michael Naguib, Tulane University

Tuesday PM Room: D134
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University

2:00 PM Keynote

Crafting Uniform Hairy Nanocrystals for Energy Conversion and Storage: *Lin Zhiqun*¹; ¹Georgia Institute of Technology

2:40 PM Invited

The Core-shell Engineering on Energy Product of Magnetic Nanometals: *Shenqiang Ren*¹; ¹University at Buffalo, The State University of New York

3:10 PM

Epitaxial Growth of Soft Perovskites and the Hidden Carrier Dynamics: *Jie Jiang*¹; Yiping Wang¹; Jing Feng²; Jian Shi¹; ¹Rensselaer Polytechnic Institute; ²Kunming University of Science and Technology

3:30 PM Invited

Synthesis, Processing and Additive Manufacturing of Architected Materials with Designed Structural and Multi-functional Responses: *Xiaoyu Zheng*¹; ¹Virginia Polytechnic Institute and State University

4:00 PM

Self Supported Cu Doped TiO₂ Nano-fibrous Blankets for Visible Light Photo Catalysis: *Fateh Mikaeili*¹; Perena Gouma¹; ¹Ohio State University

4:20 PM

Controlled Synthesis of Lamellar-like Electrospun Ceramic Nanofibers for Energy Application: *Oren Elishav*¹; Gennady Shter¹; Gideon Grader¹; ¹Technion

4:40 PM

Nickel-SiOC Magnetoceramics from Water Assisted Pyrolysis of Polymers: *Kathy Lu*¹; Ni Yang¹; ¹Virginia Polytechnic Institute

Data Science for Material Property Interpretation — Machine Learning Applications to Materials Data

Program Organizers: Alex Belianinov, Oak Ridge National Laboratory; Ichiro Takeuchi, University of Maryland; Jeff Simmons, Wright Patterson Air Force Research Laboratory; Jason Hattrick-Simpers, National Institute of Standards and Technology

Tuesday PM Room: E145
October 1, 2019 Location: Oregon Convention Center

Session Chair: Alex Belianinov, Oak Ridge National Laboratory

2:00 PM Invited

Structure Prediction and Property-based Optimization of Molecular Crystals with GATOR: *Noa Marom*¹; ¹Carnegie Mellon University

2:40 PM

Deciphering the Atomic Origin of Glasses' Properties by Machine Learning: *Tyanyi Bao*¹; *Mathieu Bauchy*¹; ¹University of California, Los Angeles

3:00 PM

Application of Artificial Neural Networks to Low Cycle Fatigue and Creep Data Processing for Power Plant Materials: *Kuk-Cheol Kim*¹; Jhin-Ik Suk¹; Byeong-Ook Kong¹; ¹Doosan Heavy Industries & Construction

3:20 PM Break

3:35 PM Invited

3D Nanoprinting: An Integrated Approach of Experiments, Computer-aided Design and Simulations: *Jason Fowlkes*¹; Robert Winkler²; Eva Mutunga³; Juergen Sattelkvw²; Philip Rack³; Harald Plank²; ¹Oak Ridge National Laboratory; ²Graz University of Technology; ³The University of Tennessee

4:15 PM

Python For Glass Genomics (PyGGI): A Machine Learning Package to Predict the Properties of Glasses: *Hargun Singh*¹; R. Ravinder¹; Pratik Bhaskar¹; Hariprasad Kodamana¹; *N. M. Anoop Krishnan*¹; ¹Indian Institute of Technology Delhi

4:35 PM

A Machine Learning Approach to Independent Component Analysis for Nuclear Magnetic Resonance Spectra: *Ryan McCarty*¹; Jason Kahn¹; David Rotter¹; Ryan Padilla¹; Nadia Ahmed¹; Domingos Begalli¹; ¹University of California, Irvine

4:55 PM Invited

Adversarial Networks for Digital Microstructure Generation: *Stephen Niezgod*¹; Mengfei Yuan¹; Dennis Dimiduk¹; Yunzhi Wang¹; ¹Ohio State University

Failure Analysis & Characterization — Environmentally Assisted Failures

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Tuesday PM Room: F150
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Thomas Ackerson, Curtiss Wright - IMR Test Labs; Ellen Wright, Engineering Systems Inc.; John Macha, Southwest Research Institute

2:00 PM

When Cleaning Makes a Mess: Case Studies Involving Cleaning Agents: *Ellen Wright*¹; Mark Hineman¹; Keith Cline¹; Dale Alexander¹; Brian May¹; ¹Engineering Systems Inc. (ESi)

2:20 PM

Failure Analysis of a Corrosion Resistant Hot Water Heater: *Noah Budiansky*¹; Vir Narinkari¹; Ockert Van Der Schijff¹; ¹Exponent

2:40 PM

Comparison of Environmental Cracking in Metals and Polymers: *Mark Hineman*¹; Ron Parrington¹; Dale Edwards¹; ¹Engineering Systems Inc.

3:00 PM

Hydrogen-related Plastic Deformation and Fracture Behaviors in 2Mn-0.1C Steel with Ferrite Microstructure: *Kazuho Okada*¹; Akinobu Shibata¹; Wu Gong²; Nobuhiro Tsuji¹; ¹Department of Materials Science and Engineering, Kyoto University; ²Elements Strategy Initiative for Structural Materials (ESISM), Kyoto University

3:20 PM

Microbiological Induced Corrosion of Welds in Stainless Steel Piping: *Waleed Khalifa*¹; ¹Cairo University

3:40 PM

Corrosion Inhibition and Passivation Characteristics of Neem Leaf Oil Extracts on Mild Steel in Citric Acid Media: *Roland Loto*¹; Cleophas Loto¹; Ayobami Busari¹; ¹Covenant University

4:00 PM

Effect of White Aluminum Dross on the Corrosion Resistance of Reinforcement Carbon Steel in Simulated Concrete Pore Solution: *Roland Loto*¹; Ayobami Busari¹; ¹Covenant University

4:20 PM

Corrosion Inhibition Performance of Cedrus Atlantica on Low Carbon Steel in Dilute Acid Concentrations: *Roland Loto*¹; Cleophas Loto¹; ¹Covenant University

Failure Analysis: Industry Specific Failures — Boilers, Pressure Vessels, Welding & Joining Failures

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Tuesday PM Room: F151
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Aaron Tanzer, Element; Brett Miller, IMR Metallurgical Services; Thomas Traubert, EDT Engineering; Kyle Minden, Engineering Design & Testing Corporation; Courtney Pape, DNV GL; Thomas Kozina, Bearings; Erik Pfeif, Colorado School of Mines

2:00 PM Invited

Oil Heater Tube Failure due to Excessive Unintended Carburization: *David Williams*¹; ¹Engineering Design & Testing Corp.

2:20 PM

Failure Analysis of a Corroded SCUBA Tank: *Dana Medlin*¹; Jacob Fuerst²; ¹EAG Laboratories; ²Remington Outdoor Company

2:40 PM

Inadequate Weld Repair and Rupture of a Pressure Vessel: *Kyle Minden*¹; ¹EDT

3:00 PM

Failure Analysis of a Waste Heat Recovery Boiler Thermally Coupled to Ammonia Oxidation Reactor: *Muhammad Butt*¹; Muhammad Manzoor¹; Tahir Ahmad¹; Muhammad Kamran¹; ¹University of the Punjab

3:20 PM

Tube Leaks in Black Liquor Recovery Boiler: *Thomas Traubert*¹; ¹EDT Engineers

3:40 PM

Avoidable and Non-avoidable Failures in Power Plants: *Fahmida Hossain*¹; *Veda-Anne Ulcickas*¹; ¹Massachusetts Materials Research, Inc.

4:00 PM

A Tale of Two Studies: Remaining Useful Life in Seam-welded P-11 High Energy Steam Piping after 39 Years of Service: *Rachel Wittman*¹; John Hasier¹; ¹Intertek

4:20 PM Invited

The Perfect Storm Effects on Catastrophic Events: *Robert O'Shea*¹; Kent Johnson¹; ¹Applied Materials Technologies Inc.

Formability and Fracture of Metal Sheets — Formability and Fracture of Metal Sheets I

Program Organizers: Piyush Upadhyay, Pacific Northwest National Laboratory; John Carsley, Novelis, Inc.; Daniel Coughlin, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines

Tuesday PM Room: C123
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Piyush Upadhyay, Pacific Northwest National Laboratory

2:00 PM Invited

Biaxial Tensile Testing Using Laser-deposited Cruciform and Its Extension to Non-proportional Loading: Yong Hou¹; Junying Min¹; Nan Guo¹; Jianping Lin¹; *John Carsley*²; Thomas Stoughton²; Changwei Lian¹; ¹Tongji University; ²General Motors Company

2:30 PM Invited

Stress-strain Response in the Early Stage of Hydraulic Bulge Testing: Lulu Deng¹; Junying Min¹; *John Carsley*²; Thomas Stoughton²; Jianping Lin¹; ¹Tongji University; ²General Motors Company

3:00 PM

Behavior of Quenched-and-partitioned Steels Deformed at Elevated Temperatures: *Ana Araujo*¹; Jun Hu¹; Erik Pavlina¹; Amrinder Gill¹; ¹AK Steel Research and Innovation Center

3:20 PM

Edge Stretchability of Hot Rolled High-strength Low-alloy Steel: David Overby¹; Chad Cathcart¹; *Xingcai Yu*¹; Tihe Zhou¹; Peter Badgley¹; Chris Martin-Root¹; ¹Stelco Inc.

3:40 PM

Effect of Ultrasonic-assisted Two-point Incremental Sheet Forming (UA-TPIF) on Surface Finish: *Randy Cheng*¹; Ankush Bansal¹; Xun Liu²; Alan Taub¹; ¹University of Michigan; ²The Ohio State University

4:00 PM

The Influence of Phase Constituents on Hole Expansion Capacity of Multi-phase Steels: *Wei Li*¹; Martina Vittoriotti²; Geurt Jongbloed²; Jilt Sietsma¹; ¹Department of Materials Science and Engineering, Delft University of Technology; ²Delft Institute of Applied Mathematics, Delft University of Technology

4:20 PM

A Method to Predict the Ductile Fracture of Metal Sheets under Complex Plane Stress: *Jian Fang*¹; Jian-wei Zhang¹; ¹Baoshan Iron & Steel Co. Ltd.

Glasses, Optical Materials, and Devices: Current Issues in Science & Technology — ACerS GOMD

Alfred R. Cooper Award Session

Program Organizers: Jincheng Du, University of North Texas; S. Sundaram, Alfred University

Tuesday PM Room: A106
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Steve Martin, Iowa State University; Kathleen Richardson, University of Central Florida

2:00 PM Invited

Cooper Distinguished Lecture: Function-tailoring Strategies for Broadband Infrared Glasses: *Kathleen Richardson*¹; ¹University of Central Florida

2:40 PM Invited

2019 Alfred R. Cooper Young Scholar Award Presentation: Topological Constraint Model of High Lithium Content Borate Glasses: *Wataru Takeda*¹; ¹Coe College

3:20 PM Invited

Thin-film Glassy Solid Electrolytes: A New Functionality for Glass Enabling High Energy Density Li and Na Batteries: *Steve Martin*¹; Steven Kmiec¹; Guantai Hu¹; Ran Zhao¹; Ryan Gebhardt¹; Adriana Joyce¹; Dmitriy Bayko¹; Onel Valdez¹; Jacob Lovi¹; ¹Iowa State University

3:50 PM Invited

Glass Contributions to Advances in Nuclear Energy: *Charmayne Lonergan*¹; Jarrod Crum¹; Josef Matyas¹; John Vienna¹; ¹Pacific Northwest National Laboratory

4:20 PM Invited

Electrical Conduction in Metal-doped Chalcogenide Glasses: Kirtankumar Dixit¹; David Drabold¹; *Gang Chen*¹; ¹Ohio University

Grain Boundaries, Interfaces, and Surfaces in Functional Materials: Fundamental Structure-Property-Performance Relationships — Interfaces in Energy Storage and Conversion Materials

Program Organizers: Ming Tang, Rice University; Shen Dillon, University of Illinois, Urbana-Champaign; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute of Technology

Tuesday PM Room: E143
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Linsen Li, Shanghai Jiao Tong University; Yue Qi, Michigan State University

2:00 PM Invited

First-principles Prediction of Potentials and Space-charge Layers in All-solid-State Batteries: Michael Swift¹; *Yue Qi*¹; ¹Michigan State University

2:30 PM Invited

Anisotropy in Ceramic Interfaces: Rare-earth Pyrosilicates for High-temperature Coatings and Halide Perovskites for Solar Cells: *Hadas Sternlicht*¹; Nitin Padture¹; ¹Brown University

3:00 PM

A Thermal Grooving Study of Ni-diffusion and Grain-boundary Energies in SOFC-anodes: *Patricia Haremski*¹; Matthias Wieler²; Anika Maruszczyk²; Michael J. Hoffmann³; Paul Hoffrogge⁴; Daniel Schneider⁵; Britta Nestler⁵; Piero Lupetin²; ¹Robert Bosch GmbH; Karlsruhe Institute of Technology; ²Robert Bosch GmbH; ³Karlsruhe Institute for Technology; ⁴Karlsruhe University of Applied Sciences; ⁵Karlsruhe University of Applied Sciences; Karlsruhe Institute of Technology

3:20 PM

Insights into the CO₂ Stability-performance Trade-off of Antimony-doped SrFeO_{3-d} Perovskite Cathode for Solid Oxide Fuel Cells: *Yuqing Meng*¹; Jun Gao¹; Kyle Brinkman¹; ¹Clemson University

3:40 PM Invited

Electrochemical-shock Resistant Single-crystal Ni-rich Layered Cathode Materials: *Linsen Li*¹; Guannan Qian¹; Zi-Feng Ma¹; ¹Shanghai Jiao Tong University

4:10 PM

Stress-induced Interface Instability in Battery Electrode Compounds: *Youtian Zhang*¹; *Ming Tang*¹; ¹Rice University

4:30 PM

Design of Highly Stable Nanostructured LiMn₂O₄ for Li-ion Battery Cathodes: *Kimiko Nakajima*¹; Ricardo Castro¹; ¹University of California, Davis

Hybrid Organic-Inorganic Materials for Alternative Energy — Photovoltaics

Program Organizers: Andrei Jitianu, Lehman College, City University of New York; Lisa Klein, Rutgers University; Lia Stanciu, Purdue University; Mihaela Jitianu, William Paterson University

Tuesday PM
October 1, 2019

Room: E147
Location: Oregon Convention Center

Session Chair: Andrei Jitianu, Lehman College - City University of New York

2:00 PM Invited

Impacts of Nanostructures and Interfaces on Perovskite Solar Cell Performance: *Guozhong Cao*¹; ¹University of Washington

2:30 PM Invited

In Situ Transient Absorption Spectroscopy of Organometal Halide Perovskite Nanoparticles: James Sadighian¹; Michael Crawford¹; *Cathy Wong*¹; ¹University of Oregon

3:00 PM

Composition-dependent Properties of Point Defects in Halide Perovskite: An ab Initio Study: *Rabi Khanal*¹; Anirban Naskar¹; M. F. N. Taufique²; Nicholas Ayers¹; Soumik Banerjee²; Samrat Choudhury¹; ¹University of Idaho; ²Washington State University

3:20 PM Invited

Probing Electronic Stability in Hybrid Halide Perovskites: *John Labram*¹; ¹Oregon State University

3:50 PM Invited

Self-assembled Amphiphilic Block Copolymers/CdTe Nanocrystals for Efficient Aqueous-processed Hybrid Solar Cells: *Christine Luscombe*¹; ¹University of Washington

Hydrogen Effects on Materials Performance — Advanced Computational and Experimental Methods for Probing Hydrogen-Materials Interactions

Program Organizers: Samantha Lawrence, Los Alamos National Laboratory; Kip Findley, Colorado School of Mines; Megan Cordill, Erich Schmid Institute for Materials Science

Tuesday PM
October 1, 2019

Room: E146
Location: Oregon Convention Center

Session Chairs: Neville Moody, Sandia National Laboratories; Vsevolod Razumovskiy, Materials Center Leoben Forschung GmbH

2:00 PM

Molecular Dynamics Analysis on the Effect of Hydrogen in Grain Boundary Deformation of Lath Martensitic Steel: *Kazuki Matsubara*¹; Akihide Nagao¹; Nobuyuki Ishikawa¹; ¹JFE Steel Corporation

2:20 PM Invited

Modeling Hydrogen-induced Fracture of Lath Martensitic Steels: *Mohsen Dadfarnia*¹; Akihide Nagao²; Brian Somerday³; Petros Sofronis⁴; Robert Ritchie⁵; ¹Seattle University; ²JFE Steel Corporation; ³Southwest Research Institute; ⁴University of Illinois at Urbana-Champaign; ⁵University of California, Berkeley

2:50 PM

Technology Maturity for Molecular Dynamics Studies of Hydrogen Embrittlement in Fe-C Based Steels: *Xiaowang Zhou*¹; Michael E. Foster¹; Joseph Allen Ronevich¹; Christopher W San Marchi¹; ¹Sandia National Laboratories

3:10 PM Invited

Probing Three Proposed Mechanisms of Hydrogen Embrittlement: Combined HEXRD and SAXS Measurements of Strain, Dislocation Density, and Porosity Near Steel Fatigue Cracks Grown in Hydrogen: *Matthew Connolly*¹; May Martin¹; Peter Bradley¹; Damian Lauria¹; Andrew Slifka¹; Robert Amaro²; ¹National Institute of Standards and Technology; ²Southern Research

3:40 PM

In situ Studies of High Pressure Hydrogen Effects on Polymeric Materials Performance: *Wenbin Kuang*¹; Kevin Simmons¹; Wendy Bennett¹; Timothy Rooseedaal¹; Stanley Owsley¹; Stan Pitman¹; Dustin Celand¹; Angel Ortiz¹; Brian Weed¹; Gayaneh Petrossian¹; ¹Pacific Northwest National Laboratory

4:00 PM

Hydrogen Doping Effect on the Photocatalytic Performance of Titanium Dioxide: *Evan Hyde*¹; Matthew Beck¹; ¹University of Kentucky

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales — Session III

Program Organizers: M Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen's University; Josh Kacher, Georgia Institute of Technology; Caizhi Zhou, Missouri University of Science and Technology; Lei Cao, University of Nevada, Reno

Tuesday PM
October 1, 2019

Room: G132
Location: Oregon Convention Center

Session Chairs: Sid Pathak, University of Nevada, Reno; Ondrej Muránsky, University of New South Wales

2:00 PM Invited

Improving Ductility of Magnesium through Reversible Phase Transformation in bcc Mg/Nb Nanolaminates: *Youxing Chen*¹; Nan Li²; Satyesh Yadav³; Xiangyang Liu²; Jian Wang⁴; Nathan Mara⁵; ¹University of North Carolina, Charlotte; ²Los Alamos National Laboratory; ³Indian Institute of Technology Madras; ⁴University of Nebraska, Lincoln; ⁵University of Minnesota, Twin Cities

2:30 PM Invited

Enhancing Ductility of Metal-metal and Metal-ceramic Multilayered Nanocomposites: *Siddhartha Pathak*¹; ¹University of Nevada, Reno

3:00 PM

Characterizing Glissile Dislocation Junctions Using Electron Microscopy: *Fulin Wang*¹; Daniel Weygand²; Daniel Gianola¹; ¹University of California, Santa Barbara; ²Karlsruhe Institute of Technology

3:20 PM Invited

Dynamical Deformation Mechanism Study on a Zirconium Alloy by In-situ TEM Deformation Coupled with 3D Dislocation Tomography: *Fei Long*¹; Josh Kacher²; Zhongwen Yao¹; Mark Daymond¹; ¹Queen's University; ²Georgia Institute of Technology

3:50 PM Invited

On the Measurement of Dislocations and Dislocation Structures using EBSD and HRSD Techniques: *Ondrej Muránsky*¹; ¹ANSTO

Joining of Advanced and Specialty Materials XXI — Welding in the Automotive Industry / Joining, Brazing and Adhesive of Advanced Materials

Program Organizers: Mathieu Brochu, McGill University; Anming Hu, University of Tennessee; Hiroaki Mori, Osaka University; Yuri Hovanski, Brigham Young University; Darren Barborak, WeldQC Inc; Akio Hirose, Osaka University; Peng He, Harbin Institute of Technology; Zhiyong Gu, University of Massachusetts Lowell; Zhenzhen Yu, Colorado School of Mines

Tuesday PM
October 1, 2019

Room: Portland Ballroom 252
Location: Oregon Convention Center

Session Chair: Michael Halbig, NASA Glenn Research Center

2:00 PM

A Challenge in Multi-material Structures with Automotive Metal Fasteners: *Hyun-Ju Choi*¹; Won-Kyung Kang¹; ¹Korea Automotive Technology Institute

2:20 PM

Study of Solid-state Reactions in Diffusion Bonded Inconel 600 to SiC with Metallic Interlayers: *Yaiza Rodriguez*¹; Timothy Phero¹; Allyssa Bateman¹; Kyu Han¹; Jim Steppan¹; Balky Nair¹; Brian Jaques¹; ¹Boise State University

2:40 PM

Air Braze Tape for High Temperature Electrochemical Devices: *Jens Darsell*¹; John Hardy¹; Tim Lin²; Quan Yang²; Chuck Tan²; ¹Pacific Northwest National Laboratory; ²Aegis Technology, Inc.

3:00 PM

Investigation of Corrosion Resistance of Nickel-based Brazing Filler Metal for Stainless Steel for Heat Exchanger: *Yusuke Fukai*¹; Ikuro Shohji¹; Tetsuya Ando²; Takuya Yoshida³; Tuyoshi Kashiwase³; Noboru Otomo³; ¹Gunma University; ²Muroran Institute of Technology; ³Atago Mfg. Co., Ltd

3:20 PM

Interfacial Reaction and Strengthening Mechanism of YIG/MTC Joint Brazed by Bismuth-based Glass: *Qianqian Chen*¹; Peng He¹; Tiesong Lin¹; Panpan Lin¹; Dusan Sekulic¹; ¹Harbin Institute of Technology

3:40 PM

Investigation of Mechanical Properties of Sn-5Sb and Sn-6.4Sb-3.9Ag High-temperature Lead-free Solder: *Kohei Mitsui*¹; Ikuro Shohji¹; ¹Gunma University

4:00 PM

Joining of Additively Manufactured Titanium with Different Surface Structures and Fiber-reinforced Polyetherketone (PEK) for Lightweight Design Applications: *Juliane Moritz*¹; Philipp Goetze²; Tom Schiefer¹; Annett Klotzbach¹; Elena López¹; Jens Standfuss¹; Frank Brueckner³; Christoph Leyens⁴; ¹Fraunhofer Institute for Material and Beam Technology IWS; ²Technische Universitaet Dresden; ³Fraunhofer Institute for Material and Beam Technology IWS, Lulea University of Technology; ⁴Fraunhofer Institute for Material and Beam Technology IWS, Technische Universitaet Dresden

4:20 PM

Effect of Aging under High-temperature and High-humidity Environment on Adhesion Strength and Change in Chemical Structure of Structural Adhesive: *Hitomi Abiko*¹; Ikuro Shohji¹; Seigo Shimizu²; Yugo Tomita²; ¹Gunma University; ²Subaru Co., Ltd

Light Metal Technology — Aluminum Technology

Program Organizers: Xiaoming Wang, Purdue University; Alan Luo, Ohio State University; Kumar Sadayappan, Canmet MATERIALS

Tuesday PM
October 1, 2019

Room: D138
Location: Oregon Convention Center

Session Chair: Xiaoming Wang, Purdue University

2:00 PM

Alloy Development and Process Innovations for Lightweight Alloys: *Alan Luo*¹; ¹Ohio State University

2:20 PM

Screening Micro-alloying Additions to Accelerate Al₃Zr Precipitation in Aluminum-zirconium Alloys, using ICME: *Philip Staublin*¹; Paul Sanders¹; ¹Michigan Technological University

2:40 PM

Influence of Iron and Nickel Additions on the Conductivity, Microhardness and Microstructure of Pure Aluminum: *Stephanie Kottadis*¹; Abdallah Elsayed¹; Eli Vandersluijs²; Comodore Ravindran²; ¹University of Guelph; ²Ryerson University

3:00 PM

Development of High Ductility Al-Zn-Mg Casting Alloys for Automotive Structural Components: *Anthony Lombardi*¹; Glenn Byczynski¹; Chufan Wu²; Xiaochun Zeng²; Sumanth Shankar²; Gabriel Birsan³; Kumar Sadayappan³; ¹Nemak USA/CAN; ²McMaster University; ³Canmet Materials, Natural Resources Canada

3:20 PM

Aluminum Matrix Composites: The Formation and Effects of In-situ Reinforcing Particles: Siming Ma¹; Corey Vian¹; Aoke Jiang¹; *Xiaoming Wang*¹; ¹Purdue University

3:40 PM

Contribution to the Study of Portevin-Le Chatelier Effect in Aluminum Alloy 2024: *Fabienne Delaunois*¹; Edwin Denil²; Yves Marchal³; Véronique Vitry¹; ¹UMONS - FPMs; ²ArcelorMittal Liège; ³SONACA

4:00 PM Invited

The Effect of Reduced Graphene Oxide on Spark Plasma Sintered Aluminum Powder: Kristian Mackowiak¹; *Kyle Lessoway*¹; Colin van der Kuur²; Lukas Bichler¹; ¹University of British Columbia - Okanagan Campus; ²Zenyatta Ventures Ltd.

4:20 PM

Compositional Design, Microstructure and Mechanical Properties of Al-Mg-X Alloys with Ultra-high Content of Mg: *Yaojun Lin*¹; Zhibo Liu¹; Zhigang Yan²; ¹Wuhan University of Technology; ²Yanshan University

Materials for Nuclear Applications — Fundamentals of Radiation Effects

Program Organizers: Philip Edmondson, Oak Ridge National Laboratory; Yutai Katoh, Oak Ridge National Laboratory; Jake Amoroso, Savannah River National Laboratory; Levi Gardner, University of Utah; Amy Gandy, University of Sheffield; Karl Whittle, University of Liverpool; Monica Ferraris, Politecnico di Torino

Tuesday PM
October 1, 2019

Room: E148
Location: Oregon Convention Center

Session Chairs: Izabela Szlufarska, University of Wisconsin-Madison; Rachel Seibert, Oak Ridge National Laboratory

2:00 PM Invited

Combined Use of In-situ and Ex-situ TEM to Characterize Irradiation Induced Dislocation Loops in F/M Steels for Nuclear Applications: *Djamel Kaoumi*¹; ¹North Carolina State University

2:40 PM

In-situ Ion Irradiation Study of Silicon Carbide-carbon Coated Nanostructured Ferritic Alloy: *Kathy Lu*¹; Kaustubh Bawane¹; ¹Virginia Polytechnic Institute

3:00 PM

Comparison of In-situ Micro- and Ex-situ Meso-scale Tensile Testing for the Evaluation of Mechanical Properties of Stainless Steels: *Tanvi Ajantawalay*¹; Hi Vo²; Peter Hosemann²; Assel Aitkaliyeva¹; ¹University of Florida; ²University of California Berkeley

3:40 PM

Multi-dimensional, In-situ Mechanical Testing to Evaluate Damage and Fracture of Chromium-coated Zirconium-based Fuel Claddings: *David Roche*¹; Alex Jarama¹; Clifton Bumgardner¹; Frederick Heim¹; Xiaodong Li¹; ¹University of Virginia

4:00 PM

Predicting Concrete's Response to Irradiation: *Mathieu Bauchy*¹; Anoop Krishnan²; ¹University of California, Los Angeles; ²IIT Delhi

4:20 PM

Techniques for In-situ Monitoring of Materials Degradation in VTR Cartridge Loop Environments: *Camila Toledo*¹; Lucas Teeter¹; Andrew Brittan¹; Guillaume Mignot¹; Julie Tucker¹; George Young²; Samuel Briggs¹; ¹Oregon State University; ²Kairos Power

4:40 PM

Transmutation-induced Precipitation in Tungsten Irradiated with a Mixed Energy Neutron Spectrum: *Xunxiang Hu*¹; Chad Parish¹; Kun Wang²; Takaaki Koyanagi¹; Benjamin Eftink³; Yutai Katoh¹; ¹Oak Ridge National Laboratory; ²Alfred University; ³Los Alamos National Laboratory

Metal and Polymer Matrix Composites IV — Metal Matrix Composites

Program Organizers: Nikhil Gupta, New York University; Tomoko Sano, U.S. Army Research Laboratory

Tuesday PM
October 1, 2019

Room: D136
Location: Oregon Convention Center

Session Chairs: Tomoko Sano, US Army Research Laboratory; William Harrigan, Gamma Alloys

2:00 PM Invited

Micropillar Compression in As-solidified and Ultrafine-grained Inhomogeneous Al-TiC Nanocomposites: A Comparative Study: *Zuqi Hu*¹; Chezheng Cao¹; Marta Pozuelo¹; Suveen Mathaudhu²; Christian Roach²; Xiaochun Li¹; Jenn-Ming Yang¹; ¹University of California, Los Angeles; ²University of California, Riverside

2:20 PM

Exploiting Metal-carbon Interfaces in Covetic Hybrid Materials for Superior Multifunctional Performance: *Christopher Shumeyko*¹; Daniel Cole¹; Xiaoxiao Ge²; Christopher Klingshirn²; Lourdes Salamanca-Riba²; ¹U.S. Army Research Laboratory; ²University of Maryland

2:40 PM

Production of Tricycle Brake Pad/Lining with Iron Dross Waste: Wasiu Ajibola Ayoola¹; Muideen Bodude¹; *Chuwuemeka Onoh*¹; Kafayat Ayoola¹; ¹University of Lagos

3:00 PM

Wear Behavior of Hybrid Cu/TiC-Gr Infiltrated Composites: *Carlos Leon-Pattino*¹; Alejandro Miranda-López¹; Ena Aguilar-Reyes¹; Gabriel Rodríguez-Ortiz²; ¹Universidad Michoacana De San Nicolas De Hidalgo; ²Universidad Politécnica de Juventino Rosas



Modeling Variability of Mechanical Behavior through ICME Techniques with Emphasis on Verification, Validation & Uncertainty Quantification — Uncertainty Quantification

Program Organizers: Jacob Hochhalter, University of Utah; Michael Sangid, Purdue University; Corbett Battaile, Sandia National Laboratories; Barron Bichon, Southwest Research Institute

Tuesday PM Room: D135
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Barron Bichon, SwRI; Richard Russell, NASA

2:00 PM Invited
Uncertainty Quantification for Process-Structure-Property Linkages Extracted Using Materials Knowledge Systems Framework: *Surya Kalidindi*¹; Ali Khosravani¹; Andrew Castillo¹; Andrew Marshall¹; ¹Georgia Institute of Technology

2:40 PM
Uncertainty Quantification in the Mechanical Response of Crystal Plasticity Simulations: *Ritwik Bandyopadhyay*¹; Veerappan Prithivirajan¹; Michael Sangid¹; ¹Purdue University

3:00 PM
Uncertainty Informed Decision Making in Inductive Design Exploration of Ti64: *Gary Whelan*¹; David McDowell¹; ¹Georgia Institute of Technology

3:20 PM Invited
UQ Modeling of Structures and Materials Using the Hypercomplex Differentiation Method: *Harry Millwater*¹; Matt Balcer¹; Daniel Ramirez¹; Arturo Montoya¹; ¹University of Texas at San Antonio

3:40 PM Invited
Algorithms and Computational Tools for V&V: *Roger Ghanem*¹; Zhiheng Wang¹; ¹University of Southern California

4:10 PM Invited
A Generalized Bayesian Random Effects Model for Assessing Parameter Uncertainty in Materials Simulation: *Stephen Niezgod*¹; Denielle Ricciardi¹; Oksana Chkrebti¹; ¹Ohio State University

4:30 PM
UQ for Forward Material Models and Dependency on Training Data Quality and Quantity Using a Bayesian Modeling Paradigm: *Denielle Ricciardi*¹; Oksana Chkrebti¹; Stephen Niezgod¹; ¹The Ohio State University

4:50 PM Invited
Quantification of Uncertainty in Forging Process Induced Residual Stress and Associated Fatigue Life: *Dale Ball*¹; Mark Ryan¹; Joseph Yurko²; John Watton²; Adrian DeWald³; Michael Hill³; Bradford Cowles⁴; ¹Lockheed Martin Aeronautics Co.; ²Arconic Technology Center; ³Hill Engineering, LLC; ⁴Cowles Consulting, LLC

Nanostructured Materials under Extreme Environments — Materials Designed for Radiation Environment II

Program Organizers: Jin Li, Purdue University; Assel Aitkaliyeva, University of Florida; Youxing Chen, University of North Carolina at Charlotte; Yue Liu, Shanghai Jiao Tong University; Shuai Shao, Louisiana State University

Tuesday PM Room: D133
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Jin Li, Purdue University; Youxing Chen, University of North Carolina at Charlotte

2:00 PM Invited
Effects of Nanoclusters on Radiation and Deformation Responses of Fe-based Alloys: *Meimei Li*¹; Wei-Ying Chen¹; Fallon Laliberte²; Jonathan Almer¹; ¹Argonne National Laboratory; ²RPI

2:30 PM Invited
Investigation of Helium Precipitates in Ta-Ti Composites: *Kelvin Xie*¹; Sisi Xiang¹; Ian McCue¹; Michael Demkowicz¹; ¹Texas A&M University

3:00 PM Invited
Irradiation Effects in Materials for Nuclear Applications: *Cheng Sun*¹; ¹Idaho National Laboratory

3:30 PM Invited
Designing Nanocrystalline Steels Against Intense Irradiation by Grain Boundary Stabilization: *Tongde Shen*¹; ¹Yanshan University

4:00 PM Invited
Complex Interactions of Grain Boundaries and Radiation Damage: *Khalid Hattar*¹; Christopher Barr¹; Brittany Muntifer¹; Daniel Bufford¹; Caitlin Taylor¹; Stephen Foiles¹; Fadi Abdeljawad²; Samuel Briggs³; ¹Sandia National Laboratories; ²Clemson University; ³Oregon State University

4:30 PM
Analysis of Nano-ferritic Alloys with Oxide Dispersoids in Fully Consolidated Mechanically Alloyed 14YWT Powder: *Rebecca Whitesell*¹; Iver Anderson²; Stuart Maloy³; Emma White²; Timothy Prost²; G. Odette⁴; David Hoelzer⁵; ¹Iowa State University; ²Ames Laboratory; ³Los Alamos National Laboratory; ⁴University of California, Santa Barbara; ⁵Oak Ridge National Laboratory

4:50 PM
Thermal Stability of Ultrafine-grained FeCrAl Alloy Processed by Equal-channel Angular Pressing or High-pressure Torsion: *Maalavan Arivu*¹; Andrew Hoffman¹; Jiaqi Duan¹; Haiming Wen¹; ¹Missouri University of Science and Technology

Next Generation Biomaterials — Next Generation Biomaterials III

Program Organizers: Roger Narayan, University of North Carolina; Federico Rosei, INRS Centre for Energy, Materials and Telecommunications

Tuesday PM Room: C122
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Janet Gbur, Case Western Reserve University; Jaroslaw Drelich, Michigan Technological University

2:00 PM Invited

Translational Research at the Intersection of Engineering, Biology and Medicine: Opportunities and Challenges: *Bikramjit Basu*¹; ¹Indian Institute of Science

2:20 PM Invited

Production of Wound Repair Biomaterials with Combined Manufacturing Techniques: Mohan Edirisinghe¹; *Jubair Ahmed*¹; ¹University College of London

2:40 PM Invited

Interaction between Biopolymers Derived from Biofilms and Various Metallic Materials: *Hideyuki Kanematsu*¹; Reo Itoh¹; Dana Barry²; Yuta Sakagami¹; Noriyuki Wada¹; Nobumitsu Hirai¹; Akiko Ogawa¹; Takeshi Kogo¹; Daisuke Kuroda¹; Katsuhiko Sano³; ¹National Institute of Technology (KOSEN), Suzuka College; ²Clarkson University / SUNY Canton; ³D&D Corporation

3:00 PM Invited

Fatigue and Fracture of Drawn Filled Tubes Used in Neuromodulation and Cardiovascular Applications: *Janet Gbur*¹; John Lewandowski¹; ¹Case Western Reserve University

3:20 PM Invited

Bioconjugated Nanoprobes for Tumor Specific Uptake and Localization: Shaista Ilyas¹; Markus Schütz¹; Alexander Renner¹; Nighat Ullah¹; *Sanjay Mathur*¹; ¹Institute of Inorganic and Materials Chemistry

3:40 PM Invited

An Investigation of Breast Cancer Detection: From Tumor-specific Nanoparticles to Cell Mechanics: *Jingjie Hu*¹; John Obayemi²; Yuxiao Zhou³; Jing Du³; Wole Soboyejo²; ¹Mayo Clinic; ²Worcester Polytechnic Institute; ³The Pennsylvania State University

4:00 PM

Silicon and Hydroxyapatite Reinforced Ti6Al4V for Articulating Surfaces of Load-bearing Implants: *Jose Avila*¹; Amit Bandyopadhyay¹; Susmita Bose¹; ¹Washington State University

4:20 PM

Osteogenic Effects of Strontium-lithium-silver Hydroxyapatite Implants and Early Bone Tissue Healing: *Sam Robertson*¹; Amit Bandyopadhyay¹; Susmita Bose¹; ¹Washington State University

Phase Transformations in Ceramics: Science and Applications — Experimental Studies on Structure and Control I

Program Organizers: Pankaj Sarin, Oklahoma State University; Waltraud Kriven, University of Illinois at Urbana-Champaign; Sanjay Khare, University of Toledo; Yu Zhong, Worcester Polytechnic Institute

Tuesday PM Room: A104
October 1, 2019 Location: Oregon Convention Center

Session Chair: Waltraud Kriven, University of Illinois at Urbana-Champaign

2:00 PM Invited

Realizing Novel Defect Ordering in Ytria Stabilized Zirconia via Ion Radiation: *Jessica Krogstad*¹; ¹University of Illinois at Urbana-Champaign

2:30 PM

Influence of Annealing Temperature and Time on Phase Stability and Fracture Toughness of Rare-earth Stabilized Zirconia: *Archana Loganathan*¹; Surendra Anantharaman²; Mohan Ponnuchamy³; Ashutosh Gandhi⁴; ¹Florida International University; ²École Polytechnique Fédérale De Lausanne (EPFL), Switzerland; ³Indian Institute of Technology, Madras; ⁴Indian Institute of Technology, Bombay

2:50 PM

In Situ Investigation of Stress-induced Martensitic Transformation in Granular Shape Memory Ceramics: Hunter Rauch¹; Yan Chen²; Ke An²; *Hang Yu*¹; ¹Virginia Polytechnic Institute; ²Oak Ridge National Laboratory

3:10 PM

Effect of Microstructure on Cyclic Phase Transformation Behavior in Shape Memory Zirconia: *Isabel Crystal*¹; Alan Lai¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

3:30 PM Break

3:50 PM Invited

Avoiding Transformation-induced Cracking in ZrO₂ Shape-memory Ceramics: Constraints, Surfaces and Interfaces: Edward Pang¹; *Christopher Schuh*¹; ¹Massachusetts Institute of Technology

4:30 PM

The Effect of Zr⁴⁺ Co-Substitution on the Phase Transition and Thermal Expansion Properties of RENbO₄ Materials (RE = La³⁺, Dy³⁺, Y³⁺): Daniel Lowry¹; *Pankaj Sarin*¹; ¹Oklahoma State University

4:50 PM Invited

Meso- and Micro-structural Design and Processing of Shape-memory and Superelastic Bulk Ceramics: Xiaomei Zeng¹; Noriaki Arai¹; *Katherine Faber*¹; ¹California Institute of Technology

Powder Metallurgy of Light, Reactive and Other Non-ferrous Metals — Metal Injection Moulding and Powder Processing

Program Organizers: Ma Qian, Royal Melbourne Institute of Technology; Zak Fang, University of Utah; David Yan, San Jose State University; James Paramore, U.S. Army Research Laboratory

Tuesday PM Room: F149
October 1, 2019 Location: Oregon Convention Center

Session Chair: Ma Qian, RMIT University

2:00 PM Keynote

Development of Water-soluble Binders for Titanium Metal Injection Moulding (Ti-MIM) to Produce High Performance Components: *Peng Cao*¹; Muhammed Hayat¹; ¹University of Auckland

2:40 PM Keynote

Metal Injection Molding of Titanium Alloys and its Applications in the Industry: *Peng Yu*¹; ¹Southern University of Science and Technology

3:20 PM

Fabrication of La₂O₃ Dispersed Mo-Si-B Alloys and Its Mechanical Properties: *Won June Choi*¹; Chun Woong Park¹; Jung Hyo Park²; Jong Min Byun³; Young Do Kim¹; ¹Hanyang University; ²Agency for Defense Development; ³Seoul National University of Science & Technology

3:40 PM

Phase Diagram and Mechanical Properties of a CoCrFeNi_{1-x}Ti_x High Entropy Alloy Fabricated by Mechanical Alloying: *Geraldine Anis*¹; Mostafa Youssef¹; Moataz Attallah²; Hanadi Salem¹; ¹The American University in Cairo; ²University of Birmingham

4:00 PM

Powder Hot Isostatic Pressing of Pure Nb: Influence of Powder Characteristics on the Mechanical Properties: *Alessandro Sergi*¹; Raja Khan²; Nicholas Adkins¹; Moataz Attallah¹; ¹University of Birmingham; ²TWI Ltd

4:20 PM Invited

Ultrasonic Consolidation of Nanocrystalline Powders: *Zachary Cordero*¹; ¹Rice University

Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work – Rustum Roy Symposium — Session III

Program Organizers: Morsi Mahmoud, King Fahd University of Petroleum and Minerals - KFUPM; Dinesh Agrawal, Pennsylvania State University; Guido Link, Karlsruhe Institute of Technology; Motoyasu Sato, Chubu University; Rishi Raj, University of Colorado; Victoria Blair, Army Research Laboratory

Tuesday PM Room: D139
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Hideyuki Kanematsu, National Institute of Technology (KOSEN), Suzuka College; Edward Ripley, Y-12 National Security Complex

2:00 PM Invited

Vapor Dephosphorization Kinetics from Steel Making Slag by Microwave Rapid Heating: *Noboru Yoshikawa*¹; Manami Sunako¹; Kazunori Miyamoto¹; Keita Kawahira¹; Shoji Taniguchi¹; ¹Tohoku University

2:20 PM Invited

In-situ High Spatial Resolution Two-color Thermography in Microwave Selective Heating System: *Jun Fukushima*¹; Hirotsugu Takizawa¹; ¹Tohoku University

2:40 PM Invited

Proposal of Mining Method of Methane Hydrate by Microwave: *Shin Nakatani*¹; Motohiko Tanaka¹; Sato Motoyasu¹; Masao Yukumoto¹; ¹Chubu University

3:00 PM

Magnetic Field-Assisted Freeze Casting of Porous Ceramic Structures: *Jihyung Lee*¹; Robert Wheeler¹; Samir Aouadi¹; Diana Berman¹; Marcus Young¹; Raymond Brennan²; ¹University of North Texas; ²U.S Army Research Laboratory

3:20 PM

Stage I Laser Flash Sintering: *Deborah Hagen*¹; Desiderio Kovar¹; Joseph Beaman¹; ¹University of Texas at Austin

3:40 PM

Thermal Analysis of a High Temperature Coaxial Dielectric Test Cell: *Robert Tempke*¹; Candice Ellison¹; Christina Wildfire¹; Terence Musho²; Dushyant Shekhawat¹; ¹National Energy Technology Laboratory; ²West Virginia University

4:00 PM

Exploration of Phase Transformations in Alnico and Its Implications for Magnetic Annealing: *Emily Rinko*¹; Iver Anderson²; Tim Prost²; Pratik Ray²; Emma White²; Wei Tang²; Lin Zhou²; Matthew Kramer²; ¹Iowa State University; ²Ames Laboratory

4:20 PM

Modeling Microstructural Evolution under Applied Magnetic Fields: *Heather Murdoch*¹; Efrain Hernandez²; Philip Goins¹; Anit Giri¹; ¹US Army Research Laboratory

PSDK XIV: Phase Stability and Diffusion Kinetics — Thermodynamics and Modeling

Program Organizers: Michael Gao, National Energy Technology Laboratory; Hans Seifert, Karlsruhe Institute of Technology; Zi-Kui Liu, Pennsylvania State University; Fan Zhang, CompuTherm LLC; Richard Otis, Jet Propulsion Laboratory; Aurelien Perron, Lawrence Livermore National Laboratory

Tuesday PM Room: E144
October 1, 2019 Location: Oregon Convention Center

Session Chairs: Dongwon Shin, Oak Ridge National Laboratory; Fritz Koermann, Fritz Koermann

2:00 PM Invited

Revisiting Cast Al-Cu Alloy with Advanced Characterization and Modern Supercomputing: *Dongwon Shin*¹; Shyam Amit¹; Lawrence Allard¹; Matthew Chisholm¹; James Morris¹; J. Haynes¹; ¹Oak Ridge National Laboratory

2:20 PM

Effect of Non-dilute Fe and Mo on Atomic Ordering in fcc Ni-Cr Alloys – A First-principles Study: *Jia-Hong Ke*¹; Julie Tucker¹; ¹Oregon State University

2:40 PM

Thermodynamic Reassessment of Ti-Al-Fe Ternary System Including L21 Ordering, t2 and t3 Descriptions: *Zhi Liang*¹; Peisheng Wang²; Carelyn Campbell¹; Ursula Kattner¹; ¹National Institute of Standards and Technology; ²Northwestern University

3:00 PM

CALPHAD in the Cloud: Uncertainty Quantification and Propagation in ICME: *Changning Niu*¹; Abhinav Saboo¹; Ramon Frey¹; Jiadong Gong¹; Gregory Olson¹; ¹Questek Innovations

3:20 PM Invited

Phase Stability and Mechanical Properties of High Entropy and Chemically Complex Alloys: Yuji Ikeda¹; Prashanth Srinivasan²; Jörg Neugebauer¹; Blazej Grabowski³; Tatiana Kostiuhenko⁴; Alexander Shapeev⁴; *Fritz Koermann*²; ¹Max-Planck-Institut für Eisenforschung GmbH; ²TU Delft; ³University of Stuttgart; ⁴Skolkovo Institute of Science and Technology

3:40 PM Invited

Correlation of Local Order in Multicomponent Alloys with Microstructural Evolution: *Mitra Taheri*¹; ¹Drexel University; Johns Hopkins University

4:00 PM

Thermodynamic Modeling for Atomic Layer Etching: *Nagraj Kulkarni*

4:20 PM

Thermodynamic Simulation and Experimental Validation of Phase Stability in Ni-based Superalloys: *Kyle Ventura*¹; David Beaudry¹; Alex Aviles¹; Gerhard Fuchs¹; ¹University of Florida

4:40 PM

Close-packed Phases in Nickel-based Superalloys – Investigation of Stabilising Subsystems Using Siffusion Multiples: *Robert Popp*¹; Florian Schemm¹; Erwin Povoden-Karadeniz²; Ernst Kozeschnik²; Thomas Göhler³; Uwe Glatzel¹; ¹University of Bayreuth; ²TU Wien; ³MTU Aero Engines

Retained Austenite for High and Ultrahigh Strength Steels — Retained Austenite for High and Ultrahigh Strength Steels

Program Organizer: Mahesh Somani, University of Oulu

Tuesday PM
October 1, 2019

Room: C125
Location: Oregon Convention Center

Session Chairs: Sung Joon Kim, POSTECH; Mahesh Somani, University of Oulu

2:00 PM Introductory Comments

2:10 PM

Austenite Stability in Bainite Steel after Austempering Heat Treatments: *Giovani Ribamar*¹; Arthur Nishikawa²; Hélio Goldenstein¹; ¹Universidade de São Paulo; ²Delft University of Technology

2:30 PM

Medium-carbon TRIP-aided Bainitic Ferrite Steels: *Seong Hoon Kim*¹; Dong-Woo Suh¹; ¹POSTECH

2:50 PM

Retained Austenite in Nanobainite Bearing Steel after Austempering Heat Treatments: *Giovani Ribamar*¹; Arthur Nishikawa²; Hélio Goldenstein¹; ¹Universidade de São Paulo; ²Delft University of Technology

3:10 PM

Novel Concepts for Tough Ductile Ultra-high Strength Martensitic / Bainitic Steels Containing Finely Divided Retained Austenite: *Mahesh Somani*¹; Pekka Kantanen¹; Pentti Kaikkonen¹; Jaakko Hannula¹; Sakari Pallaspuro¹; David Porter¹; Jukka Kõmi¹; Pentti Karjalainen¹; Devesh Misra²; ¹University of Oulu; ²University of Texas at El Paso

3:30 PM Break Coffee

3:50 PM

Effect of Nickel on Austenite Stabilization during Quenching and Partitioning Process in Medium-Mn Steels: *Sudhindra Ayenampudi*¹; Carola Celada Casero¹; Jilt Sietsma¹; Maria Santofimia Navarro¹; ¹Delft University of Technology

4:10 PM

Application of Room-temperature Quenching and Partitioning on Medium Mn Steel: *Woojun Kim*¹; Sung-Joon Kim¹; ¹GIFT, Postech

4:30 PM

Carbon Partitioning between Ferrite and Austenite in Medium-Mn Steel and Its Impact on Mechanical Properties: *Yan Ma*¹; Binhan Sun²; Wenwen Song¹; Wolfgang Bleck¹; ¹RWTH Aachen University; ²Max-Planck-Institut für Eisenforschung GmbH

4:50 PM

Tensile Deformation Characteristics and Austenite Transformation Behavior of Advanced High Strength Steel Considering Adiabatic Heating: *Christopher Finfrock*¹; Gus Becker¹; Trevor Ballard¹; Grant Thomas²; Kester Clarke¹; Amy Clarke¹; ¹Colorado School of Mines; ²AK Steel

Sintering and Related Powder Processing Science and Technologies — Fundamentals of Sintering

Program Organizers: Wolfgang Rheinheimer, Purdue University; Zachary Cordero, Rice University; Ricardo Castro, University of California, Davis; Eugene Olevsky, San Diego State University

Tuesday PM
October 1, 2019

Room: E142
Location: Oregon Convention Center

Session Chairs: Amanda Krause, University of Florida; Hadas Sternlicht, Brown University

2:00 PM Invited

Electrochemically-driven Abnormal Grain Growth of Ionic Ceramics: Vikrant Karra¹; Wolfgang Rheinheimer¹; *Edwin Garcia*¹; ¹Purdue University

2:40 PM Invited

Surface and Grain Boundary Segregation during Nanopowders Preparation and Sintering: *Douglas Gouvêa*¹; ¹University of Sao Paulo

3:10 PM Invited

The Role of Grain Boundaries in Nanoscale Sintering: Atomistic and Mesoscale Modeling Studies: *Fadi Abdeljawad*¹; ¹Clemson University

3:40 PM

Neck Growth in Sintering of Silver Nanowires: *Md Jahangir*¹; Rajiv Malhotra¹; ¹Rutgers University

4:00 PM

Simulation of Densification of Contacting Particles using a Two-dimensional Monte Carlo Model for Solid State Sintering: *Youngkyun Son*¹; Minji Kim¹; Sukbin Lee¹; ¹UNIST

4:20 PM

Stochastic Modeling of the Effect of Structural Randomness on the Mechanical Behaviors of 3D Printed Metallic Powders: *Skylar Mays*¹; Mujan Seif¹; Katherine Moody¹; Matthew Beck¹; ¹University of Kentucky



Surface Properties of Biomaterials — Additive Manufactured & Surface-modified Biomaterials

Program Organizers: Ryan Bock, SINTX Technologies; Jason Langhorn, DePuy Synthes Joint Reconstruction; Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University; Mangal Roy, Indian Institute of Technology-Kharagpur; Venu Varanasi, University of Texas at Arlington

Tuesday PM Room: C121
 October 1, 2019 Location: Oregon Convention Center

Session Chairs: Amit Bandyopadhyay, Washington State University; Ryan Bock, SINTX Technologies; Susmita Bose, Washington State University

2:00 PM Invited
3D Printing of Microstructured and Nanostructured Surfaces for Medical Applications: *Roger Narayan*¹; ¹University of North Carolina

2:40 PM
Enhanced Osteogenesis of 3D Printed Scaffolds by Cissus Quadrangularis-loaded Polydopamine Coatings: *Sam Robertson*¹; Susmita Bose¹; ¹Washington State University

3:00 PM
Surface Chemical Structure and in Vitro Biological Behavior of Patterned Bioactive Amorphous Silicon Oxynitride (SiONx): *Kamal Awad*¹; Jian Huang¹; Leticia Brotto¹; Pranesh Aswath¹; Marco Brotto¹; Venu Varanasi¹; ¹University of Texas at Arlington

3:20 PM
Solid Freeform Fabrication of Functionally Graded Polymer-ceramic Composite Bone Scaffolds: *Arjak Bhattacharjee*¹; Amit Bandyopadhyay¹; Susmita Bose¹; ¹Washington State University

3:40 PM Invited
Interaction of Blood Plasma Proteins on Superhemophobic Titania Nanotube Surfaces: *Roberta Maia Sabino*¹; *Ketul Popat*¹; ¹Colorado State University

4:20 PM
Direct Comparison of Additively Manufactured Porous Titanium and Tantalum Implants Towards in Vivo Osseointegration: *Amit Bandyopadhyay*¹; *Indranath Mitra*¹; Anish Shivaram¹; Susmita Bose¹; ¹Washington State University

4:40 PM
Anodization of Titanium Implant Alloys to Incorporate Phosphorous and Promote Bioactivity: *Haden Johnson*¹; Caleb Hardman¹; Morgan Doukas¹; R Williamson¹; Amol Janorkar¹; Michael Roach¹; ¹University of Mississippi Medical Center

Surface Protection for Enhanced Materials Performance: Science, Technology, and Application — CMAS Degradation and Mitigation / Environmental Barrier Coatings

Program Organizers: Kang Lee, NASA Glenn Research Center; Jun Song, McGill University; Yutaka Kagawa, University of Tokyo; Rodney Trice, Purdue University; Daniel Mumm, University of California, Irvine; Mitchell Dorfman, Oerlikon Metco (US) Inc.; Christian Moreau, Concordia University; Emmanuel Boakye, UES Inc.; Edward Gorzkowski, Naval Research Laboratory; Scooter Johnson, Naval Research Laboratory; Stephen Yue, McGill University; Richard Chromik, McGill University

Tuesday PM Room: D137
 October 1, 2019 Location: Oregon Convention Center

Session Chairs: Kang Lee, NASA Glenn Research Center; Valerie Wiesner, NASA Glenn Research Center

2:00 PM Invited
Understanding and Mitigating the CMAS Problem in Gas Turbine Coatings: *Carlos Levi*¹; David Poerschke²; Collin Holgate¹; William Summers¹; Frank Zok¹; ¹University of California, Santa Barbara; ²University of Minnesota

2:40 PM
Some Implications to CMAS Infiltration and Arrest Kinetics of Gradual Application: *Eric Jordan*¹; Byung Jun¹; ¹University of Connecticut

3:00 PM
Investigation of Environmental Barrier Coating Degradation by Molten Calcium-Magnesium-Aluminosilicate (CMAS) at Low Concentrations: *Valerie Wiesner*¹; Gustavo Costa²; John Setlock³; Kang Lee¹; Bryan Harder¹; ¹NASA Glenn Research Center; ²Vantage Partners, LLC; ³University of Toledo

3:20 PM Invited
Manufacture of Environmental Barrier Coatings by Thermal Spray Techniques: *Robert Vassen*¹; Emine Bakan¹; Seongwong Kim²; Daniel Mack¹; Olivier Guillon³; ¹Forschungszentrum Jülich GmbH; ²Forschungszentrum Jülich GmbH; Korea Institute of Ceramic Engineering and Technology (KICET); ³Forschungszentrum Jülich GmbH; Jülich Aachen Research Alliance

3:50 PM Invited
Role of Process Induced Chemical Composition Changes and Rapid Solidification on the Characteristics of Plasma Sprayed Yb₂Si₂O₇ Environmental Barrier Coatings: *Sanjay Sampath*¹; Eugenio Garcia¹; ¹Stony Brook University

4:20 PM
High-temperature, High-velocity Water Vapor Studies of Environmental Barrier Coating Candidates: *Mackenzie Ridley*¹; Elizabeth Opila¹; ¹University of Virginia

Thermodynamics of Materials in Extreme Environments — Thermodynamics and Long Term Stability of Materials for Fuel Cells and Other Energy Applications

Program Organizers: Kyle Brinkman, Clemson University; Kristina Lilova, University California Davis; Alexandra Navrotsky, University California Davis; Jake Amoroso, Savannah River National Laboratory; Fei Peng, Clemson University; Xingbo Liu, West Virginia University; Gustavo Costa, NASA; Xiaofeng Guo, Washington State University

Tuesday PM Room: B119
October 1, 2019 Location: Oregon Convention Center

Session Chair: Xingbo Liu, West Virginia University

2:00 PM Invited

Ab-Initio Screening for New Solid Oxide Fuel Cell Cathodes: *Dane Morgan*¹; Ryan Jacobs¹; ¹University of Wisconsin - Madison

2:30 PM

Ab Initio Thermodynamic Modeling of Hydrogen Defects and Transport for Solid Oxide Fuel Cells and Tritium Producing Burnable Absorber Rod Applications: *Yueh-Lin Lee*¹; Yuhua Duan¹; Dane Morgan²; Hari Paudel¹; Dan Sorescu¹; Harry Abernathy³; Gregory Hackett¹; ¹National Energy Technology Laboratory; ²University of Wisconsin-Madison; ³Leidos

3:00 PM Invited

Thermodynamic and Structural Evolutions of Solid State Materials under 2D or 3D Confinement: Xianghui Zhang¹; Cody Cockreham¹; Hongwu Xu¹; Xiaofeng Guo¹; *Di Wu*¹; ¹Washington State University

3:30 PM

Effect of Refractory Oxide Coatings on the Thermodynamic Stability of the Yb₁₄MnSb₁₁ Thermoelectric Compound at High Temperatures: A CALPHAD Study: *Jorge Paz Soldan Palma*¹; Yi Wang¹; Obed Villalpando²; Richard Otis²; Kurt Star²; Fivos Drymiotis²; Ravi Vilapanur²; Jean-Pierre Fleurial²; Zi-Kui Liu¹; ¹Pennsylvania State University; ²Jet Propulsion Laboratory

3:50 PM Invited

Thermodynamic Considerations in Solid Oxide Fuel Cells; Data Interconsistency, Transformation, Reactions and Microstructure Changes: *Harumi Yokokawa*¹; ¹University of Tokyo

Ultra High Performance Metallic Systems for Aerospace, Defense, and Automotive Applications — High Entropy Alloys and High Temperature Materials

Program Organizers: Ali Yousefiani, Boeing Research And Technology; Troy Topping, California State University, Sacramento; Robert Dillon, NASA Jet Propulsion Laboratory; Linruo Zhao, National Research Council of Canada

Tuesday PM Room: D140
October 1, 2019 Location: Oregon Convention Center

Session Chair: Ali Yousefiani, Boeing Research and Technology

2:00 PM

Microstructural Characterization and High Temperature Oxidation of High Entropy Nb-Cr-W-Ta-V alloy between 600 and 1400°C: *Shailendra Varma*¹; Sabastian Moncayo¹; Ramana Chintalapalle¹; ¹University of Texas

2:20 PM

First-principles Methods of Investigating Stacking Fault Energies in Refractory BCC High-entropy Alloys: Joshua Strother¹; *Chelsey Hargather*¹; ¹New Mexico Institute of Mining and Technology

2:40 PM

Deformation Behavior of Al_{0.4}CoCrFeNi High Entropy Alloy: *Anumat Sittitho*¹; Jazia Graves¹; Indrajit Charit¹; Rajiv Mishra²; ¹University of Idaho; ²University of North Texas

3:00 PM

Creep of High Entropy Alloys: *Kevin Garber*¹; Bhaskar Majumdar¹; ¹New Mexico Tech

3:20 PM Invited

Development of Nb-Si Based Ultrahigh Temperature Alloys: *Xiping Guo*¹; Song Zhang¹; Haisheng Guo¹; Yin Wang¹; Yanqiang Qiao¹; ¹Northwestern Polytechnical University

3:40 PM

Mechanical Behavior of Mo Solid Solutions with Minor B and Si Additions: *Longfei Liu*¹; John Perepezko¹; ¹University of Wisconsin- Madison

11th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Energy, Sustainability, and Biobased Materials I

Program Organizers: Surojit Gupta, University of North Dakota; Yiquan Wu, Alfred University; Hisayuki Suematsu, Nagaoka University of Technology; John Wolodko, University of Alberta; Christopher Taylor, DNV GL; Junichi Tatami, Yokohama National University; Enrico Bernardo, University of Padova; Zhengyi Fu, Wuhan University of Technology; Rajiv Asthana, University of Wisconsin; Allen Applett, Oklahoma State University; Richard Sisson, Worcester Polytechnic Institute; Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Mritunjay Singh, Ohio Aerospace Institute

Wednesday AM Room: Portland Ballroom 255
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Richard Sisson, Worcester Polytechnic Institute; Daniel Koop, Rutgers University; Luca Masi, Granta Design

8:00 AM Invited

Theory Based Design of the Morphology and Electronic Properties of Solution-processed Thin Films in Perovskite Solar Cells: *Soumik Banerjee*¹; MFN Taufique¹; Rabi Khanal²; Samrat Choudhury²; ¹Washington State University; ²University of Idaho

8:20 AM Invited

Introducing Sustainability in Materials Selection: *Luca Masi*¹; ¹Granta Design / Ansys Inc.

8:40 AM

3D Printing of Soy Hull Fiber Reinforced Thermoplastic Copolymer Composites: Vamsi Balla¹; Dattu Tadimeti¹; *Kunal Kate*¹; Jagannadh Satyavolu¹; ¹University of Louisville

9:00 AM

A Novel Bio-based Deicer Additive for Improving the Sustainability of Buried Pipeline and the Environment: *Mehdi Honarvar Nazari*¹; Xianming Shi¹; ¹Washington State University



9:20 AM

Separation of Rare Earth Elements from Nd Magnet Scraps Using Gas Electrodes in Molten Chlorides: *Hirokazu Konishi*¹; *Yuichiro Koizumi*¹; ¹Osaka University

9:40 AM Invited

Towards Efficient Extraction of ‘Oil’ from Oil Shales: *Kalpana Katti*¹; *HM Nasrullah Faisal*¹; *Keshab Thapa*¹; *Dinesh Katti*¹; ¹North Dakota State University

10:00 AM Break

10:20 AM Invited

Sustainable Technology for Bauxite Residue Processing: *Brajendra Mishra*¹; *Sumedh Gostu*²; ¹Worcester Polytechnic Institute; ²Air Liquide

10:40 AM

Hydrothermal Vapor Synthesis: Sustainable Production of Inorganic Oxides: *Daniel Kopp*¹; *Richard Riman*¹; ¹Rutgers, The State University of New Jersey

11:00 AM Invited

Oxide-based Ceramic Matrix Composites for Army Rotorcraft: *Michael Walock*¹; *Vann Heng*²; *Anindya Ghoshal*¹; *Muthuvel Murugan*¹; *Andy Nieto*²; ¹US Army Research Laboratory; ²The Boeing Company; ³Naval Postgraduate School

11:20 AM

A Study of an Alternative Carbon Source to Improve Environmental Sustainability in Steel Production: *Blake Stewart*¹; *Haley Doude*¹; *Terry Taylor*²; *Morgan Abney*²; *Hongjoo Rhee*¹; ¹Center for Advanced Vehicular Systems; ²Marshall Space Flight Center

ACerS Robert B. Sosman Award Symposium: From Carbides to Carbons - from Bulk to Nano — Session I

Program Organizer: *Babak Anasori*, Drexel University

Wednesday AM
October 2, 2019

Room: Portland Ballroom 253
Location: Oregon Convention Center

Session Chairs: *Michael Naguib*, Tulane University; *Babak Anasori*, Indiana University-Purdue University Indianapolis

9:10 AM Invited

Hydrothermal Carbons: Synthesis and Reaction of Various Nano-carbon Materials under Hydrothermal Conditions: *Masahiro Yoshimura*¹; ¹National Cheng Kung University

9:40 AM Invited

3D Printed Porous Carbon from mm to μm Resolution: *Hendryk Steldinger*¹; *Bastian Etzold*¹; ¹TU Darmstadt

10:10 AM Break

10:30 AM Invited

Carbon-based Nanocomposites for Li-ion Batteries and Supercapacitors: *Gleb Yushin*¹; ¹Georgia Institute of Technology

11:00 AM Invited

Thermodynamics of Transition Metal Carbide Formation: *William Fahrenholtz*¹; ¹Missouri University of Science and Technology

11:30 AM Invited

Two-dimensional Transition Metal Carbides and Nitrides “MXenes” from Layered Bulk MAX Phases; Synthesis, Properties and Applications: *Michael Naguib*¹; ¹Tulane University

Actinide and Lanthanide Materials III — Oxides, Compounds, Metals

Program Organizers: *Clarissa Yablinsky*, Los Alamos National Laboratory; *Ryan Stillwell*, Lawrence Livermore National Laboratory; *Kester Clarke*, Colorado School of Mines; *Clinique Brundidge*, Naval Nuclear Laboratory; *Adam Farrow*, Los Alamos National Laboratory; *Curt Lavender*, Battelle - Pacific Northwest National Laboratory; *Douglas Burkes*, Pacific Northwest National Laboratory

Wednesday AM
October 2, 2019

Room: C120
Location: Oregon Convention Center

Session Chairs: *Ryan Stillwell*, Lawrence Livermore National Laboratory; *Clarissa Yablinsky*, Los Alamos National Laboratory

8:00 AM Invited

Using Neutron Diffraction to Characterize the Microstructure of Plutonium and Its Alloys: *Donald Brown*¹; *Alice Smith*¹; *J. Zhang*¹; *Bjorn Clausen*¹; *F. J. Freibert*¹; ¹Los Alamos National Laboratory

8:30 AM

Thermal Properties and Structure Evolution during Cryogenic Thermal Cycling of a d-phase 239PuGa Alloy: *Alice Smith*¹; *Franz Freibert*¹; *Sven Vogel*¹; *Jianzhong Zhang*¹; ¹Los Alamos National Laboratory

8:50 AM

Determination of Damage in Plutonium DSC Samples: *Meghan Gibbs*¹; *Miranda Williams*¹; *Tomas Martinez*¹; *Carlos Archuleta*¹; ¹Los Alamos National Laboratory

9:10 AM

Thermochemical Models to Address Impurities in Actinide Alloys: *Emily Moore*¹; *Alexander Landa*¹; *Scott McCall*¹; *Stephen Stout*¹; *Perron Aurélien*¹; ¹Lawrence Livermore National Laboratory

9:30 AM

Differential Scanning Calorimetry and Evolved Gas Analysis of Plutonium Tetrafluoride PuF₄ (LA-UR-19-22789): *David Wayne*¹; ¹Los Alamos National Laboratory

9:50 AM

New Insights into Early Stage Uranium Hydride Growth: *Terry Holesinger*¹; *Matthew Schneider*¹; *Matthew Janish*¹; *Edward Holby*¹; *Eric Tegtmeier*¹; *Andrew Richards*¹; *Roland Schulze*¹; ¹Los Alamos National Laboratory

10:10 AM Break

10:30 AM Invited

Possible Structural Quantum Phase Transition in UC₂Si₂ Accessed Through Cr to Ru Chemical Substitution: *Ryan Baumbach*¹; ¹National High Magnetic Field Laboratory

11:00 AM

Synthesis and Pyrolysis of Uranium Borohydride: *Patrick Campbell*¹; *Andrew Lange*¹; *Selim Elhadji*¹; ¹Lawrence Livermore National Laboratory

11:20 AM

Hydride-dehydride Production of Uranium-niobium Powder Feedstocks: *Ryan Stillwell*¹; *Cherie Schaeffer-Cuellar*¹; *Scott Simpson*¹; *Kevin Huang*¹; *Jason Jeffries*¹; ¹Lawrence Livermore National Laboratory

WEDNESDAY AM

Additive Manufacturing of Glass, Ceramics and Composites — Additive Manufacturing of Glass, Ceramics and Composites IV

Program Organizers: Tobias Schaedler, Hrl Laboratories Llc; Matthew Dickerson, Air Force Research Laboratory; Rebecca Dylla-Spears, Lawrence Livermore National Laboratory; Chang-Jun Bae, Korea Institute of Materials Science (KIMS)

Wednesday AM
October 2, 2019

Room: B113
Location: Oregon Convention Center

Session Chair: Matthew Dickerson, Air Force Research Laboratory

8:00 AM Invited

The Glassomer Technology – Glass Processing in the 21st Century: *Bastian Rapp*¹; ¹Albert-Ludwigs University of Freiburg

8:30 AM

3d Printed Glass Optics with Tailored Composition: *Rebecca Dylla-Spears*¹; Du Nguyen¹; Nikola Dudukovic¹; Timothy Yee¹; Koroush Sasan¹; Tyler Fears¹; Frederick Ryerson¹; Michael Johnson¹; Oscar Herrera¹; Lana Wong¹; ¹Lawrence Livermore National Laboratory

8:50 AM

Direct Ink Writing of Silica-titania Glass: Prediction and Tuning of Ink Rheology: *Nikola Dudukovic*¹; Megan Ellis¹; Moira Foster¹; Lana Wong¹; Du Nguyen¹; Timothy Yee¹; Frederick Ryerson¹; Tayyab Suratwala¹; Eric Duoss¹; Rebecca Dylla-Spears¹; ¹Lawrence Livermore National Laboratory

9:10 AM

Titanium Diffusion in SiO₂ Glass – An Evaluation of Lengths Scales in AM Parts: *Andrew Lange*¹; Leonardus Bimo Bayu Aji¹; Koroush Sasan¹; Rebecca Dylla-Spears¹; ¹Lawrence Livermore National Laboratory

9:30 AM

Mechanical and Kinetic Studies on the Refractory Fused Silica of Integrally Cored Ceramic Mold Fabricated by Additive Manufacturing: *Chang-Jun Bae*¹; John Halloran²; ¹Korea Institute of Materials Science (KIMS); ²University of Michigan

10:00 AM Break

10:20 AM Invited

Innovative Glass and Ceramic Components Made by Suspension-based and Thermoplastic Additive Manufacturing Methods: *Tassilo Moritz*¹; Uwe Scheithauer¹; Steven Weingarten¹; Eric Schwarzer¹; Johannes Abel¹; Jochen Schilm¹; Dörte Wagner¹; ¹Fraunhofer IKTS

10:50 AM

Diatom-based 3D Printed Materials with Many Levels of Hierarchy: John Gardner¹; Benjamin Lazarus¹; Anna Song¹; *Hannes Schniepp*¹; ¹The College of William & Mary

11:10 AM

Additive Manufacturing and Mechanical Performance of Architected Cement-based Materials: *Mohamadreza Moini*¹; Jan Olek¹; Jeffrey Youngblood¹; Pablo Zavattieri¹; ¹Purdue University

11:30 AM

Sintering and Ag-infiltration of 3D-extrusion-printed SnO₂ Scaffolds: *Pengyu Chen*¹; Christoph Kenel¹; Yaping Wang²; David Dunand¹; ¹Northwestern University; ²Xi'an Jiaotong University

Additive Manufacturing of Metals: Microstructure and Material Properties of Nickel-based Alloys — Properties and Performance of AM Materials

Program Organizers: Andrzej Wojcieszynski, ATI Specialty Materials; Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Sudarsanam Babu, University of Tennessee, Knoxville

Wednesday AM
October 2, 2019

Room: B117
Location: Oregon Convention Center

Session Chair: Sudarsanam Babu, University of Tennessee

8:00 AM

Effect of Processing Parameters on Density, Surface Roughness and Mechanical Properties of Hastelloy X Manufactured by Electron Beam Melting: *Amal Shaji Karapuzha*¹; Darren Fraser²; Xinhua Wu¹; Aijun Huang¹; ¹Monash Centre for Additive Manufacturing (MCAM), Monash University; ²CSIRO

8:20 AM

High Temperature Air Oxidation Behavior of Hastelloy X Processed by Electron Beam Melting (EBM) and Selective Laser Melting (SLM): *Marie Romedenne*¹; Sebastien Dryepondt¹; Rishi Pillai¹; ¹Oak Ridge National Laboratory

8:40 AM

Corrosion Studies on Inconel 718 Produced by Laser Powder Bed Manufacturing: Mythreyi O.V¹; Raja A¹; Nagesh B.K²; *Jayaganthan R*¹; ¹Indian Institute of Technology Madras; ²Gas Turbine Research Establishment, DRDO

9:00 AM

Stress Corrosion Cracking Resistance of Additively Manufactured Nickel Alloy UNS N07718 and UNS N09946 in Chloride-containing Environments: *Madison Burns*¹; Matthias Gieseke¹; Christoph Wangenheim¹; ¹Baker Hughes, a GE Company

9:20 AM

Tribocorrosion Behavior of Inconel 718 Fabricated by Laser Powder Bed Fusion Based Additive Manufacturing: *Pankaj Kumar*¹; Arpith Siddaiah¹; Javed Akram²; Pradeep Menezes¹; Mano Misra¹; ¹University of Nevada, Reno; ²ANSYS

9:40 AM

Creep and Oxidation Performance of Alloy 282 Fabricated by Electron Beam Melting: *Sebastien Dryepondt*¹; Mike Kirka¹; Patxi Fernandez-Zelaia¹; Yousub Lee¹; Kinga Unocic¹; ¹Oak Ridge National Laboratory

10:00 AM Break

10:20 AM

Influence of Geometry on Process-Structure-Property Relationships in Electron Beam Melted Ni-based Superalloys: *Patxi Fernandez-Zelaia*¹; Michael Kirka¹; Sebastien Dryepondt¹; Yousub Lee¹; ¹Oak Ridge National Laboratory

10:40 AM

The Creep Behavior of Additively Manufactured Inconel 625: Michael Kassner¹; *Kwangtae Son*¹; Lyle Levine²; Thien Phan²; Mark Stoudt²; Kee-Ahn Lee³; ¹University of Southern California; ²NIST; ³Inha University

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Additive Manufacturing of Miscellaneous Non-ferrous Alloys

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Specialty Materials; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Wednesday AM
October 2, 2019

Room: B115
Location: Oregon Convention Center

Session Chair: Prashanth Konda Gokuldoss, Tallinn University of Technology

8:00 AM Invited

Additive Manufacturing of Implantable Biomaterials: Processing Challenges, Biocompatibility Assessment and Clinical Translation: *Bikramjit Basu*¹; ¹Indian Institute of Science

8:30 AM

Milling of Ti-64Al-4V for in Space Manufacturing of 3D-printed Metal Structures: *Curtis Hill*¹; ¹NASA, Marshall Space Flight Center

8:50 AM

Additive Manufacturing of Pure Magnesium: Densification Behavior, Microstructural Evolution, and Mechanical Properties: *Bandar AlMangour*; Abdulaziz AlHazaa¹; Dariusz Grzesiak²; Ahmad Sorour³; ¹Department of Physics & Astronomy, College of Science, King Saud University; ²Department of Mechanical Engineering and Mechatronics, West Pomeranian University of Technology, Szczecin; ³Center of Research Excellence in Corrosion, Research Institute, King Fahd University of Petroleum and Minerals

9:10 AM

Effect of Processing Conditions on Mechanical Properties of Copper Fabricated Using Electron Beam Powder Bed Fusion: *Prithwish Tarafder*¹; Christopher Ledford¹; Timothy Horn¹; Magnus Ahlfors²; Joel Alfano³; Harvey West¹; Christopher Rock¹; ¹North Carolina State University; ²Quintus Technologies; ³Siemens

9:30 AM

Development of Parameters and Comparison of Mechanical and Microstructural Properties of Tungsten Nickel Iron (W-Ni-Fe) with Parts Fabricated from Laser Powder Bed Fusion (PBF): *Michael Brand*¹; Colt Montgomery¹; Robin Pacheco¹; Joel Montalvo¹; Jessica Lopez¹; Adam Wachtor¹; John Carpenter¹; ¹Los Alamos National Laboratory

9:50 AM

Effect of Heat Treatments on Compressive Properties of Lattice-structured AlSi10Mg Alloy Fabricated by Selective Laser Melting: *Asuka Suzuki*¹; Keito Sekizawa¹; Mulin Liu¹; Takafumi Wada¹; Naoki Takata¹; Makoto Kobashi¹; ¹Nagoya University

10:10 AM Break

10:30 AM

Effect of Sample Dimensions on Microstructure of Selectively Laser Melted AlSi10Mg Alloy: *Naoki Takata*¹; Hirohisa Kodaira¹; Asuka Suzuki¹; Makoto Kobashi¹; ¹Nagoya University

10:50 AM

Fatigue Life of Additively Manufactured AlSi10Mg Produced by Powder Bed Fusion: *Daniel Urban*¹; Kevin Chasse¹; Marc Heffes¹; Walter Myers¹; Edward Martin¹; Noe Rodriguez¹; ¹Northrop Grumman Systems Corporation

Additive Manufacturing of Metals: Post Processing — HIP and Heat Treatment II

Program Organizers: Ola Harrysson, North Carolina State University; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Metals; Sudarsanam Babu, University of Tennessee, Knoxville

Wednesday AM
October 2, 2019

Room: B110
Location: Oregon Convention Center

Session Chair: Carter Keough, North Carolina State University

8:00 AM

Evaluating the Effect of Heat Treatment on the Mechanical, Microstructural, Corrosion and Low Temperature Fracture Performances of WAAM Manufactured 2.25Cr-1Mo Type Steel Structure: *Osahon Ehigiator*¹; Supriyo Ganguly¹; Filomeno Martina¹; ¹Cranfield University

8:20 AM

How Do EBM Alloy 718 Builds with Distinct Microstructures Respond to Thermal Post-treatment?: *Sneha Goel*¹; Johannes Gårdstam²; Jonas Olsson¹; Uta Klement³; Shrikant Joshi¹; ¹University West; ²Quintus Technologies AB; ³Chalmers university of technology

8:40 AM

Microstructure and Properties of Additive Laser Powder Bed Fusion Processed and Heat-treated Co-29Cr-5Mo Alloy: *Boateng Twum Donkor*¹; Jie Song¹; Michael Kattoura¹; Seetha Mannava¹; Vijay Vasudevan¹; ¹University of Cincinnati

9:00 AM

On Silicon Morphology in Additively Manufactured AlSi10Mg: Effects of Various Post Heat Treatments: Farwan Alghamdi¹; Amir Hadadzadeh²; Babak Shalchi-Amirkhiz²; Mohsen Mohammadi²; *Meysam Haghshenas*¹; ¹University of North Dakota; ²University of New Brunswick; ³Natural Resources Canada

9:20 AM

Optimizing Microstructure in AM Alloys through the Development of AM-specific Heat Treatments: *Branden Kappes*¹; Thomas Gallmeyer¹; Nathan Johnson¹; Sen Liu¹; Behnam Aminahmadi¹; Xiaoli Zhang¹; Aaron Stebner¹; ¹Colorado School of Mines

9:40 AM

Post-processing Heat Treatments and Residual Stress Behavior of AlSi10Mg: *Michael Juhasz*¹; Jared Clark¹; William Bevin¹; Jason Walker¹; Brett Conner¹; ¹Youngstown State University

10:00 AM Break

10:20 AM

Thermohydrogen Refinement of Microstructure (THRM) as a Post-treatment to Improve Reliability of Additively Manufactured Titanium Alloy Components: *Brady Butler*¹; James Paramore¹; Jonathan Ligda¹; Nathaniel Saenz¹; Matthew Dunstan¹; ¹US Army Research Laboratory

10:40 AM

Implementing a Commercially Available Self-locking Screw System in Additively Manufactured Medical Implants: *Ralf Fischer*¹; Jan Klasen²; Bart Prorok¹; ¹Auburn University; ²Voxelmed

Additive Manufacturing: Microstructure and Material Properties of Titanium-based Alloys — Electron Beam Powder Bed Fusion

Program Organizers: Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Powder Metals; Ola Harrysson, North Carolina State University; Sudarsanam Babu, University of Tennessee, Knoxville

Wednesday AM
October 2, 2019

Room: B116
Location: Oregon Convention Center

Session Chair: Ulf Ackelid, Freemelt AB

8:00 AM

Characterization of Additively Manufactured Ti 6Al 4V in Hydrogen: *Paul Korinko*¹; John Bobbitt¹; Travis Hubbard¹; ¹Savannah River National Laboratory

8:20 AM

Crystallographic Texture Evolution in Additively Manufactured Ti-6Al-4V as a Function of Build Height and Scan Strategy: *Alec Saville*¹; Matt Kenney²; Priyanka Agrawal²; Sabina Kumar³; Jonah Klemm-Toole¹; Sven Vogel⁴; Sudarsanam Babu³; Pete Collins²; Amy Clarke¹; ¹Colorado School of Mines; ²Iowa State University; ³University of Tennessee - Knoxville; ⁴Los Alamos National Laboratory

8:40 AM

Deformation and Fracture Behavior of Electron Beam Melted Ti-6Al-4V under High Strain Rate Impacts: *Reza Alaghmandfard*¹; *Dharmendra Chalasani*¹; Akindele Odeshi²; Mohsen Mohammadi¹; ¹Marine Additive Manufacturing Centre of Excellence; ²University of Saskatchewan

9:00 AM

Electron Beam Melted Ti-48Al-2Cr-2Nb Intermetallics: Microstructure, Room- and High-temperature Compression Properties, and High Temperature Creep Properties: *Kee-Ahn Lee*¹; Young-Kyun Kim¹; Seong-June Youn¹; Seong-Woong Kim²; Jaekyun Hong²; ¹Inha University; ²Korea Institute of Materials Science

9:20 AM

Factors on Tensile Properties of EBM Fabricated Ti-6Al-4V Alloy: *Yuta Tanaka*¹; Yutaro Ota¹; Keiji Kubushiro²; ¹IHI Corporation; ²IHI Asia Pacific (Thailand) Co., Ltd.

9:40 AM

Identifying and Understanding the Influence of Columnar Prior-beta Grain Boundaries on the Tensile and Fatigue Properties of Additively Manufactured Ti-6Al-4V Alloy: *Ma Qian*¹; ¹RMIT University (Royal Melbourne Institute of Technology)

10:00 AM Break

10:20 AM

Numerical Prediction of Fatigue Life of Additively Manufactured Ti-6Al-4V: *Manisha Banker*¹; Mannur Sundaresan¹; Carter Keough²; Cynthia Waters³; Harvey West²; Richard Wysk²; Ola Harrysson²; ¹North Carolina A&T State University; ²North Carolina State University; ³NSWC Carderock Division

10:40 AM

The Role of Microstructural Heterogeneities and as-Built Defects in EBM-PBF Ti-6Al-4V: Mechanical Testing and Characterization at Appropriate Length Scales: *Jake Benzing*¹; Nik Hrabe¹; Li-Anne Liew¹; Enrico Lucon¹; Ryan White¹; ¹National Institute of Standards and Technology

11:00 AM

Local Microstructures in Electron Beam Melted Ti-6Al-4V Lattice Primitives with Slender Intersecting Struts: *Sara Messina*¹; Connie Dong¹; Toby Francis¹; Andrew Polonsky¹; Jean-Charles Stinville¹; McLean Echlin¹; Rachel Collino²; Matthew Begley¹; Tresa Pollock¹; ¹University of California, Santa Barbara; ²Los Alamos National Laboratory

11:20 AM

Toughness of EBM Additively Manufactured Titanium Alloy Octet Truss Lattice: *Andrew Neils*¹; Liang Dong¹; Abbas Moftakhar²; Haydn Wadley¹; ¹University of Virginia; ²General Electric Additive

Advanced Coatings for Wear and Corrosion Protection — Advanced Coatings for Wear and Corrosion Protection II

Program Organizers: Evelina Vogli, LM Group Holdings Inc.; Fei Tang, DNV GL; Arif Mubarak, PPG; Mary Lyn Lim, PPG Industries

Wednesday AM
October 2, 2019

Room: B118
Location: Oregon Convention Center

Session Chairs: Fei Tang, DNV GL USA, Inc.; Evelina Vogli, LM Group Holdings Inc.; Arif Mubarak, PPG

8:00 AM

Influence of Laser Intensity and Speed of Scanning on the Ultimate Tensile Strength and Metallurgical Properties of Laser Cladded Ti-6Al-4V+Ni/Ti-6Al-4V Composite Coating: *Stephen Akinlabi*¹; Olawale Fatoba¹; Adedoyin Lasisi¹; Esther Akinlabi¹; ¹University of Johannesburg

8:20 AM

Intermetallic TiAl Alloys Properties Enhancement by Thermal Sprayed Heat Resistant Coatings: *Nikolai Zaitsev*¹; Ivan Mazilin²; Anton Artamonov²; Mikhail Gorshenkov¹; Andrei Stepashkin¹; Vladimir Sudarchikov¹; Sergey Kaloshkin¹; Vladislav Zadorozhnyy¹; ¹NUST MISIS; ²TSPC™ LLC

8:40 AM Invited

On the Corrosion Resistance of Nitrided and Boronized Nickel-based Alloys: *Virendra Singh*¹; Manuel Marya¹; ¹Schlumberger

9:00 AM Invited

Test the Corrosion Effect on High Hard Steel Armor MIL-DTL-46100 Coated with Stellite 6 Applied by Direct Energy Deposition Method: *Ian Toppler*¹; Claudio Romero²; Daniel Schleh¹; ¹Da Tardec; ²Chilean Army

9:20 AM

High Performance, Low Friction Amorphous Thermal Sprayed Coatings: *Evelina Vogli*¹; John Kang¹; Ricardo Salas¹; ¹LM Group Holdings Inc.

9:40 AM

Nanoscratch and Electrochemical Behavior of Plasma Sprayed Fe-based Amorphous / Nanocrystalline Coating: *Anil Kumar*¹; Sapan K. Nayak¹; Pavan Bijalwan²; Atanu Banerjee²; Tapas Laha¹; ¹Indian Institute of Technology, Kharagpur; ²Research and Development Division, Tata Steel

10:00 AM Break

10:20 AM

Electrochemical Corrosion Behavior of Fe based Amorphous / Nanocrystalline Composite Coating Prepared by High Velocity Oxy-fuel Thermal Spraying: *Sapan K. Nayak*¹; Anil Kumar¹; Kuntal Sarkar²; Abhishek Pathak²; Atanu Banerjee²; Tapas Laha¹; ¹Indian Institute of Technology Kharagpur; ²Research and Development Division, Tata Steel



10:40 AM

Corrosion Behavior of a CoCrFeMo_{0.25}Ni₂ High-entropy Alloy in Laminar Flow CO₂-saturated 3.5 wt.% NaCl: *Alvaro Rodriguez*¹; Joseph Tylczak²; Margaret Ziomek-Moroz²; Paul Jablonski²; Michael Gao³; Kelsea Keenan⁴; ¹ORISE; ²National Energy Technology Laboratory; ³Leidos; ⁴Mickey Leland Energy Fellowship

11:00 AM

Selective Laser Melting of Ti/SiC Nanocomposite Coating towards Enhanced Surface Performance of Ti64: *Xing Zhang*¹; Bo Mao¹; Rebecca Histed¹; Mohamed Trabia²; Brendan O'Toole²; Richard Jennings²; Pouya Shojaei²; Yiliang Liao¹; ¹University of Nevada, Reno; ²University of Nevada, Las Vegas

Advanced Manufacturing, Processing, Characterization and Modeling of Functional Materials — Additive Manufacturing of Functional Materials

Program Organizers: Mohammad Elahinia, University of Toledo; Haluk Karaca, University of Kentucky; Reza Mirzaeifar, Virginia Tech; Reginald Hamilton, Pennsylvania State University; Reza Mehrabi, University of Toledo; Hamdy Ibrahim, University of Tennessee at Chattanooga; Mohammad Mahtabi, University of Tennessee at Chattanooga; Narges Shayesteh Moghaddam, University of Texas at Arlington; Markus Chmielus, University of Pittsburgh

Wednesday AM
October 2, 2019

Room: D136
Location: Oregon Convention Center

Session Chairs: Ibrahim Karaman, Texas A&M University; Reginald Hamilton, The Pennsylvania State University

8:00 AM

Laser Powder Bed Fusion of Ti-rich TiNi Graded Lattice Structures: Process Optimisation, Geometrical Integrity and Mechanical Property: *Chaolin Tan*¹; Moataz Attallah¹; ¹University of Birmingham

8:30 AM

Effects of Heat Treatments on H-phase Growth in Thermo-mechanically Processed NiTiZr: *Jordyn Ward*¹; Nathan Ley¹; Robert Wheeler¹; Brian Van Doren²; Marcus Young¹; ¹University of North Texas; ²ATI Specialty Alloys and Components

8:50 AM

Directed Energy Deposition of Multilayer Shape Memory Alloy Structures: Titus Reed¹; Todd Palmer¹; *Reginald Hamilton*¹; ¹Pennsylvania State University

9:10 AM

Computational Design of Additively Manufactured Compositionally Graded Alloys: *Tanner Kirk*¹; Olga Eliseeva¹; Richard Malak¹; Raymundo Arroyave¹; Ibrahim Karaman¹; ¹Texas A&M University

9:30 AM

Connecting Process Parameters to Grain Structure of Parts Produced by Laser Powder-bed Fusion Additive Manufacturing Using a Monte Carlo Potts Model: *Joseph Pauza*¹; Anthony Rollett¹; ¹Carnegie Mellon University

9:50 AM Break

10:10 AM

Investigating SOFC Electrode Microstructures and Performance Degradation: A High Throughput Integrated Model: *William Epting*¹; Jerry Mason¹; Yinkai Lei¹; Paul Ohodnicki¹; Harry Abernathy¹; Gregory Hackett¹; ¹National Energy Technology Laboratory

10:30 AM

Effects of Laser-beam Defocus on Microstructural Features of Compositionally Graded WC/Co Composites Additively Manufactured by Multi-laser Metal Deposition: *Takahiro Kunimine*¹; Ryusei Miyazaki¹; Yorihiro Yamashita²; Yoshinori Funada²; ¹Kanazawa University; ²Industrial Research Institute of Ishikawa

10:50 AM

Direct Energy Deposition Material Process Validation for Remanufacture, Restoration, and Coating for Ground Vehicle Systems: *Ian Toppler*¹; Daniel Schleh¹; ¹DA GVSC

11:10 AM

Processing of Multi-material Composites Using Laser-based Additive Manufacturing: *Kellen Traxel*¹; Amit Bandyopadhyay¹; ¹Washington State University

11:30 AM

Design-Processing-Properties of Alternating/Multi-layered, Metal-ceramic Composites Fabricated via Laser-based Additive Manufacturing: *Kellen Traxel*¹; Amit Bandyopadhyay¹; ¹Washington State University

Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder — Environmental Effect and Current Stressing in Advanced Interconnects

Program Organizers: Tae-Kyu Lee, Portland State University; Darrel Frear, Freescale Semiconductor; David Yan, San Jose State University; Albert T. Wu, National Central University

Wednesday AM
October 2, 2019

Room: A108
Location: Oregon Convention Center

Session Chairs: Albert Wu, National Central University; David Yan, San Jose State University

8:00 AM Invited

IMC Evolution as a Function of Grain Orientation under High Current Density in Sn-based Solder Joints: *Fu Guo*¹; Yu Tian¹; Yan Wang¹; Yishu Wang¹; Limin Ma¹; ¹Beijing University of Technology

8:30 AM

Predicting Electromigration-mediated Damage in Interconnects Using Phase-field Models: *William Farmer*¹; Kumar Ankit¹; ¹Arizona State University

8:50 AM

Micro Interconnect Shear and Creep Performance under Current Stressing: *Mohamed Sheikh*¹; Scott Fuller¹; Yeonjin Baek¹; Tae-Kyu Lee¹; ¹Portland State University

9:10 AM

Effect of Reducing Agent on the Joint Strength of Sintered-joint with Cu Paste: *Soonyong Kwon*¹; Yong-Ho Ko¹; Jeong-Hwan Bang¹; Hoo-Jeong Lee²; Schoon Yoo¹; ¹KITECH; ²Sungkyunkwan University

9:30 AM

Microstructure Evolution in Cu and Ag Coated Cu Particle Sintering for Power Module Interconnection: *Mitchell Flynn*¹; Chul-Min Oh²; Sung-Dae Park²; Hyun-Seung Yang²; Jeong-Won Yoon³; Tae-Kyu Lee¹; ¹Portland State University; ²Korea Electronics Technology Institute; ³Korea Institute of Industrial Technology

9:50 AM Question and Answer Period

10:10 AM Break

10:30 AM Invited

Understanding Reliability Failure Mechanisms in Pb Free Solder Joint with Micro-gap Configuration: *Choong-un Kim*¹; Yi-Ram Kim¹; Madanipour¹; ¹University of Texas at Arlington

11:00 AM

Stretchable Joint with Ag-PDMS for Wearable Electronics: *Junhwan Park*¹; Kyoung-Ryeol Park¹; Sungwook Mhin¹; Young-Bae Park²; Sehoon Yoo¹; ¹KITECH; ²Andong National University

11:20 AM

Heated Mechanical Cycling as a Substitute for Thermal Cycling - A Preliminary Investigation for a New Failure Analysis Technique: *David Routledge*¹; Tae-Kyu Lee²; ¹Nordson DAGE; ²Portland State University

11:40 AM

Micro Interconnect Mechanical Stability in Cryogenic Temperature Environment: *Ande Kitamura*¹; Timothy Mathews¹; David Routledge²; Tae-Kyu Lee¹; ¹Portland State University; ²Dage Precision Industries

Advances in Dielectric Materials and Electronic Devices — Ferroics and Multiferroics: Session II

Program Organizers: Amar Bhalla, University of Texas; Ruyan Guo, University of Texas at San Antonio; Rick Ubic, Boise State University; Danilo Suvorov, Jožef Stefan Institute

Wednesday AM
October 2, 2019

Room: A105
Location: Oregon Convention Center

Session Chairs: Rattikorn Yimnirun, Vidyasirimedhi Institute of Science and Technology; Matjaz Spreitzer, Jozef Stefan Institute

8:00 AM Invited

Superparamagnetic Gallium-substituted Cobalt Ferrite Nanoparticles: Sonja Jovanovic¹; Marija Vukomanovic¹; Lea Udovc¹; Davide Peddis¹; Matjaz Spreitzer¹; *Danilo Suvorov*¹; ¹Jožef Stefan Institute

8:20 AM Invited

Carbon Loads for Electromagnetic Absorption: From Nanoparticles to Fibers: *Ratiba Benzerga*¹; Chloé Méjean¹; Mathieu Badard¹; Ala Sharaiha¹; ¹University of Rennes, IETR

8:40 AM Invited

Symmetry Modulation and Electric Field-controlled Magnetism in Bi_{1-x}R_xFeO₃ Solid Solutions: *Xiang Ming Chen*¹; ¹Zhejiang University

9:00 AM

CoFe₂O₄ - BaTiO₃ Magnetolectric Nanocomposites: Structural, Microstructural and Ferroic Properties: Denise Alanis¹; Amauri Carvalho Jr¹; Gustavo Dias¹; Ivair Santos¹; Ruyan Guo²; Amar Bhalla²; *Luiz Cótica*¹; ¹State University of Maringá; ²University of Texas at San Antonio

9:20 AM

Development of Multiferroic Devices Utilizing Hybrid 3D Deposition: *Brandon Young*¹; Bryan Gamboa¹; Amar Bhalla¹; Ruyan Guo¹; ¹University of Texas, San Antonio

9:40 AM Invited

The Novel Structure and Properties in Self-assembled, Topologically Confined BiFeO₃ Nano-islands: Ji Ma¹; Jing Wang¹; Mingfeng Chen¹; Renci Peng¹; *Jing Ma*¹; Ce-Wen Nan¹; ¹Tsinghua University

10:00 AM Break

10:20 AM Invited

Advances in Graphene Science and Engineering for Electronic Applications: *David Carey*¹; ¹University of Surrey

10:40 AM Invited

The Polar Order and Dielectric Anomalies in Ag(Nb_{1-x}Ta_x)O₃ Ceramic System: *Matjaz Spreitzer*¹; Lei Li²; Danilo Suvorov¹; ¹Jozef Stefan Institute; ²Zhejiang University

11:00 AM

Conduction Mechanisms and Dielectric Properties of BaBiO₃ Bulk Ceramics: *Rachel Sherbondy*¹; Geoff Brennecke¹; ¹Colorado School of Mines

11:20 AM

Multiferroic Devices on Semiconductors: *Srinivasa Rao Singamaneni*¹; ¹The University of Texas at El Paso

11:40 AM

Effect of Hafnium Content on Properties of PSZT: Nicholas Anselmo¹; *Eric Neuman*¹; Christopher Diantonio¹; Rose Torres¹; Tom Chavez¹; Brian Brane¹; ¹Sandia National Laboratories

12:00 PM Invited

Strain Induced Enhanced Magnetic Response in Mechanically Processed BiFeO₃ Polycrystals: Eduardo Volnistem¹; Livia Macková¹; Luiz Cótica¹; Gustavo Dias¹; *Ivair Santos*¹; ¹State University of Maringá

Advances in Understanding of Martensite in Steels — Design & Modeling

Program Organizers: Ian Zuazo, ArcelorMittal Global R&D - (CRMC, Industeel); Amy Clarke, Colorado School of Mines; Eric Payton, Air Force Research Laboratory; Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Eric Lass, University of Tennessee, Knoxville; Mohsen Asle Zaeem, Colorado School of Mines

Wednesday AM
October 2, 2019

Room: C125
Location: Oregon Convention Center

Session Chairs: Mohsen Asle Zaeem, Colorado School of Mines; Amy Clarke, Colorado School of Mines

8:30 AM Invited

Flying Martensite: Transformations in Materials Design: *Gregory Olson*¹; ¹Northwestern University

9:00 AM Invited

Tools for Materials Design of Martensitic Materials: *Annika Borgenstam*¹; ¹KTH Royal Institute of Technology

9:30 AM

Effect of Tensile Stress on the Kinetics of Isothermal Martensitic Transformation: *Wenqi Mao*¹; Si Gao¹; Yu Bai¹; Myeong-Hoem Park¹; Akinobu Shibata¹; Nobuhiro Tsuji¹; ¹Kyoto University

9:50 AM

Comparison of Transformation Potential Calculations for Two Martensitic Transformation Paths: *Adam Creuziger*¹; Whitney Poling¹; Thomas Gnaupel-Herold¹; ¹National Institute of Standards and Technology

10:10 AM Break

10:30 AM Invited

Martensite and Manufacturing- Alloy Development to Minimize Residual Stress in Large Ferrous Additive Manufactured Parts: *Niyanth Sridharan*¹; Michael Kottman²; Jeff Bunn¹; Badri Narayanan²; Andrzej Nycz¹; Noakes Mark¹; Lonnie Love¹; Ryan Dehoff³; ¹Oak Ridge National Laboratory; ²Lincoln Electric Company

11:00 AM

Effect of Boron on Segregation Behavior on M-A Formation during Continuous Cooling: *Ryo Arao*¹; Katsuyuki Ichimiya¹; Yoshiaki Murakami¹; Naoki Takayama¹; Koichi Nakashima¹; Kazukuni Hase¹; Keiji Ueda¹; Satoshi Igi¹; ¹JFE Steel Corporation

11:20 AM

Molybdenum and Niobium Alloying for Property Optimization of Quenched Steels: *Hardy Mohrbacher*¹; ¹NiobelCon bvba

Alloy Design for Additive Manufacturing: Developing New Feedstock Materials — Development of Alloy Feedstocks

Program Organizers: Joseph McKeown, Lawrence Livermore National Laboratory; Aurelien Perron, Lawrence Livermore National Laboratory; Manyalibo Matthews, Lawrence Livermore National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Peter Hosemann, University of California

Wednesday AM
October 2, 2019

Room: B111
Location: Oregon Convention Center

Session Chairs: Aurelien Perron, Lawrence Livermore National Laboratory; Peter Hosemann, University of California, Berkeley

8:00 AM Introductory Comments

8:05 AM Invited

Alloy Design and Development for AM: Opportunities and Challenges: *Behrang Poorganji*¹; Mahdi Jamshidinia¹; Eric Ott¹; Andrew Wessman¹; ¹GE Additive

8:35 AM Invited

Microstructures and Meta-structures: Exerting Control Across the Length Scales in Additive Manufacture: *Iain Todd*¹; ¹University of Sheffield

9:05 AM

Controlling In Situ Reactions during Laser Powder Bed Fusion – A Ti + Mo2C Case Study: *Bey Vrancken*¹; Sasan Dadbakshsh²; Raya Mertens³; Kim Vanmeensel⁴; Jef Vleugels⁴; Shoufeng Yang³; Jean-Pierre Kruth³; ¹Lawrence Livermore National Laboratory; ²Department of Production Engineering, KTH Royal Institute of Technology; ³PMA, Department of Mechanical Engineering, KU Leuven, Member of Flanders Make; ⁴Department of Materials Engineering, KU Leuven

9:25 AM

Processability and Properties of an Innovative AlSi10Mg+Cu Alloy for Laser Powder Bed Fusion: *Alberta Aversa*¹; Federico Bosio¹; Silvia Marola²; Dario Gianoglio²; Massimo Lorusso³; Diego Manfredi³; Livio Battezzati²; Mariangela Lombardi¹; ¹Politecnico di Torino, DISAT; ²Università di Torino; ³Istituto Italiano di Tecnologia

9:45 AM

Discerning the Impact of Powder Feedstock Variability on Structure, Property and Performance of Selective Laser Melted Alloy 718: David Ellis¹; Chantal Sudbrack²; ¹NASA; ²NASA GRC (Separated)

10:05 AM Break

10:25 AM Invited

The Next Generation of NiTi-based Shape Memory Alloys: Developed for Additive Manufacturing: *Aaron Stebner*¹; ¹Colorado School of Mines

10:55 AM

Developing Feedstock Powder for Laser Consolidation of Aluminum Metal Matrix Composites: *Ethan Parsons*¹; ¹MIT Lincoln Laboratory

11:15 AM

Improving the Sintering Behavior of Aluminum Powders by Polydopamine Assisted Introduction of Copper Nanoparticles: *Yao Zhao*¹; Haoqi Li¹; Fei Ren¹; ¹Temple University

11:35 AM

Parametric Study of Melt Pool Dynamics and Microstructure of WE43 Processed by Laser Powder Bed Fusion: *Julie Soderlind*¹; Nicholas Calta²; Jenny Wang²; Aiden Martin²; Philip Depond²; Joerg Loeffler³; Subhash Risbud¹; Manyalibo Matthews²; ¹University of California, Davis; ²Lawrence Livermore National Laboratory; ³ETH Zurich

Bulk Metallic Glasses and their Composites – Progresses, Outcomes and Prospects — Mechanical Properties

Program Organizers: Muhammad Rafique; Weidong Li, Corning; Junwei Qiao, Taiyuan University of Technology

Wednesday AM
October 2, 2019

Room: E146
Location: Oregon Convention Center

Session Chair: Takeshi Egami, The University of Tennessee - Oak Ridge National Laboratory

8:00 AM Invited

Structure Formation and Property Optimization of Metallic Glasses and Composites: *Jurgen Eckert*¹; ¹Erich Schmid Institute of Materials Science

8:30 AM Invited

Nanoindentation of Bulk Metallic Glasses – Size Effects: Z.H. Melgarejo¹; J.E. Jakes²; *Donald Stone*¹; ¹Materials Science and Engineering, University of Wisconsin-Madison; ²Forest Biopolymer Science and Engineering, USDA Forest Products Laboratory

9:00 AM

Strain Delocalization and Its Dependence on Microstructural Length Scales in Metallic Glass Matrix Composites: *Jason Trelewicz*¹; ¹Stony Brook University

9:30 AM

Enhancing Ductility of Metallic Glasses by Tuning Nanoscale Structural Heterogeneity: Soohyun Im¹; Pengyang Zhao¹; Geun Hee Yoo²; Eun Soo Park²; Yunzhi Wang¹; *Jinwoo Hwang*¹; ¹Ohio State University; ²Seoul National University

Characterization of Materials and Properties through Metallography, Mechanical Testing and Analysis - From Fundamentals to the Cutting Edge — Quantification, Classification and Simulation of Microstructures and Properties II

Program Organizer: Michael Keeble, Buehler

Wednesday AM
October 2, 2019

Room: F152
Location: Oregon Convention Center

Session Chairs: Andrew Kitahara, Carnegie Mellon University; Janet Gbur, Case Western Reserve University; Steven Gentz, NASA Engineering and Safety Center

8:00 AM Invited

Analysis and Comparison of Microstructure and Mineral Properties of Two Kind of Sinters: Ti-bearing and General Sinter: *Yapeng Zhang*¹; Wen Pan¹; Zhe Wang²; Shaoguo Chen¹; Zhixing Zhao¹; ¹Shougang Group Co., LTD Research Institute of Technology; ²Shougang Jingtang United Iron & Steel Co., Ltd

8:20 AM

Characterizing Metal Oxide Composites Processed by Internal Oxidation and Severe Plastic Deformation: *Anna Weiss*¹; Jörg Wiezorek²; Yoosuf Picard¹; Bryan Webler¹; ¹Carnegie Mellon University; ²University of Pittsburgh

8:40 AM

Surface Analysis of Film Formed by Egg Shell Extract on Stainless Steel in Acid Solution: Omotayo Sanni¹; API Popoola¹; *OSI Fayomi*¹; ¹Tshwane University of Technology

9:00 AM

Investigation of Thermal Diffusivity for the First Generation Graphitic White Iron: Jie Wan¹; Jingjing Qing²; *Mingzhi Xu*²; ¹Missouri University of Science and Technology; ²Georgia Southern University

9:20 AM

Investigation of Wear Performance for the First Generation Graphitic White Iron: *Jie Wan*¹; Jingjing Qing²; Mingzhi Xu²; ¹Missouri University of Science and Technology; ²Georgia Southern University

9:40 AM

Observation of Nanotwin and Ni₂Si Discontinuous Precipitation in Cold-drawn Cu-Ni-Si Alloy: *Hwangsun Kim*¹; Jee Hyuk Ahn¹; Seung Zeon Han²; Janghyun Jo¹; Miyoung Kim¹; Heung Nam Han¹; ¹Seoul National University; ²Korea Institute of Materials Science

10:00 AM Break

10:20 AM

Classification of Steel Microstructures – Tracing Bainite with the Help of Textural Parameters: *Martin Mueller*¹; Frank Mücklich²; Dominik Britz²; Thorsten Staudt³; ¹Saarland University; ²Universität des Saarlandes; ³AG der Dillinger Hüttenwerke

10:40 AM

Pearlite Spheroidization and Its Relationship with Tensile Strength: *Monserrat Lopez*¹; Hector Vergara-Hernández¹; Pedro Garnica-González¹; Octavio Vázquez-Gómez¹; Sixtos Arreola-Villa²; ¹Instituto Tecnológico de Morelia; ²Universidad Autónoma de Coahuila

11:00 AM

Effect of Process Parameters on the Porosity of Al-7%Si Alloy Castings Produced by Ceramic Shell Investment Casting Process: Balwinder Singh¹; *Pargeet Chauhan*²; ¹GZS Campus CET Bathinda; ²Freudenberg NOK Pvt Ltd Mohali

11:20 AM

Development of an Orthogonal Metal Cutting Experiment to Investigate Microstructural Evolution in Friction Stir Welding: *Benjamin Lund*¹; ¹University of Alabama in Huntsville

11:40 AM

Phase Fraction Development of Ni₂Cr from Isothermal Ageing Conditions: *Nicholas Aerne*¹; Julie Tucker¹; ¹Oregon State University

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — Ceramic Nanostructures and Energy Applications

Program Organizers: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Tech; Edward Gorzkowski, Naval Research Laboratory ; Jian Shi, Rensselaer Polytechnic Institute; Kejie Zhao, Purdue University ; Michael Naguib, Tulane University

Wednesday AM
October 2, 2019

Room: D134
Location: Oregon Convention Center

Session Chairs: Edward Gorzkowski, Naval Research Laboratory; Jian Shi, Rensselaer Polytechnic Institute

8:00 AM Invited

Electroactive Materials for Divalent Ion Rechargeable Batteries: *Guozhong Cao*¹; ¹University of Washington

8:30 AM

Elaboration of Solid Nano-structured Electrolytes of Ce_{0.85}-xGd_{0.15}MxO₂- δ (x = 0.03, 0.05 and M = Sm and La) and Measurement of Ionic Conductivity at Intermediate Temperatures: Karla María Rangel-Arreola¹; *Ena Athenea Aguilar-Reyes*¹; Carlos Alberto León-Patiño¹; ¹Universidad Michoacana de San Nicolas de Hidalgo

8:50 AM

An All Zirconia Ceramic Solid Oxide Fuel Cell with Improved Power Generation: *John Drazin*¹; Dustin McLarty¹; ¹Washington State University

9:10 AM

Thermal Conductivity Reduction in 7 wt% Ytria Doped Zirconia Nanocrystalline Ceramics: John Drazin¹; James Wollmershauser²; Stephanie Wimmer²; Brian Donovan³; *Edward Gorzkowski*²; ¹Washington State University; ²Naval Research Laboratory; ³United States Naval Academy

9:30 AM

Topochemical Conversion of Different Shaped BaTiO₃ and Its Effect on Boosting Electrical Properties of Composite Materials: *Jing Fu*¹; Haiyan Zhao¹; Mupeng Zheng¹; Mankang Zhu¹; Yudong Hou¹; ¹Beijing University of Technology

9:50 AM Invited

Perovskite-based Functional Nanocomposites for Highly Stable and Efficient Hybrid Solar Cells: *Yoon-Bong Hahn*¹; ¹Chonbuk National University

10:20 AM Break

10:40 AM

Scalable Electrospinning of CsH₂PO₄ Micro- and Nanometer Fibers for Solid Acid Fuel Cell Applications: *Ryan McCarty*¹; Konstantinos Giapis²; Fernando Diaz Campos³; Mandy Abbott³; Calum Chisholm³; ¹University of California, Irvine; ²California Institute of Technology; ³SAFCe



11:00 AM

Light-matter Interactions in Nanocrystalline Ceramics Near the Mie Scattering Limit: James Wollmershauser¹; Serge Nakhmanson²; John Drazin³; Boris Feigelson¹; Lukasz Kuna²; *Edward Gorzkowski¹*; ¹Naval Research Laboratory; ²University of Connecticut; ³Washington State University

11:20 AM

Shape Evolution of CdSe/CdS Dot-in-Rods into Multi-tiered Pyramidal Nanocrystals: Growth Mechanisms and Optical Properties: *Natalie Gogotsi¹*; Aditya Maan¹; Christopher Murray¹; ¹University of Pennsylvania

Corrosion of Additively Manufactured Metals — Corrosion of Additively Manufactured Metals I

Program Organizers: Eric Schindelholz; Rajeev Gupta, The University of Akron; Ajit Mishra, Haynes International; Amit Pandey, Ansys/Granta Design

Wednesday AM
October 2, 2019

Room: B112
Location: Oregon Convention Center

Session Chairs: Eric Schindelholz, Sandia National Laboratories; Rajeev Gupta, University of Akron

8:00 AM

Corrosion of Additively Manufactured Stainless Steels – Process, Structure, and Performance: *Michael Melia¹*; Eric Schindelholz¹; Jeffrey Rodelas¹; ¹Sandia National Laboratories

8:20 AM

Issues in Localized Corrosion of Selective Laser Melted 316L: *Duane Armell Macatangay¹*; Robert Kelly¹; Alex Chmielinski¹; ¹University of Virginia

8:40 AM

Improved Electrochemical Response of SLM 316L SS in Physiological Solutions: *Nahid Sultan Al-Mamun¹*; Ishraq Shabib¹; ¹Central Michigan University

9:00 AM

Effect of Chloride and Heat Treatment on Pitting Corrosion Resistance and Mechanical Properties of a 316L Stainless Steel Manufactured by the Direct Metal Laser Sintering (DMLS) Process: *Claudia Prieto¹*; David Young¹; Marc Singer¹; ¹Ohio University

9:20 AM Invited

Surface Preparation of Additively Manufactured Metals and Subsequent Comparison of Corrosion Characteristics: *Daniel Hooks¹*; Randall Edwards¹; Jamie Stull¹; D. Allen Gresham¹; Donald Johnson¹; Enkeleda Dervishi¹; ¹Los Alamos National Laboratory

9:40 AM

Effect of Surface Finish on the Corrosion Properties of Additively Manufactured Stainless Steel: *Jamie Stull¹*; Courtney Clark¹; Daniel Hooks¹; Randy Edwards¹; Enkeleda Dervishi¹; Don Johnson¹; Allen Gresham¹; ¹Los Alamos National Laboratory

10:00 AM Break

10:20 AM

Corrosion Behavior of Additive Manufactured 316L and Alloy 625: *Michael Bestic¹*; Xiaoli (Shelly) Tang¹; Robert Bianco¹; ¹Swagelok Company

10:40 AM

Hydrogen Concentration and Uptake in Additively Manufactured Austenitic Stainless Steels: *Rebecca Schaller¹*; Amin Imani¹; Edouard Asselin¹; Eric Schindelholz²; ¹University of British Columbia; ²Sandia National Laboratories

11:00 AM

Evaluation of the Corrosion Response of Additively-Manufactured 17-4 PH Stainless Steel Samples as a Function of Build and Finish Parameters: *Michael Roach¹*; Joseph Thomas¹; Karl Nelson²; Rod McMillan²; ¹Biomedical Materials Science Department, University of Mississippi Medical Center; ²3D Printing Center of Excellence, Johnson and Johnson

11:20 AM Invited

Understanding the Influence of Retained Nitrogen in Additively-manufactured 17-4 Stainless Steel: Does it Really Improve Corrosion Resistance?: *Mark Stoudt¹*; Richard Ricker¹; ¹National Institute of Standards and Technology

11:40 AM

Corrosion of Additive Materials for Naval Applications: *Pin Lu¹*; Marie Thomas¹; Abhinav Saboo¹; Dana Frankel¹; Greg Olson¹; ¹Questek Innovations Llc

Crosscutting Issues in Corrosion of Materials: Control, Monitoring, Mitigation and Material Selection — Cross-cutting Applications of Steel and Its Corrosion Protection

Program Organizers: Matthew Asmussen, Pacific Northwestern National Laboratory; Jeff Binns, Nuclear Waste Management Organization; James Neeway, Pacific Northwest National Laboratory; John Zhang, Gamry Instruments; Mary Lyn Lim, PPG; Sudhakar Mahajanam, Pinnacle ART; Eric Schindelholz, Sandia National Laboratories; Ajit Mishra, Haynes International; James Noel, Western University; Guang-Ling Song, Xiamen University; David Shoosmith, Western University; Raul Rebak, General Electric Global Research

Wednesday AM
October 2, 2019

Room: B119
Location: Oregon Convention Center

Session Chairs: James Neeway, Pacific Northwest National Laboratory; Xueyuan Zhang, Gamry Instruments

8:00 AM

Effect of NaNO₂ in Corrosion Inhibition of Micro-alloyed Steel in E20 and E40 Simulated Fuel Grade Ethanol Environment: *Olufunmilayo Joseph¹*; Seetharaman Sivaprasad²; Raghuvir Singh²; ¹Covenant University; ²CSIR-NML

8:20 AM

An Electrolytic Cell Used in a Simulated High Pressure Corrosive Deep Sea Environment: *Yuqing Xu¹*; Guangling Song¹; ¹Xiamen University

8:40 AM Invited

Corrosion Studies of the Copper-coated Canadian Used Fuel Container: *Wilfred Binns¹*; Mehran Behazin¹; Peter Keech¹; ¹Nuclear Waste Management Organization

9:20 AM

The Complex History of Rb Influenced Steel Corrosion: *Matthew Asmussen¹*; James Neeway¹; Charles Demarest²; John Scully²; ¹Pacific Northwestern National Laboratory; ²University of Virginia

9:40 AM

Corrosion of Coated Tinsplate Cans Used for Food Storage: *Kuo-Hsiang Chang¹*; G. S. Frankel¹; ¹Ohio State University

10:00 AM Break

10:15 AM

An Investigation of Cast Iron Corrosion Behavior in Chloride Containing Engine Coolant Environment: *Gaurav Argade*¹; Anusha Chilukuri¹; Justin Perry¹; Corey Trobaugh¹; Randy Schafer¹; Erica Raisor¹; Jacob Steenhoek¹; Glenia Pena Lugo¹; ¹Cummins Inc.

10:35 AM

Steel Corrosion Resistance in the Technological Process: Valerii Mishchenko¹; Natalia Evseeva²; *Sergey Shejko*¹; Vadim Shalomoev²; ¹Zaporizhzhya National University; ²Zaporizhzhya National Technical University

10:55 AM

Evaluation of Palm Kernel Oil as Green Inhibitor for Protection of Mild Steel in Acidic and Alkaline Media: Muideen Bodude¹; Ruth Nnaji¹; Wasiu Ayoola¹; Abdurasaq Adeleke¹; *Ademola Agbeleye*¹; ¹University of Lagos

Emergent Materials under Extremes and Decisive In-situ Characterizations — Pressure-induced Dramatic Changes in Structures and Properties I

Program Organizers: Xujie Lu, Center for High Pressure Science & Technology Advanced Research; Judith Driscoll, Cambridge University; Xiaofeng Guo, Washington State University; Hua Zhou, Argonne National Laboratory

Wednesday AM
October 2, 2019

Room: E145
Location: Oregon Convention Center

Session Chairs: BingBing Liu, Jilin University; Xujie Lu, Center for High Pressure Science & Technology Advanced Research

8:30 AM Invited

Emerging Materials from Pressure Induced Electronic Transition: *Wenge Yang*¹; ¹HPSTAR

9:00 AM Invited

High-pressure Chemistry: Novel Compounds and Bond Schemes: *Alexander Goncharov*¹; ¹Geophysical Laboratory, Carnegie

9:30 AM

Superconductivity in Amorphous Sb₂Se₃: *Kai Zhang*¹; Wenge Yang²; ¹The University of Chicago; ²HPSTAR

9:50 AM Invited

Novel Superhard sp³ Carbon Allotrope from Cold-Compressed C70 Peapods: *Liu Bingbing*¹; ¹Jilin University

10:20 AM Break

10:40 AM Invited

Structural Behavior and Phase Relations of β -Eucryptite at High P-T Conditions: *Hongwu Xu*¹; ¹Los Alamos National Laboratory

11:10 AM Panel Discussion

Failure Analysis: Industry Specific Failures — Agricultural, Forestry & Logging Failures

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Wednesday AM
October 2, 2019

Room: F151
Location: Oregon Convention Center

Session Chairs: Amber Dalley, Consultant; David Riegner, SEA Limited; Adam Boesenberg, Iowa State University; Jake Auliff, Danfoss Power Solutions

8:00 AM Invited

Adhesive-wood Interactions in Relation to Failure in Bonded Wood Products from Centimeter to Nanometer Scale: *Charles Frihart*¹; Nayomi Plaza¹; Christopher Hunt¹; Joseph Jakes¹; ¹Forest Products Laboratory

8:40 AM

Case Studies in Failure Analysis of Tinplate Containers for Food Packaging: *Francisco Rumiche*¹; Carlos Juarez²; ¹Pontificia Universidad Catolica Del Peru

9:00 AM

Failure of Beet Planter Support Wheel Kingpins: *Keith Cline*¹; ¹ESI

9:20 AM Invited

Failure Analysis of a Combine Wheel Motor: *Adam Boesenberg*¹; ¹Iowa State University

9:50 AM

When a Butterfly Flaps Its Wings: Failure Analysis of a Hydrostatic Axial Piston Pump Control Module Component: *Jake Auliff*¹; ¹Danfoss Power Solutions Company

Failure Prevention and Unconventional Failures — Unusual & Unconventional Failures & Failure Analysis

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Wednesday AM
October 2, 2019

Room: F149
Location: Oregon Convention Center

Session Chairs: Joseph Lemberg, Exponent; Conrad Park, Case Western Reserve University; Erik Mueller, National Transportation Safety Board; Craig Schroeder, Element

8:00 AM Invited

When a Highway Bridge Suddenly Lifts Its Up Without Prior Announcement ... !: *Pierre Dupont*¹; ¹UMONS, Faculté Polytechnique de MONS (FPMs)

8:20 AM

As Designed Does Not Always Equal as Manufactured: *Charles White*¹; ¹Kettering University

8:40 AM

Common Failures, Uncommon Features: *Erhan Ulvan*¹; ¹Acuren Group Inc.

9:00 AM Invited

The Power of the “Infinite Smalls” Where Heavy Rude Working Conditions Are Involved!: *Pierre Dupont*¹; ¹UMONS, Faculté Polytechnique de MONS (FPMs)



9:20 AM

Wind-induced Failure of 9m Street Lamp Poles: *Milo Kral¹*; ¹University of Canterbury

9:40 AM Invited

Failure Analysis of a LORAN C Tower Near Greenland: *George Vander Voort¹*; ¹Vander Voort Consulting L.L.C.

10:00 AM Break

10:20 AM

Failure by Design: *Andrew Havics¹*; ¹PH2 LLC

10:40 AM

Metallurgical Failure Analysis of a Fractured Intermediate Coupling: *Craig Schroeder¹*; ¹Element

11:00 AM

Leak in Water Line 45 Years in the Making: *Thomas Traubert¹*; ¹EDT Engineers

11:20 AM

The Unusual Case of a Not-so-Obvious Brake Line Failure: *Erik Mueller¹*; *Stephen Stein¹*; ¹National Transportation Safety Board

11:40 AM

Investigation of an Amphibious Duck-boat Fracture in Seattle, WA: *Adrienne Lamm¹*; ¹National Transportation Safety Board

Formability and Fracture of Metal Sheets — Formability and Fracture of Metal Sheets II

Program Organizers: Piyush Upadhyay, Pacific Northwest National Laboratory; John Carsley, Novelis, Inc.; Daniel Coughlin, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines

Wednesday AM
October 2, 2019

Room: C123
Location: Oregon Convention Center

Session Chairs: Kester Clarke, Colorado School of Mines; Daniel Coughlin, Los Alamos National Laboratory; Piyush Upadhyay, Pacific Northwest National Laboratory

8:00 AM Invited

Mechanical Behavior of Ni and Cr added Bainite/ Martensite Multiphase Steels: *Hongwei Ma*

8:30 AM

Study of GP-zone/MgZn₂ Precipitation Coupled with Deformation in Al-Zn-Mg-Cu to Overcome the Strength-ductility Paradox: *Tarang Mungole¹*; *Aashish Rohatgi¹*; ¹Pacific Northwest National Laboratory

8:50 AM

Deformation Mode Effects on Austenite Stability of Quenched-and-Partitioned Steel Measured via X-ray Diffraction and Electron Backscattered Diffraction: *Jun Hu¹*; *Ana Araujo¹*; *Kavesary Raghavan¹*; *Grant Thomas¹*; ¹AK Steel Research and Innovation Center

9:10 AM

Mitigation of Edge Cracking during Accumulative Roll Bonding of Aluminum Alloys: *Brady McBride¹*; *Kester Clarke¹*; *Amy Clarke¹*; ¹Colorado School of Mines

9:30 AM

Anisotropic and Time-dependent Continuum Damage Coupled Plasticity Model for Predicting Ductile Fracture of AA 6xxx: *Mustapha Makki¹*; *Georges Ayoub¹*; *Jackie Ayoub¹*; *Andrey Linich²*; *George Luckey²*; *Ghassan Kridli¹*; ¹University of Michigan - Dearborn; ²Ford Motor Company

9:50 AM

Distortional Anisotropic Hardening Model for Describing Complex Bauschinger and Transient Effects in Metal Forming Simulations: *Myoung-Gyu Lee¹*; *Hongjin Choi¹*; *Jinwoo Lee²*; *Hyukjong Bong²*; *Kwang Seon Shin¹*; ¹Seoul National University; ²Korea Institute of Materials Science

Glasses, Optical Materials, and Devices: Current Issues in Science & Technology — Glass-environment Interactions

Program Organizers: Jincheng Du, University of North Texas; S. Sundaram, Alfred University

Wednesday AM
October 2, 2019

Room: A106
Location: Oregon Convention Center

Session Chairs: John Vienna, PNNL; Jincheng Du, University of North Texas; Nicholas Smith, Corning Inc.

8:00 AM Invited

Commonalities in Corrosion Mechanisms across Materials: *Joseph Ryan¹*; ¹Pacific Northwest National Laboratory

8:40 AM Invited

What Does “Chemical Durability” Mean to a Glass Industry and Current Challenges?: *Aize Li¹*; ¹Corning Inc.

9:10 AM Invited

Nuclear Waste Glass Composition Control for Predictable Chemical Durability: *John Vienna¹*; ¹Pacific Northwest National Laboratory

9:40 AM

Interactions between Modifier Identity, Network Connectivity, and Solution pH in Corrosion of Aluminosilicate Glasses: *Nicholas Smith¹*; *Robert Schaut¹*; *Jonathan Icenhower¹*; *Elzbieta Bakowska¹*; *Adama Tandia¹*; ¹Corning Incorporated

10:00 AM Break

10:20 AM Invited

Understanding Water-silicate Glass Interactions from Reactive Potential Based Simulations: *Jincheng Du¹*; ¹University of North Texas

10:50 AM Invited

Water Affects the Properties of Silica and the Silica Surface Affects the Properties of Water: Atomistic Mechanisms: *Jesse Lentz¹*; *Stephen Garofalini¹*; ¹Rutgers University

11:20 AM

Molar Volume of SiOH Estimated from Swelling Strains: *Sheldon Wiederhorn¹*; *Karl Schell²*; *Theo Fett²*; ¹National Institute of Standards and Technology; ²Karlsruhe Institute of Technology(KIT)

WEDNESDAY AM

Global Young Investigators Forum — Global Young Investigator's Forum: Session I

Program Organizers: Kathleen Shugart Cissel, UES Inc; Victoria Christensen, University of California Santa Barbara

Wednesday AM Room: A109
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Kathleen Cissel, MacAulay Brown Inc.; Victoria Christensen, University of California, Santa Barbara; Ashley Hilmas, University of Michigan; Brian Gilmore, Pioneer Natural Resources

8:00 AM Invited

Statistical Mechanical Modeling of Topological Fluctuations and the Adaptability of Glass-forming Systems: *Katelyn Kirchner*¹; John Mauro¹; ¹Pennsylvania State University

8:30 AM

Microstructure and Thermoelectric Properties of Sr_{0.9}La_{0.1}TiO₃ Ceramics with Nano-sized Metal Particles as Additive: *Mengjie Qin*¹; ¹Northwestern Polytechnical University

8:50 AM

Probing the Influence of Defects on the Fundamental Mechanical Properties of Titanium Carbide MXenes via Atomistic Simulations: *Gabriel Plummer*¹; Babak Anasori²; Yury Gogotsi²; Garritt Tucker¹; ¹Colorado School of Mines; ²Drexel University

9:10 AM

Rapid Laser Reactive Sintering of Ceramics for 3D Printing of Protonic Ceramic Energy Devices: *Shenglong Mu*¹; Zeyu Zhao¹; Hua Huang¹; Minda Zou¹; Jincheng Lei¹; Yuzhe Hong¹; Kyle Brinkman¹; Fei Peng¹; Hai Xiao¹; Jianhua Tong¹; ¹Clemson University

9:30 AM

Pair Distribution Function Computed Tomography to Investigate the Local Atomic Structure of Carbonated Alkali-activated Slag Paste: *Eric McCaslin*¹; Claire White¹; ¹Princeton University

9:50 AM

Additive Manufacturing of Ceramics for Electrochemical Oxidative Coupling of Methane: *Shanti Kiran Nayak*¹; Angelica Benavidez¹; Lok-kun Tsui¹; Fernando Garzon¹; ¹University of New Mexico

Grain Boundaries, Interfaces, and Surfaces in Functional Materials: Fundamental Structure-Property-Performance Relationships — Characterization of Interface Properties

Program Organizers: Ming Tang, Rice University; Shen Dillon, University of Illinois, Urbana-Champaign; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute of Technology

Wednesday AM Room: E143
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Chris Marvel, Lehigh University; Shen Dillon, University of Illinois, Urbana-Champaign

8:00 AM Keynote

Measurements of Grain Boundary Energy and Curvature from the Three Dimensional Structure of Polycrystals: *Gregory Rohrer*¹; ¹Carnegie Mellon University

8:40 AM

Ultrahigh Temperature In Situ Micromechanics for Probing Interfacial Properties of Oxides: *Shen Dillon*¹; ¹University of Illinois

9:00 AM

Quantitative Characterization of Grain Growth in Polycrystalline Nickel Using Three-dimensional X-ray Microscopy: *Aditi Bhattacharya*¹; Yu-Feng Shen¹; Gregory S. Rohrer¹; Robert M. Suter¹; Christopher M. Hefferan²; Shiu Fai Frankie Li³; Jonathan Lind³; ¹Carnegie Mellon University; ²RJ Lee Group; ³Lawrence Livermore National Laboratory

9:20 AM

Grain Boundary Chemistry Effects on Local Stress Relaxation: *Prasad Soman*¹; Erik Herbert¹; Stephen Hackney¹; ¹Michigan Technological University

9:40 AM

Observations of Multiple Grain Boundary Complexions in Eu-doped Boron Suboxide: *Christopher Marvel*¹; Kristopher Behler²; Jerry LaSalvia³; Martin Harmer¹; ¹Lehigh University; ²U.S. Army Research Laboratory; SURVICE Engineering; ³U.S. Army Research Laboratory

10:10 AM Break

10:30 AM

Liquid Metal Interactions with Dislocations: Liquid-Metal-Mediated Recrystallization and Other Puzzling Phenomena: Justin Norkett¹; Alec Chu¹; Kit Manchette¹; Courtney Wiley¹; *Victoria Miller*²; ¹North Carolina State University; ²University of Florida

10:50 AM

Characterization of α -alumina and Pt/ α -alumina Interfaces Using Transmission Electron Microscopy and Density Functional Theory: *Arielle Clauser*¹; Kofi Owari Sarfo¹; Al Rise¹; Colin Ophus²; Raquel Giulian³; Liney Árnadóttir¹; Melissa Santala¹; ¹Oregon State University; ²National Center for Electron Microscopy; ³Universidade Federal do Rio Grande do Sul

11:10 AM

Ba Transport in Scandate Cathodes: Evaporation, Adsorption Surface Transport at Operating Temperature: *Mujan Seif*¹; Kerry Baker¹; Huanhuan Bai¹; Thomas Balk¹; Matthew Beck¹; ¹University of Kentucky

Hybrid Organic-Inorganic Materials for Alternative Energy — Energy Storage

Program Organizers: Andrei Jitianu, Lehman College, City University of New York; Lisa Klein, Rutgers University; Lia Stanciu, Purdue University; Mihaela Jitianu, William Paterson University

Wednesday AM Room: E147
October 2, 2019 Location: Oregon Convention Center

Session Chair: Masahide Takahashi, Osaka Prefecture University

8:00 AM Invited

Fabrication and Characterization of Metal Oxide Based Hybrid Materials for High Power Energy Storage: *Chun-Han (Matt) Lai*¹; Christopher Choi¹; Danielle Butts¹; Bruce Dunn¹; ¹University of California, Los Angeles

8:30 AM Invited

Facile Fabrication of Fe Oxide Negative Electrode for Fe-air Battery Application: *Wai Kian Tan*¹; Kenta Asami¹; Go Kawamura¹; Hiroyuki Muto¹; Atsunori Matsuda¹; ¹Toyohashi University of Technology

9:00 AM Invited

Probing Interfacial Reactions in Energy Storage and Conversion Devices Using Synchrotron X-ray Techniques: *Zhenxing Feng*¹; ¹Oregon State University

9:30 AM Invited

Metal-organic Frameworks for Electrochemical Energy Storage Applications: *Min Kyu Song*¹; ¹Washington State University

10:00 AM Break

10:10 AM Invited

Functional Organic-inorganic Hybrids and Inorganic Nanostructures Generated by Infiltration Synthesis: *Chang-Yong Nam*¹; ¹Brookhaven National Laboratory

10:40 AM

Theoretical Modelling of Hydrogen Storage in Graphene-based Electrode Material in a Novel Proton Battery: *Michael Ling*¹; John Andrews²; Saeed Seif Mohammadi²; ¹DST Group; ²RMIT University

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales — Session IV

Program Organizers: M Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen's University; Josh Kacher, Georgia Institute of Technology; Caizhi Zhou, Missouri University of Science and Technology; Lei Cao, University of Nevada, Reno

Wednesday AM
October 2, 2019

Room: G132
Location: Oregon Convention Center

Session Chairs: M Arul Kumar, Los Alamos National Laboratory; Philip Eisenlohr, Michigan State University

8:00 AM Invited

ICME at the Mesoscale: Computational and Experimental Challenges and Opportunity: Stephen Niezgoda¹; Pengyang Zhao¹; Yunzhi Wang¹; *Michael Mills*¹; Connor Slone¹; Supriyo Chakraborty¹; ¹Ohio State University

8:30 AM Invited

Micromechanics – Crystal Plasticity Links for Deformation Twinning: *Yubraj Paudel*¹; Christopher Barrett¹; Haitham El Kadiri¹; ¹Mississippi State University

9:00 AM

Multiscale Modeling of the Elasto-plastic Behavior of Architected and Nanostructured Cu-Nb Composite Wires and Comparison with Neutron Diffraction Experiments: *Tang Gu*¹; David McDowell¹; ¹Georgia Institute of Technology

9:20 AM

Investigating Active Slip Planes in Tantalum using Single Crystal Experiments and Simulations: *Hojun Lim*¹; Jay Carroll¹; Joseph Michael¹; Corbett Battaile¹; Matthew Lane¹; ¹Sandia National Laboratories

9:40 AM

Mechanical Properties of Single Crystal Niobium from Uniaxial Deformation Experiments and Crystal Plasticity Modeling: *Eureka Pai Kulyadi*¹; Jean-Francois Croteau²; Philip Eisenlohr¹; Chaitanya Kale³; Kiran Solanki³; Thomas Bieler¹; Di Kang¹; ¹Michigan State University; ²I-Cube Research ; ³Arizona State University

10:00 AM Break

10:20 AM Invited

Comparison between Experiments and Modeling for Slip Transfer Across Grain Boundaries: *Thomas Bieler*¹; Harsha Phukan¹; Yang Su¹; Chelsea Edge¹; Sarra Haouala²; Martin Crimp¹; Philip Eisenlohr¹; Carl Boehlert¹; Javier Seguardo²; Jonathan Molina²; Javier LLorca²; Marcos Peña-Ortega³; Reza Alizadeh²; ¹Michigan State University; ²IMDEA Materiales; ³Universidad Polytechnica Madrid

10:50 AM Invited

More than Crystal Plasticity: Multiphysics in DAMASK: *Philip Eisenlohr*¹; Aritra Chakraborty¹; Pratheek Shanthraj²; Martin Diehl³; Darren Pagan⁴; Thomas Bieler¹; ¹Michigan State University; ²University of Manchester; ³Max-Planck-Institut für Eisenforschung GmbH; ⁴Cornell University

11:20 AM

In-situ Mapping of Spatially Resolved Stress Fields Associated with Twinning in Bulk HCP Crystals: *M Arul Kumar*¹; Laurent Capolungo¹; Rodney McCabe¹; Wenjun Liu²; Jon Tischler²; Carlos Tome¹; ¹Los Alamos National Laboratory; ²Argonne National Laboratory

11:40 AM

Modeling of Two-phase Polycrystals using a Gradient Crystal Plasticity Theory Including Dissipative Hardening and Energetic Micro-stress: *Paul Christodoulou*¹; Avery Samuel¹; Ricardo Lebensohn²; Frank Zok¹; Irene Beyerlein¹; ¹University of California, Santa Barbara; ²Los Alamos National Laboratory

International Symposium on Ceramic Matrix Composites — CMC I

Program Organizers: Narottam Bansal, National Aeronautics and Space Administration; Jacques Lamon, LMT-Cachan, CNRS; Sung Choi, Naval Air Systems Command; J. P. Singh, US Army Research Laboratory (Retired)

Wednesday AM
October 2, 2019

Room: A103
Location: Oregon Convention Center

Session Chairs: Randall Hay, AFRL; Sung Choi, NAVAIR

8:20 AM Invited

Environmental Durability/Reliability of Ceramic Matrix Composites (CMCs): D. Calvin Faucett¹; Sean Kane¹; Ashlynn Stanley¹; Brandon Thomas¹; *Sung Choi*¹; ¹Naval Air Systems Command

9:00 AM Invited

Environmental Effects on Ceramic Fibers: *Randall Hay*¹; ¹USAF

9:40 AM

Characterization and Modeling of SiC Fiber and SiC Matrix Ceramic Tubular Composites: *Ghatu Subhash*¹; James Nance¹; Hemanth Thandaga¹; Bhavani Sankar¹; Raphael Hafitka¹; ¹University of Florida

10:00 AM Break

10:20 AM Invited

Application of Machine Learning for Reliability Assessment of Advanced Ceramic Matrix Composites: Naohiro Shichijo¹; *Yutaka Kagawa*¹; ¹Tokyo University of Technology

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11:00 AM

Deep Learning CT Image Segmentation for High Throughput Quantitative Analysis of SiC-SiC Ceramic Matrix Composites: *Aly Badran*¹; Mike Marsh²; David Marshall¹; Nicolas Piche³; Zacharie Legault³; Benjamin Provencher³; Ruslana Makovetsky²; ¹University of Colorado Boulder; ²Object Research Systems; ³Polytechnique Montreal

11:20 AM

Life Limiting Behavior of Ceramic Matrix Composites (CMCs) under Cyclic Interlaminar Shear Loading at Elevated Temperatures: *Sean Kane*¹; Ashlynn Stanley¹; Brandon Thomas¹; David Faucett¹; Sung Choi¹; ¹NAVAIR

11:40 AM

Rebounding Velocity of Projectiles in Ceramic Matrix Composites (CMCs) Subjected to Foreign Object Damage (FOD): *David Faucett*¹; Ashlynn Stanley¹; Sean Kane¹; Sung Choi¹; ¹NAVAIR

Joining of Advanced and Specialty Materials XXI — Micro and Nano-Joining / Steel Welding I

Program Organizers: Mathieu Brochu, McGill University; Anming Hu, University of Tennessee; Hiroaki Mori, Osaka University; Yuri Hovanski, Brigham Young University; Darren Barborak, WeldQC Inc; Akio Hirose, Osaka University; Peng He, Harbin Institute of Technology; Zhiyong Gu, University of Massachusetts Lowell; Zhenzhen Yu, Colorado School of Mines

Wednesday AM
October 2, 2019

Room: Portland Ballroom 252
Location: Oregon Convention Center

Session Chairs: Anming Hu, University of Tennessee; Hiroaki Mori, Osaka University; Peng He, Harbin Institute of Technology; Zhiyong Gu, University of Massachusetts Lowell

8:00 AM Invited

Reactive and Non-reactive Nanomultilayers for Advanced Joining Applications: *Lars P.H. Jeurgens*¹; Bastian Rheingans¹; Luchan Lin¹; Sebastian Siol¹; Claudia Cancellieri¹; Jolanta Janczak-Rusch¹; ¹Empa

8:30 AM Invited

Fabricate of Nanomaterials using Microreactor-assisted Printing for Joining: *Chih-Hung Chang*¹; Brian Paul¹; ¹Oregon State University

9:00 AM Invited

Laser Direct-writing of Copper Electrodes and Sensors on Flexible Substrate: *Peng Peng*¹; ¹Beihang University

9:20 AM

Laser Welding of Te Nanowires for Single Nanowire Field Effect Transistor: *Anming Hu*¹; Yongchao Yu¹; ¹University of Tennessee

9:40 AM

Magnetic-assisted Assembly and IR Soldering of Multi-segmented Nanowires for Nanodevices: *Jirui Wang*¹; Chefu Su¹; Hongwei Sun¹; Zhiyong Gu¹; ¹University of Massachusetts Lowell

10:00 AM

Nickel Nanoparticles for Boron-free and Silicon-free Nano-transient Liquid Phase Bonding of Inconel 718: *Anming Hu*¹; Denzel Bridges¹; Raymond Xu²; ¹University of Tennessee Knoxville; ²Rolls-Royce

10:20 AM Break

10:35 AM Invited

Impact Welding of Wrought vs. Additively Manufactured Ultra-high-strength Stainless Steel: *Bert Liu*¹; Anthony Palazotto¹; Anupam Vivek¹; Glenn Daehn¹; ¹Air Force Institute of Technology

11:05 AM

Austenite Transformation in Duplex Stainless Steels under Fast Cooling Rates: Lilia Luengas¹; Eduardo Morales²; Luis Felipe Souza³; *Ivani Bott*¹; ¹Puc-Rio; ²Central University of Las Villas; ³CEFET-RJ

11:25 AM

Influence of the Process Parameters on the Transformation Behaviour of 2205 Duplex Stainless Steel during Laser Beam Welding: Stefan Ulrich¹; *Felix Gemse*¹; Peter Schaafe²; Simon Jahn¹; ¹ifw - Günter-Köhler-Institut für Fügetechnik und Werkstoffprüfung GmbH; ²TU Ilmenau, Institute of Materials Science and Engineering

11:45 AM

Effect of Weld Designs on Steel and Ductile Iron Laser Weld Properties: *Huaxin Li*¹; ¹General Motors

12:05 PM

Study of Variation in Mechanical Properties from Welding Low Density Fe-Mn-Al-C Steel for Armor Applications: *Rishi Kant*¹; John DuPont¹; ¹Lehigh University

Journal of the American Ceramic Society Awards Symposium — JACerS Award Symposium Session I

Program Organizer: William Fahrenholtz, Missouri University of Science and Technology

Wednesday AM
October 2, 2019

Room: A107
Location: Oregon Convention Center

Session Chair: William Fahrenholtz, Missouri University of Science and Technology

8:00 AM Introductory Comments Bill Fahrenholtz

8:10 AM Invited

Creep and Relaxation of Cement Paste Caused by Stress-induced Dissolution of Hydrated Solid Components: *Zachary Grasley*¹; Xiaodan Li²; Jeffrey Bullard³; Pan Feng⁴; ¹Texas A&M University; ²Oklahoma State University; ³NIST; ⁴Southeast University

8:40 AM Invited

Titanate Based Glass-ceramics for Zirconium Immobilization: *Yingjie Zhang*¹; Linggen Kong¹; Tao Wei¹; Inna Karatchevtseva¹; Zhaoming Zhang¹; Daniel Gregg¹; ¹Australian Nuclear Science & Technology Organisation

9:10 AM Invited

Increased UV Absorption of Natural Hydroxyapatite-based Sunscreen through Laser Ablation in Liquid: Clara Piccirillo¹; Mónica Fernández-Arias²; Mohamed Boutinguiza²; David Tobaldi³; Jesús del Val²; Maria Pintado⁴; *Juan Pou*²; ¹Institute of Nanotechnology, CNR NANOTEC; ²University of Vigo; ³CICECO, University of Aveiro; ⁴Escola Superior de Biotecnologia, Universidade Católica Portuguesa.

9:40 AM Invited

Conductivity of Iron-doped Strontium Titanate in the Quenched and Degraded States: *Elizabeth Dickey*¹; Daniel Long¹; Jonathon Baker¹; Preston Boyes¹; Douglas Irving¹; ¹North Carolina State University

10:10 AM Break

10:30 AM Invited

Microstructure-conductivity Relationship of Na₃Zr₂Si₂PO₁₂: *Sahir Naqash*¹; Frank Tietz¹; Doris Sebold¹; Olivier Guillon¹; ¹Forshungszentrum Juulich

WEDNESDAY AM

11:00 AM Invited

High-performance Energy Harvesting Piezoceramics with High Depolarization Temperature: Haiyan Zhao¹; Jing Fu¹; Mupeng Zheng¹; Mankang Zhu¹; Yudong Hou¹; ¹Beijing University of Technology

11:30 AM Invited

Polar Domain Structural Evolution under Electric Field and Temperature in the (Bi_{0.5}Na_{0.5})TiO₃-0.06BaTiO₃ Piezoceramics: Nan Zhang¹; Jinyan Zhao¹; Wei Ren¹; Gang Niu¹; Lingyan Wang¹; Zuo-Guang Ye²; ¹Xi'an Jiaotong University; ²Simon Fraser University

Light Metal Technology — Magnesium Technology

Program Organizers: Xiaoming Wang, Purdue University; Alan Luo, Ohio State University; Kumar Sadayappan, Canmet MATERIALS

Wednesday AM
October 2, 2019

Room: D138
Location: Oregon Convention Center

Session Chair: Alan Luo, Ohio State University

8:00 AM Invited

Shear Assisted Processing and Extrusion (ShAPE): Tim Skszek¹; Scott Whalen²; ¹Magna International Inc.; ²Pacific Northwest Laboratory

8:20 AM

A Study of Improvement of Mechanical Properties of Magnesium Alloys through Rolling Confinement: Pavitra Krishnan¹; Zhigang Xu²; Sergey Yarmolenko²; Jagannathan Sankar²; Laszlo Kecskes³; Qiuming Wei¹; ¹University of North Carolina Charlotte; ²N.C. A&T State University; ³HEMI, Johns Hopkins University

8:40 AM

Ultra-high Strain Rate Processing of Magnesium Alloys: Microstructure Evolution and Enhanced Mechanical Properties: Bo Mao¹; Yiliang Liao¹; Bin Li¹; ¹University of Nevada, Reno

9:00 AM

Development Strategies of Next Generation Magnesium Alloy Sheets: Dietmar Letzig¹; Jose Victoria-Hernandez¹; Jan Bohlen¹; Gerrit Kurz¹; Sangbong Yi¹; ¹Magnesium Innovation Centre (MagIC), Helmholtz-Zentrum Geesthacht

9:20 AM

Effect of Alloying Element on Deformation Behavior of Binary Magnesium Alloys: Jihyun Hwang¹; Byeong-Chan Suh²; Jae H. Kim¹; Byeong-Joo Lee¹; H. S. Kim³; Nack J. Kim¹; ¹Pohang University of Science and Engineering; ²Korea Institute of Materials Science

9:40 AM

Improving the Tribological Performance of Magnesium Alloys by Laser Shock Peening: Bo Mao¹; Arpith Siddaiah¹; Xing Zhang¹; Bin Li¹; Pradeep Menezes¹; Yiliang Liao¹; ¹University of Nevada, Reno

10:00 AM Break

10:20 AM

Grain Refinement of Magnesium Cast Alloys: Norbert Hort¹; Sihang You¹; Jiang Gu¹; Yuanding Huang¹; ¹Helmholtz-Zentrum Geesthacht

10:40 AM Invited

Production of High-quality Aircraft Magnesium Alloys Castings Using Carbon-containing Materials: Vadim Shalomeev¹; Valeriy Naumik¹; Nikita Aikin¹; Sergei Sheyko²; ¹Zaporozhye National Technical University; ²Zaporizhzhia National University

11:00 AM Invited

Understanding the Mechanical Properties of Mg Alloys: A Multi-scale Study: Zongrui Pei¹; ¹National Energy Technology Laboratory

11:20 AM Invited

Novel Al-Ti-C and Al-C Grain Refinement of AZ91D Mg Alloys: Tyler Davis¹; Lukas Bichler¹; Kristian Mackowiak¹; ¹University of British Columbia - Okanagan Campus

Materials for Nuclear Applications — Carbide and Advanced Reactor Materials

Program Organizers: Philip Edmondson, Oak Ridge National Laboratory; Yutai Katoh, Oak Ridge National Laboratory; Jake Amoroso, Savannah River National Laboratory; Levi Gardner, University of Utah; Amy Gandy, University of Sheffield; Karl Whittle, University of Liverpool; Monica Ferraris, Politecnico di Torino

Wednesday AM
October 2, 2019

Room: E148
Location: Oregon Convention Center

Session Chair: Xunxiang Hu, Oak Ridge National Laboratory

8:00 AM Invited

Exploring TRISO Layer Properties and Performance for Multiple Reactor Concepts: Rachel Seibert¹; Tyler Gerczak¹; ¹Oak Ridge National Laboratory

8:40 AM

Computational Studies of Environmental Degradation of Silicon Carbide: Izabela Szlufarska¹; Jianqi Xi¹; Cheng Liu¹; ¹University of Wisconsin - Madison

9:00 AM

Unveiling SiC/SiC CMC Cladding Failure Mechanisms and Hermetic Performance with In-situ 3D-Digital Image Correlation: Clifton Bumgardner¹; Frederick Heim¹; Xiaodong Li¹; ¹University of Virginia

9:20 AM

High-entropy Carbide Ceramics for Extreme Environments: Fei Wang¹; Xueliang Yan¹; Yongfeng Lu¹; Michael Nastasi¹; Bai Cui¹; ¹University of Nebraska Lincoln

9:40 AM

Temperature Impacts on Damage Response in Mixed Carbides: Karl Whittle¹; Glyn Cobourne¹; Philip Edmondson²; ¹University of Liverpool; ²Oak Ridge National Laboratory

10:00 AM Break

10:20 AM Invited

Development and Performance of High Temperature Irradiation Resistant Thermocouples: Brian Jaques¹; Richard Skifton²; Lan Li¹; Beck Perrine¹; Scott Riley¹; Ember Sikorski¹; ¹Boise State University; ²Idaho National Laboratory

11:00 AM

Thermophysical Properties of Binary Cl & F Compositions for Next Generation Molten Salt Reactors: Jason Lonergan¹; Dallas Reilly¹; Sayandev Chatterjee¹; Bruce McNamara¹; ¹Pacific Northwest National Laboratory

11:20 AM

Using ACRT with MVB Furnace to Achieve Low-cost CZT: Seth McPherson¹; Saketh Kakkireni¹; Jedidiah McCoy¹; Santosh Swain¹; Kelvin Lynn¹; ¹Washington State University

Nanostructured Materials under Extreme Environments — Mechanisms, Microstructure Evolution, and Mechanical Properties of Nanostructured Materials II

Program Organizers: Jin Li, Purdue University; Assel Aitkaliyeva, University of Florida; Youxing Chen, University of North Carolina at Charlotte; Yue Liu, Shanghai Jiao Tong University; Shuai Shao, Louisiana State University

Wednesday AM
October 2, 2019

Room: D133
Location: Oregon Convention Center

Session Chairs: Yue Liu, Shanghai JiaoTong University; Shuai Shao, Louisiana State University

8:00 AM Invited

The Elusive Toughness of Nanocrystalline Alloys: *Brad Boyce*¹; Nathan Heckman¹; Khalid Hattar¹; Christopher Barr¹; Fadi Abdeljawad²; Stephen Foiles¹; ¹Sandia National Laboratories; ²Clemson University

8:30 AM Invited

On Scratching Behavior of Ceramic/Metal Nanolaminates: *Iman Salehina*¹; Mesbah Uddin¹; Aaron McKeown¹; Michael Zawadzki¹; ¹Northern Illinois University

9:00 AM

Compressive Behavior of Accumulative Roll Bonded Mg/Al Alloys under Confinement: *Pavitra Krishnan*¹; Zhigang Xu²; Sergey Yarmolenko²; Jagannathan Sankar²; Laszlo Keeskes³; Qiuming Wei¹; ¹University of North Carolina Charlotte; ²NC A&T University; ³HEMI, Johns Hopkins University

9:20 AM Invited

High Throughput Nanoindentation - Microstructure Correlation at Elevated Temperatures: *Eric Hintsala*¹; Youxing Chen²; Jacob Noble¹; Jordan Weaver³; Bartosz Nowakowski¹; Douglas Stauffer¹; Nathan Mara⁴; ¹Bruker Nano Surfaces; ²University of North Carolina Charlotte; ³National Institute of Standards and Technology; ⁴University of Minnesota

9:50 AM Invited

Interface-dominated Plasticity in Metallic Nanostructured Materials: *Jiangwei Wang*¹; Qi Zhu¹; Guang Cao¹; Siyuan Wei¹; ¹Zhejiang University

10:10 AM Break

10:30 AM Invited

Study of Pseudomorphically Transformed bcc Mg in Mg/Nb Multilayer Nanocomposites under Extreme Conditions of Pressure, Temperature and High Strain Rates: Manish Jain¹; Irene Beyerlein²; Marko Knezevic³; Nenad Velisavljevic⁴; Nathan Mara⁵; Johann Michler⁶; *Siddhartha Pathak*¹; ¹University of Nevada, Reno; ²University of California, Santa Barbara; ³University of New Hampshire; ⁴Los Alamos National Laboratory; ⁵University of Minnesota, Minneapolis; ⁶Empa, Swiss Federal Laboratories for Materials Science and Technology

11:00 AM Invited

The Correlation between the Irradiation Microstructure and Nanoindentation Properties of the Advanced Stainless Steel D9: *Tianyi Chen*¹; Lingfeng He²; Mack Cullison¹; Jatuporn Burns³; Yaqiao Wu³; Lizhen Tan⁴; ¹Oregon State University; ²Idaho National Laboratory; ³Biose State University; ⁴Oak Ridge National Laboratory

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry — Session II

Program Organizers: Navin Manjooan, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Wednesday AM
October 2, 2019

Room: C126
Location: Oregon Convention Center

Session Chairs: Hang Yu, Virginia Polytechnic Institute and State University; Gary Pickrell, Virginia Tech; Navin Manjooan, Solve Technology and Research, Inc.

8:00 AM Keynote

Solid-state Additive Manufacturing of Metal Matrix Nanocomposites Using Additive Friction Stir Deposition: *Hang Yu*¹; ¹Virginia Tech

8:40 AM

Electrical Properties of Samarium Substituted Cobalt Nano- ferrites for Energy Applications: *Ravinder Dacheppalli*¹; ¹Osmania University

9:00 AM

Fabrication of a Helium Ion Machined Nanochannel Device: *Kate Klein*¹; Lindsey Barner²; James McLaurin¹; Javel Wilson¹; Andras Vldar³; ¹University of the District of Columbia; ²University of Washington; ³National Institute of Standards and Technology

9:20 AM

Electrochemical and Structural Study of 10GDC Electrolyte for SOFC Applications at Intermediate Temperature via Conventional Sintering: *Shabana Parvin Shaikh*¹; ¹SP Pune University

9:40 AM

Elucidating the Power of Nanoinclusion and Porous Site Scattering Mechanisms in Enhancing Thermoelectric ZT: *Seyed Aria Hosseini*¹; Jackson Harter²; Devin Coleman¹; Lorenzo Mangolini¹; Todd Palmer²; Alex Greaney¹; ¹University of California, Riverside; ²Oregon State University

10:00 AM Break

10:20 AM

Green Synthesis of Functionalized Nanoresins for Effective and Sustainable Water Purification: *Abhispa Sahu*¹; Jordan C. Poler¹; ¹University of North Carolina, Charlotte

10:40 AM Concluding Comments

Next Generation Biomaterials — Next Generation Biomaterials IV

Program Organizers: Roger Narayan, University of North Carolina; Federico Rosei, INRS Centre for Energy, Materials and Telecommunications

Wednesday AM
October 2, 2019

Room: C122
Location: Oregon Convention Center

Session Chairs: Tanveer Tabish, University of Exeter; Annabel Braem, KU Leuven; Xanthippi Chatzistavrou, Michigan State University

8:00 AM Invited

Additively Manufactured 316L Stainless Steel for Biomedical Applications: *Waseem Haider*¹; Jahangir Khan Lodhi¹; ¹Central Michigan University

8:20 AM Invited

Anti-infective Strategies for Next Generation Dental Implants: *Annabel Braem*¹; ¹KU Leuven Department of Materials Engineering

8:40 AM Invited

Hierarchical Hybrid Carbon Nano-structures as Tissue Engineering Scaffolds: Understanding Cell-scaffold Interaction: *Soham Parikh*¹; Wenhu Wang¹; Luping Huang¹; Debra Mayes¹; Sharmila Mukhopadhyay¹; ¹Wright State University

9:00 AM Invited

New Insights in Calcium Phosphate Biomineralization Unraveled by Real Time Nanoscale LTEM: *Tolou Shokuhfar*¹; ¹University of Illinois at Chicago

9:20 AM

Novel Hot-warm Rolled Zn-0.8Li Alloy with Superior Mechanical Properties and Ideal Degradation Rate for Biomedical Stents: *Luning Wang*¹; ¹University of Science and Technology Beijing

9:40 AM Invited

Sol-gel Derived Glass-ceramic with Advanced Antibacterial and Bioactive Properties: *Xanthippi Chatzistavrou*¹; Natalia Pajares; Adam Marsh¹; Logan Soule¹; Nathan Mellott¹; Neal Hammer¹; Kurt Hankenson¹; ¹Michigan State University

10:00 AM Break**10:20 AM Invited**

Biopolymer-derived Triboelectric Devices for Self-powered Human-integrated Sensors and Interfaces: *Wenzhuo Wu*¹; ¹Purdue University

10:40 AM

Multidimensional Analysis on Bioabsorbable Zn-Ag-based Alloys for Stent Applications: *Ehsan Mostaed*¹; Malgorzata Sikora-Jasinska¹; Morteza Shaker Ardakani¹; Ali Mostaed¹; Jaroslaw Drelich¹; ¹Michigan Technological University

11:00 AM Invited

Optically Monitored Photothermia within the Biological Windows: Plasmonic Heating and Luminescent Nanothermometry: *Marta Quintanilla*¹; I. García²; I. de Lázaro³; S. Vranic³; M. Henriksen-Lacey²; A. Sánchez-Iglesias²; K. Kostarelos³; L.M. Liz-Marzán²; ¹Bionanoplasmonics Laboratory, CIC biomaGUNE and CIBER-BBN/Universidad Autónoma de Madrid; ²Bionanoplasmonics Laboratory, CIC biomaGUNE and CIBER-BBN; ³NanomedicineLab, The University of Manchester

11:20 AM Invited

Graphene Nanostructures as Cancer Theranostic Probes: A Positive Rescue for Negative Margins: *Tanveer Tabish*¹; ¹University of Exeter

11:40 AM Invited

Synthesis, Characterization and Solubility Analysis of Amorphous SiO₂-CaONa₂O-P₂O₅ Scaffolds for Hard Tissue Repair: S. Chon¹; L. Piraino¹; Sahar Mokhtari¹; E.A. Krull¹; A. Coughlan¹; Y. Gong¹; Nathan Mellott¹; Timothy Keenan¹; *Anthony Wren*¹; ¹Alfred University

Phase Transformations in Ceramics: Science and Applications — Experimental Studies on Structure and Control II

Program Organizers: Pankaj Sarin, Oklahoma State University; Waltraud Kriven, University of Illinois at Urbana-Champaign; Sanjay Khare, University of Toledo; Yu Zhong, Worcester Polytechnic Institute

Wednesday AM
October 2, 2019

Room: A104
Location: Oregon Convention Center

Session Chair: Pankaj Sarin, Oklahoma State University

8:00 AM Invited

Precipitation in Metal-ceramic Systems under Reducing Conditions: *Ivar Reimanis*¹; Dylan Jennings¹; ¹Colorado School of Mines

8:30 AM

In-situ Observations of Phase Transformations on Individual Particles of a Cu/Fe Oxygen Carrier during High-temperature Oxidation and Reduction Cycles: *William Nealley*¹; Anna Nakano²; Jinichiro Nakano²; Melissa Santala³; James Bennett⁴; ¹National Energy Technology Laboratory - U.S. Department of Energy, Oak Ridge Institute for Science and Education, Oregon State University; ²National Energy Technology Laboratory - U.S. Department of Energy, Leidos Research Support Team; ³Oregon State University; ⁴National Energy Technology Laboratory - U.S. Department of Energy

8:50 AM

Thermal Expansion and Phase Transformation Mechanism in the Lanthanide Di-titanate System: *Benjamin Hulbert*¹; Kuo-Pin Tseng¹; Scott McCormack¹; Waltraud Kriven¹; ¹University of Illinois, Urbana-Champaign

9:10 AM

Ferroelectric Phase Transition in Tungsten Trioxide Gas Sensors: *Owen Abe*¹; Perena Gouma¹; ¹The Ohio State University

9:30 AM Invited

Phase Transitions in Hollandite Oxides with Nanoscale Chemical Ordering: *Scott Misture*¹; Robert Koch¹; Jake Amoroso²; Kyle Brinkman³; Mingyang Zhao³; ¹Alfred University; ²Savannah River National Laboratory; ³Clemson University

10:00 AM Break**10:20 AM**

Phase Transformations in High-entropy, Lanthanide Oxides: *Kuo-Pin Tseng*¹; Waltraud Kriven¹; Ming-Hung Tsai²; ¹University of Illinois Urbana Champaign; ²National Chung Hsing University, Taiwan

10:40 AM

Changes to the Local Environment during the Entropic Phase Transformation in High Entropy Oxides: *Alexander Dupuy*¹; Elke Arenholz²; I-Ting Chiu³; Padraic Shafer²; Yayoi Takamura³; Julie Schoenung¹; ¹University of California, Irvine; ²Lawrence Berkeley National Laboratory; ³University of California, Davis

11:00 AM Invited

Pseudo-single Crystal Growth of Cobalt Dtitanate, an Entropy Stabilized Compound: Kevin Anderson¹; Anit Giri²; Richard Vinci¹; *Helen Chan*¹; ¹Lehigh University; ²Army Research Laboratory

Powder Metallurgy of Light, Reactive and Other Non-ferrous Metals — Powder Metallurgy of Titanium, Aluminium, Magnesium and Calcium I

Program Organizers: Ma Qian, Royal Melbourne Institute of Technology; Zak Fang, University of Utah; David Yan, San Jose State University; James Paramore, U.S. Army Research Laboratory

Wednesday AM
October 2, 2019

Room: D135
Location: Oregon Convention Center

Session Chairs: James Paramore, U.S. Army Research Laboratory; Gang Chen, University of Science and Technology Beijing

8:00 AM Invited

Deformation Behavior and Microstructural Evolution of Hydrogen-sintered Ti-6Al-4V during Hot Compression Tests: Austin Mann¹; *Pei Sun*²; Omar Kergaye²; Wyatt McNeill²; Ali Yousefiani¹; Z. Zak Fang²; ¹The Boeing Company; ²University of Utah

8:30 AM Keynote

Advances in Titanium Research & Technology in Australia: *Stefan Gulizia*¹; Leon Prentice¹; ¹CSIRO Manufacturing

9:10 AM Invited

Analysis of Grain Boundary a Phase in Hydrogen Sintered Powder Metallurgy Ti-6Al-4V: *Matthew Dunstan*¹; James Paramore¹; Brady Butler¹; Z. Zak Fang²; Jonathan Ligda¹; ¹US Army Research Laboratory; ²University of Utah

9:40 AM

Low Temperature Sintering of Ti6Al4V as a Promising Route to Design Titanium based Composites: *Jennifer Bustillos*¹; Cheng Zhang¹; Pranjal Nautiyal¹; Archana Loganathan¹; Xiaolong Lu²; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University; ²Soochow University

10:00 AM Break

10:20 AM Invited

Mechanical Properties of HIP'd HSPT Sintered Ti-6Al-4V: *Wyatt McNeill*¹; Pei Sun¹; Omar Kergaye¹; Zak Fang¹; James Paramore¹; Matt Dunstan¹; ¹University of Utah

10:50 AM Invited

Design and Fabrication of Strong and Ductile (tensile) Powder Metallurgy Titanium Metal Matrix Composites: *Ma Qian*¹; Shudong Luo¹; Tingting Song¹; Bing Liu²; ¹Royal Melbourne Institute of Technology; ²Chongqing University of Arts and Sciences

11:20 AM Invited

Gas Atomization Processing of Calcium Powder with In situ Passivation: *Iver Anderson*¹; Charles Czahor¹; Dustin Hickman¹; Trevor Riedemann¹; ¹Iowa State University / Ames Laboratory

PSDK XIV: Phase Stability and Diffusion Kinetics — Diffusion and Kinetics

Program Organizers: Michael Gao, National Energy Technology Laboratory; Hans Seifert, Karlsruhe Institute of Technology; Zi-Kui Liu, Pennsylvania State University; Fan Zhang, CompuTherm LLC; Richard Otis, Jet Propulsion Laboratory; Aurelien Perron, Lawrence Livermore National Laboratory

Wednesday AM

Room: E144

October 2, 2019

Location: Oregon Convention Center

Session Chairs: Dane Morgan, University of Wisconsin-Madison; Yongho Sohn, University of Central Florida

8:00 AM

Experimental Determination of Quinary Interdiffusion Coefficients in Fe-Ni-Co-Cr-Mn System: *Vivek Verma*¹; Kaustubh Kulkarni¹; ¹Indian Institute of Technology Kanpur

8:20 AM

Closed Form Solution for the Analysis of Compact Interdiffusion Couples: *Irina Belova*¹; Mohammad Afikuzaman¹; Tanvir Ahmed¹; Graeme Murch¹; ¹University of Newcastle

8:40 AM

Grain Boundary Chemistry and Transport in Nanocrystalline Alloys: Insight from Diffusion Triples: *Pralav Shetty*¹; Francisco Andrade Chavez²; *Jessica Krogsstad*²; ¹Georgia Institute of Technology; ²University of Illinois at Urbana-Champaign

9:00 AM

A New and Exact Formalism for Describing Diffusion of Solid Binary Alloys in a Temperature Gradient: *Irina Belova*¹; Zi-Kui Liu²; *Graeme Murch*¹; ¹University of Newcastle; ²Pennsylvania State University

9:20 AM Invited

Phase Reversion Kinetics of Thermally Decomposed (α + γ') Phases to γ -phase in U – 10 wt.% Mo Alloy: Ryan Newell¹; Abhishek Mehta¹; Youngjoo Park¹; Dennis Keiser²; *Yongho Sohn*¹; ¹University of Central Florida; ²Idaho National Laboratory

9:40 AM

Pushing Direct Experimental Measurement of Crystallization Kinetics in Phase Change Materials using Multiple Microscopic Techniques: Christopher Barr¹; Victoria Bird²; Geoffrey Campbell³; Khalid Hattar¹; Isak McGieson²; Anthony Monterrosa¹; Bryan Reed⁴; Al Rise²; Shalini Tripathi²; *Melissa Santala*²; ¹Sandia National Laboratories; ²Oregon State University; ³Lawrence Livermore National Laboratory; ⁴Integrated Dynamic Electron Solutions Inc.; ⁵University of Connecticut

10:00 AM Break

10:20 AM

A Kinetic Model for Interaction of Iron (II) Oxide with Pure Alumina Refractory under Flash Ironmaking Conditions: *Rahul Sarkar*¹; Hong Yong Sohn¹; ¹University of Utah

10:40 AM

Composition-dependent Precipitation Kinetics in Fe-Mn-Al-C Alloys: *Krista Limmer*¹; Daniel Field¹; Laura Bartlett²; Katherine Sebeck³; ¹CCDC Army Research Laboratory; ²Missouri S&T; ³CCDC Ground Vehicle Systems Center

11:00 AM

Optimization of Mobility Parameters based on the Relationship to Composition Profiles: *Kil-Won Moon*¹; Maureen Williams¹; Carelyn Campbell¹; ¹National Institute of Standards & Technology

11:20 AM Invited

High-throughput Ab Initio and Machine Learning for Diffusivity Databases: *Dane Morgan*¹; Haijin Lu¹; Ryan Jacobs¹; Henry Wu¹; ¹University of Wisconsin - Madison

Sintering and Related Powder Processing Science and Technologies — Characterization of Sintering

Program Organizers: Wolfgang Rheinheimer, Purdue University; Zachary Cordero, Rice University; Ricardo Castro, University of California, Davis; Eugene Olevsky, San Diego State University

Wednesday AM

Room: E142

October 2, 2019

Location: Oregon Convention Center

Session Chairs: Zachary Cordero, Rice University; Jin Li, Purdue University

8:00 AM Invited

Glass Sealing of Solid Oxide Fuel Cells (SOFC): Benjamin Ehreiser¹; *Michael J. Hoffmann*¹; ¹Karlsruhe Institute for Technology (KIT)

8:30 AM Invited

Microstructural Control during Sintering of WC-Co: *Paul Prichard*¹; ¹Kennametal Inc

9:00 AM

Simultaneous Multiple Complex Net Shape Components Production by 3D Printing and Spark-Plasma Sintering: *Eugene Olevsky*¹; Elisa Torresani¹; Geuntak Lee¹; Charles Maniere¹; ¹San Diego State University

9:20 AM

Influence of Grain Size on the Entropic Transformation in High Entropy Oxides: *Alexander Dupuy*¹; Xin Wang¹; Julie Schoening¹; ¹University of California, Irvine



9:40 AM

Sintering Behavior and Ionic Conductivity of $\text{Li}_{1.5}\text{Al}_{0.5}\text{Ti}_{1.5}(\text{PO}_4)_3$ Synthesized with Different Precursors: *Alexandra von der Heiden*¹; Bambar Davaasuren¹; Frank Tietz²; ¹Forschungszentrum Juelich GmbH; ²Helmholtz-Institute Münster

10:00 AM Break

10:20 AM

Reactive Sintering and Templated Grain Growth of CuO-doped PIN-PMN-PT Ceramics: *Beecher Watson*¹; Michael Brova¹; Scott Misture²; Mark Fanton¹; Richard Meyer¹; Gary Messing¹; ¹Pennsylvania State University; ²Alfred University

10:40 AM

In-situ Monitoring of Interfaces Being Formed as a Function of Pressure, Temperature and Composition: *Thomas Rudzik*¹; Rosario Gerhardt¹; ¹Georgia Institute of Technology

11:00 AM

In-situ Observation of the Internal Structure of an Alumina Green Body during Sintering by Optical Coherence Tomography: *Junichi Tatami*¹; Fumika Sakamoto¹; Takuma Takahashi²; Motoyuki Iijima¹; ¹Yokohama National University; ²Kanagawa Institute of Industrial Science and Technology

11:20 AM

3D Multiscale-imaging of Processing-induced Defects Formed during Sintering of Alumina: *Gaku Okuma*¹; Shuhei Watanabe¹; Kan Shinobe¹; Norimasa Nishiyama¹; Fumihiro Wakai¹; Akihisa Takeuchi²; Kentaro Uesugi²; Satoshi Tanaka³; ¹Tokyo Institute of Technology; ²Japan Synchrotron Radiation Research Institute; ³Nagaoka University of Technology

11:40 AM

Visualization of Sintering in Particle-based Ink Printed Ni Scaffolds via In Situ X-ray Tomography: *Safa Khodabakhsh*¹; *Ashley Paz y Puente*¹; ¹University of Cincinnati

Surface Properties of Biomaterials — Composite Biomaterials

Program Organizers: Ryan Bock, SINTX Technologies; Jason Langhorn, DePuy Synthes Joint Reconstruction; Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University; Mangal Roy, Indian Institute of Technology-Kharagpur; Venu Varanasi, University of Texas at Arlington

Wednesday AM
October 2, 2019

Room: C121
Location: Oregon Convention Center

Session Chair: Jason Langhorn, DePuy Synthes Joint Reconstruction

8:00 AM Invited

Multiferroic Particle Reinforced Injectable Bone Cement: In Vitro Bone Cell Differentiation and Mineralization: Chandra Khatua¹; Somoshree Sengupta¹; Biswanath Kundu¹; Dipten Bhattacharya¹; *Vamsi Balla*²; ¹CSIR-Central Glass & Ceramic Research Institute; ²University of Louisville

8:40 AM Invited

Bioactive Silicon Nitride Dental Implant: *Wei Xia*¹; Håkan Engqvist¹; ¹Uppsala University

9:00 AM

PEO/Sol-gel Composite Coating on a Mg-based Alloy Towards Degradation-controlled Orthopedic Implants: *Hamdy Ibrahim*¹; David Dean²; Alan Luo²; Rigoberto Advincula³; Mohammad Elahinia⁴; ¹University of Tennessee, Chattanooga; ²The Ohio State University; ³Case Western Reserve University; ⁴The University of Toledo

9:20 AM

Effects of Sr Doping on Biodegradation and Bone Regeneration of Magnesium Phosphate Bioceramics: *Kaushik Sarkar*¹; Vinod Kumar²; Samit Nandi²; Mangal Roy¹; ¹Indian Institute of Technology; ²West Bengal University of Animal & Fishery Sciences

9:40 AM

In Vitro Corrosion and Cytocompatibility behaviour of Bioactive Glass Reinforced Magnesium Composite Fabricated by Hot Press Sintering: *Sourav Dutta*¹; Sanjay Gupta¹; Mangal Roy¹; ¹Indian Institute of Technology Kharagpur

10:00 AM

Soy Isoflavones Incorporated 3D Printed Bone Scaffolds with In Vitro Chemopreventive, Osteogenic and In Vivo Anti-Inflammatory Activity: *Naboneeta Sarkar*¹; Susmita Bose¹; ¹Washington State University

Surface Protection for Enhanced Materials Performance: Science, Technology, and Application — Thermal Barrier Coatings / Ceramic Coatings Formed by Aerosol Deposition I

Program Organizers: Kang Lee, NASA Glenn Research Center; Jun Song, McGill University; Yutaka Kagawa, University of Tokyo; Rodney Trice, Purdue University; Daniel Mumm, University of California, Irvine; Mitchell Dorfman, Oerlikon Metco (US) Inc.; Christian Moreau, Concordia University; Emmanuel Boakye, UES Inc.; Edward Gorzkowski, Naval Research Laboratory; Scooter Johnson, Naval Research Laboratory; Stephen Yue, McGill University; Richard Chromik, McGill University

Wednesday AM
October 2, 2019

Room: D137
Location: Oregon Convention Center

Session Chairs: Daniel Mumm, University of California, Irvine; Kang Lee, NASA Glenn Research Center; Edward Gorzkowski, Naval Research Laboratory

8:00 AM Invited

Extreme Heat Shielding, Flame Resistance and Anti-corrosion Behavior of Clay-based Nanocoatings: *Jaime Grunlan*¹; ¹Texas A&M University

8:30 AM Invited

Failure of Zirconia Thermal Barrier Coatings on Planar and Cylindrical Geometries: *Edward Gildersleeve*¹; Sanjay Sampath¹; ¹Center for Thermal Spray Research

9:00 AM

Improved Performance of Suspension Plasma Sprayed Thermal Barrier Coatings (TBCs): *Robert Vassen*¹; Dapeng Zhou¹; Christoph Vorkötter¹; ¹Forschungszentrum Jülich GmbH

9:20 AM

Luminescence Characterization of Temperature Sensitive Phosphor Doped Thermal Barrier Coatings: Quentin Fouliard¹; Sandip Haldar¹; Alexander Olvera¹; David Moreno²; Mary McCay²; Ramesh Subramanian³; Bauke Heeg⁴; Ranajay Ghosh¹; *Seetha Raghavan*¹; ¹University of Central Florida; ²Florida Institute of Technology; ³Siemens Energy; ⁴Lumium Optical Precision Measurement Solutions

9:40 AM

Modeling and Validation of Land-based Gas Turbine TBC Lifetime: *Kenneth Kane*¹; Bruce Pint¹; ¹ORNL

10:00 AM Break

10:20 AM Invited

Mach 0.3 Burner Test of YSZ-Ti2AlC at 1300°C: *James Smialek*¹; Michael Cuy²; Bryan Harder²; Anita Garg²; Richard Rogers²; ¹NASA Glenn Research Center, retired; ²NASA Glenn Research Center

10:50 AM Invited

Surface Modification of Yttria Stabilized Zirconia Thermal Barrier Coatings Produced by Freeze Casting: *Said Bakkar*¹; Mangesh Pantawane¹; Anindya Ghoshal²; Michael Walock²; Marcus Young¹; Diana Berman¹; Narendra Dahotre¹; Samir Aouadi¹; ¹University of North Texas; ²U.S. Army Research Laboratory

11:20 AM Invited

Protective Ceramic Coatings by Dry Aerosol Deposition of Extraterrestrial Regolith: *Paul Fuierer*¹; Robert Calvo¹; Gregory Strobel¹; ¹New Mexico Institute of Mining & Technology

11:50 AM

Assessment of Microwave Magnetic Properties of Barium Hexaferrite Films Formed by Aerosol Deposition: *Scooter Johnson*¹; Dong-Soo Park²; Sanghoon Shin¹; Edward Gorzkowski¹; ¹Naval Research Laboratory; ²Korean Institute of Materials Science

Synthesis, Characterization, Modeling and Applications of Functional Porous Materials — Porous Materials I

Program Organizers: Lan Li, Boise State University; Winnie Wong-Ng, National Institute of Standards and Technology (NIST); Kevin Huang, University of South Carolina

Wednesday AM
October 2, 2019

Room: D139
Location: Oregon Convention Center

Session Chairs: Winnie Wong-Ng, National Institute of Standards and Technology; Matthew Lawson, Boise State University

8:00 AM Introductory Comments

8:05 AM Invited

AntiDual-layer MOF Composite Membranes with Tunable Gas Transport Properties for Post-combustion CO₂ Separation: *David Hopkinson*¹; Sameh Elsaidi¹; Surendar Venna¹; Mona Mohamed²; Michael Gipple¹; ¹Doe/Netl; ²University of Pittsburgh

8:25 AM Invited

Understanding the Influence of Novel CO₂-responsive Phase Changing Fluids on Directing Flow Through Geo-mimicked and Natural Porous Materials for Energy Recovery: *Greeshma Gadikota*¹; Hassnain Asgar¹; ¹University of Wisconsin, Madison

8:45 AM Invited

A ScSZ-MC Dual-phase Membrane for Pre-combustion CO₂ Capture: *Shichen Sun*¹; Kevin Huang¹; ¹University of South Carolina

9:05 AM Invited

Gas-diffusion Layer Properties and Tin Electrodeposition Parameters for Carbon Dioxide Reduction Electrocatalysts: *Brian Skinn*¹; McLain Leonard²; Dan Wang¹; Antoni Forner-Cuenca²; Stephen Snyder¹; Fikile Brushett²; EJ Taylor¹; ¹Faraday Technology, Inc.; ²Department of Chemical Engineering, Massachusetts Institute of Technology

9:25 AM Invited

Reference High-pressure Adsorption Isotherms: Results of Interlaboratory Studies: *Huong Giang Nguyen*¹; Laura Espinal¹; Blaza Toman¹; Christopher Sims¹; Matthias Thommes²; Roger van Zee¹; ¹National Institute of Standards and Technology; ²Friedrich-Alexander University

9:45 AM Invited

First-principles Studies of Porous Manganese Dioxide Octahedral Molecular Sieve OMS-5: *Matthew Lawson*¹; Lan Li¹; ¹Boise State University

10:05 AM Break

10:25 AM Invited

Flexible Metal-organic Framework (MOF), NiL[Ni(CN)₄]_n, L=Azo-Pyridine: *Winnie Wong-Ng*¹; Gregory McCandless²; Jeffrey Culp³; Yu-Sheng Chen⁴; Daniel Siderius¹; Matthew Lawson²; Lan Li⁵; ¹National Institute of Standards and Technology; ²University of Texas at Dallas; ³LRST/Battelle, National Energy Technology Laboratory; ⁴University of Chicago at Advanced Photon Source; ⁵Boise State University

10:45 AM Invited

Metal-organic Framework Thin Films as Chemical Sensing Layer: *Ki-Joong Kim*¹; Jeffrey Culp¹; James Ellis¹; Paul Ohodnicki¹; ¹National Energy Technology Laboratory

11:05 AM Invited

Flexible Metal-organic Frameworks for Gas Separation: A Mechanistic Investigation: *Wei Zhou*¹; ¹National Institute of Standards and Technology

11:25 AM Invited

Thermodynamic Complexity of Transition Metal Ion-exchanged Zeolites: *Xianghui Zhang*¹; *Di Wu*¹; ¹Washington State University

11:45 AM Invited

Density Functional Theory Studies of Ferrous Metal-organic Cages: *Eric Cockayne*¹; Mitchell Groenenboom¹; Kathleen Schwarz¹; ¹National Institute of Standards and Technology

Thermal Protection Materials and Systems — TPS Computational Methods & Approaches/TPS Materials Development & Testing I

Program Organizers: Jeff DeMange, Integration Innovation, Inc. (i3); Frances Hurwitz, NASA Glenn Research Center; Arturs Jasjukevics, ArianeGroup; Thomas Reimer, German Aerospace Center

Wednesday AM
October 2, 2019

Room: B114
Location: Oregon Convention Center

Session Chairs: Thomas Reimer, German Aerospace Center; Jeff DeMange, i3

8:00 AM

Computational and Experimental Study of Heat Transfer through Flexible Ceramic-fiber Thermal Protection Systems: *Rodrigo Penide-Fernandez*¹; Frederic Sansoz¹; ¹The University of Vermont

8:30 AM

Computational Materials Techniques for Thermal Protection Solutions: Materials and Process Design: *Justin Haskins*¹; Lauren Abbott¹; Joshua Monk¹; ¹AMA, Inc

9:00 AM

Icarus v1.2: A Scalable Tool for Spacecraft TPS Modeling: *Eric Stern*¹; Joseph Schulz¹; Grant Palmer¹; Justin Haskins¹; ¹NASA Ames Research Center

9:30 AM

The Effect of Fibrous Geometry on Thermomechanical Behavior of Phenolic Impregnated Carbon Ablators for Use in Thermal Protection Systems: *Katherine Moody*¹; *Skylar Mays*¹; *Mujan Seif*¹; *Matthew Beck*¹; ¹University of Kentucky

9:50 AM Concluding Comments

10:00 AM Break

10:20 AM

Development of a Low-density Phenolic-impregnated Fibrous Ablator: *Thomas Reimer*¹; *Christian Zuber*¹; ¹DLR

10:50 AM

Development of Domestic Lyocell based Phenolic Impregnated Carbon Ablators (PICA-D) for Future NASA Missions: *Matthew Gasch*¹; *Mairead Stackpoole*¹; *Kristina Skokova*¹; *Keith Peterson*¹; *Don Ellerby*¹; *Dinesh Prabhu*¹; *Frank Milos*¹; *Steven Violette*²; ¹NASA Ames Research Center; ²Fiber Materials Inc.

11:20 AM

Heatshield for Extreme Entry Environment Technology (HEEET) Thermal Protection System (TPS): *Donald Ellerby*¹; *Matthew Gasch*¹; *Mairead Stackpoole*¹; *Peter Gage*²; *Ethiraj Venkatapathy*¹; ¹NASA Ames Research Center; ²NEERIM

11:50 AM Concluding Comments

Thermodynamics of Materials in Extreme Environments — Experimental and Computational Thermodynamics of Protective Barriers and Reactivity of Materials under Extreme Conditions

Program Organizers: *Kyle Brinkman*, *Clemson University*; *Kristina Lilova*, *University California Davis*; *Alexandra Navrotsky*, *University California Davis*; *Jake Amoroso*, *Savannah River National Laboratory*; *Fei Peng*, *Clemson University*; *Xingbo Liu*, *West Virginia University*; *Gustavo Costa*, *NASA*; *Xiaofeng Guo*, *Washington State University*

Wednesday AM
October 2, 2019

Room: C124
Location: Oregon Convention Center

Session Chair: *Kristina Lilova*, *University of California, Davis*

8:00 AM Invited

Stability of Complex Silicate Environmental Barrier Coating Candidate Materials in High-temperature Water-vapor: *Mackenzie Ridley*¹; *Ingo Markel*²; *Hans Seifert*²; *Elizabeth Opila*¹; ¹University of Virginia; ²Karlsruhe Institute of Technology

8:30 AM

Oxidative High Temperature Solution Calorimetry of Pure Elements and Application to the Thermodynamics Studies of Non-oxide Systems: *Kristina Lilova*¹; *Mykola Abramchuk*¹; *Alexandra Navrotsky*¹; ¹University of California, Davis

9:00 AM

Correlated Multimodal In-situ Gas-metal Alloy Surface Reaction Studies: *Elizabeth Kautz*¹; *Bharat Gwalani*¹; *Libor Kovarik*¹; *Sten Lambeets*¹; *Daniel Perea*¹; *Arun Devaraj*¹; ¹Pacific Northwest National Laboratory

9:20 AM

Electrochemical and Calorimetric Study of Ag-Li-Sb Alloys: *Monika Bugajska*¹; *Przemyslaw Fima*¹; ¹Institute of Metallurgy & Materials Science PAS

9:40 AM Invited

Behavior of Ultra-high Temperature Ceramics in the Hypersonic Flight Environment: *William Fahrenholtz*¹; ¹Missouri University of Science and Technology

10:10 AM Break

10:30 AM

High Temperature Vaporization into Different Environments: *Nathan Jacobson*¹; *Maria Kuczmarzski*¹; *Benjamin Kowalski*¹; ¹Nasa Glenn Research Center

10:50 AM

Thermodynamic Simulation and Materials Corrosion in Hydrothermal Liquefaction Biorefining Conditions: *Minkang Liu*¹; *Yimin Zeng*²; *Jing-Li Luo*³; ¹University of Alberta; ²CanmetMATERIALS; ³University of Alberta

11:10 AM

Uncovering the Oxidation Mechanisms of Nickel-based Alumina-forming Alloys: *Talia Barth*¹; ¹University of Michigan, Ann Arbor

11:30 AM

Thermodynamics Analysis of Flowing for SHS-reactions in System Ni-Al Alloys: *Borys Sereda*¹; *Yuriy Belokon*¹; *Karina Belokon*¹; *Dmytro Kruglyak*¹; *Irina Kruglyak*¹; *Dmytro Sereda*¹; ¹Dneprovsky State Technical University

Ultra High Performance Metallic Systems for Aerospace, Defense, and Automotive Applications — Ultrafine Grain and Severe Plastic Deformation Influence on Materials

Program Organizers: *Ali Yousefiani*, *Boeing Research And Technology*; *Troy Topping*, *California State University, Sacramento*; *Robert Dillon*, *NASA Jet Propulsion Laboratory*; *Linruo Zhao*, *National Research Council of Canada*

Wednesday AM
October 2, 2019

Room: D140
Location: Oregon Convention Center

Session Chairs: *Ali Yousefiani*, *Boeing Research And Technology*; *Troy Topping*, *California State University, Sacramento*

8:00 AM Invited

Precipitate Formation Mechanisms during High-shear Solid Phase Processing Events: *Suveen Mathaudhu*¹; *Anthony Reynolds*²; *Glenn Grant*¹; *Cynthia Powell*¹; ¹Pacific Northwest National Laboratory; ²University of South Carolina / PNNL

8:40 AM

Thermal Behavior of Ultra-fine Gradient Microstructure via Severe Plastic Deformation: *Maryam Jamalian*¹; *David Field*¹; ¹Washington State University

9:00 AM

Bulk-state Reaction for Synthesizing Bulk Hybrid Alloys through High-pressure Torsion: *Jae-Kyung Han*¹; *Jae-il Jang*²; *Terence Langdon*³; *Megumi Kawasaki*¹; ¹Oregon State University; ²Hanyang University; ³University of Southampton

9:20 AM

Influence of Equal-Channel Angular Pressing on the Microstructure, the Corrosion and the Fatigue-corrosion Behavior of a 6xxx Aluminum Alloy for Automotive Conductors: *Clement Rochet*¹; *Skyler Davis*²; *Adrien Laurino*³; *Jean-Paul Harouard*³; *Babak Arfaei*⁴; *Terry Lowe*²; *Gregory Odemer*²; *Muriel Veron*⁶; *Christine Blanc*⁵; ¹CIRIMAT / LEONI Wiring Systems France S.A.S.; ²Colorado School of Mines; ³LEONI Wiring Systems France S.A.S.; ⁴Ford Motor Company; ⁵CIRIMAT; ⁶SIMaP

9:40 AM

Mechanism Controlled Rolling: *Sebastian Wesselmecking*¹; Wolfgang Bleck²; Marco Haupt³; ¹RWTH Aachen - Steel Institute; ²Rwth Aachen - Steel Institute; ³RWTH Aachen - Institute of Metal Forming

10:00 AM Break

10:20 AM

Evolution in Mechanical Response, Phase Transformation and Texture of Titanium Aluminide Processed by High-pressure Torsion: *Jae-Kyung Han*¹; Xi Li²; Rian Dippenaar²; Klaus-Dieter Liss³; Megumi Kawasaki¹; ¹Oregon State University; ²University of Wollongong; ³Guangdong Technion - Israel Institute of Technology

10:40 AM

Structures Formed under High Strain Deformation of Ni-based Superalloys: *Agnieszka Wusatowska-Sarneck*¹; Adam Kruk²; ¹Pratt & Whitney; ²AGH University of Science and Technology

11th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Energy, Sustainability, and Biobased Materials II

Program Organizers: Surojit Gupta, University of North Dakota; Yiquan Wu, Alfred University; Hisayuki Suematsu, Nagaoka University of Technology; John Wolodko, University of Alberta; Christopher Taylor, DNV GL; Junichi Tatami, Yokohama National University; Enrico Bernardo, University of Padova; Zhengyi Fu, Wuhan University of Technology; Rajiv Asthana, University of Wisconsin; Allen Ablett, Oklahoma State University; Richard Sisson, Worcester Polytechnic Institute; Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Mritunjay Singh, Ohio Aerospace Institute

Wednesday PM
October 2, 2019

Room: Portland Ballroom 255
Location: Oregon Convention Center

Session Chairs: Soumik Banerjee, Washington State University; Jinyang Wang, IMR; Kalpana Katti, North Dakota State University

2:00 PM Invited

Alternative Spinel for Advanced Electrical Conductive Layer for SOFC Stacks: *Jung Pyung Choi*¹; Jeff Bonnett¹; Nathan Canfield¹; Jeffrey Stevenson¹; ¹Pacific Northwest National Laboratory

2:20 PM Invited

Tunable Strength of Yb₂Si₂O₇ Interphase for Different Requirements in SiCf/SiC CMC: Inspiration from SiCf/Yb₂Si₂O₇ Model Composite Investigation: *Jingyang Wang*¹; ¹Shenyang National Laboratory for Materials Science, Institute of Metal Research

2:40 PM

From Waste Steel to Materiel: Agile Production Enabled by Additive Manufacturing: Karl Sundberg¹; Jianyu Liang¹; Diran Apelian¹; Brajendra Mishra¹; *Richard Sisson*¹; Jian Yu²; Brandon McWilliams²; ¹Worcester Polytechnic Institute; ²US Army Research Laboratory

3:00 PM Invited

Green Process for Preparation of Nickel Hydroxide Films via Solution Growth: *Allen Ablett*¹; Audrey Vecoven¹; Russel Dewan Rahman¹; ¹Oklahoma State University

3:20 PM Break

3:40 PM Invited

Fabricating Optical Silica Glasses Derived from SBA-15 Powders by SPS: *Lianjun Wang*¹; Wan Jiang¹; ¹Donghua University

4:00 PM

Towards Titanium Recovery from Waste Slag: Ultra-high Temperature Molten Oxide Electrolysis: *Catherine Bishop*¹; Samuel Martin Treceno¹; Nic Weaver¹; Aaron Marshall¹; Matthew Watson¹; ¹University of Canterbury

4:20 PM

Utilization of Microwave Technology in the Enrichment of Critical Rare Earth Elements from Coal Fly Ash : *Gunes Yakaboylu*¹; Daniel Baker¹; Brandon Wayda¹; Katarzyna Sabolsky¹; John Zondlo¹; Christina Wildfire²; Edward Sabolsky¹; ¹West Virginia University; ²US DOE-National Energy Technology Laboratory

4:40 PM

Investigation of Sintering a Mixed Powder including Alumina and Aluminum for Control of Volume Shrinkage during Sintering: *Ken'ichiro Kita*¹; Naoki Kondo¹; Mikinori Hotta¹; ¹National Institute of Advanced Industrial Science and Technology

5:00 PM

Synthesis and Characterization of Novel Lignin-metal Composites: *Grant Ellis*¹; Zhuhan Xie¹; Maharshi Dey¹; Caleb Matzke¹; Yun Ji¹; Surojit Gupta¹; ¹University of North Dakota

ACerS Robert B. Sosman Award Symposium: From Carbides to Carbons - from Bulk to Nano — ACerS Basic Science Division Robert B. Sosman Lecture

Program Organizer: Babak Anasori, Drexel University

Wednesday PM
October 2, 2019

Room: Portland Ballroom 253
Location: Oregon Convention Center

1:00 PM Invited

Nanomaterials Born from Ceramics: Transformative Synthesis of Carbons, Carbides and Nitrides: *Yury Gogotsi*¹; ¹Drexel University

ACerS Robert B. Sosman Award Symposium: From Carbides to Carbons - from Bulk to Nano — Session II

Program Organizer: Babak Anasori, Drexel University

Wednesday PM
October 2, 2019

Room: Portland Ballroom 253
Location: Oregon Convention Center

Session Chairs: Bastian Eitzold, Technische Universität Darmstadt; Babak Anasori, Indiana University-Purdue University Indianapolis

2:00 PM Invited

Ordered Multi-transition Metal Carbides and their MXenes: *Babak Anasori*¹; ¹Indiana University- Purdue University Indianapolis

2:30 PM Invited

Preferential Oxidation in a High Entropy Carbide Ultra-high Temperature Ceramic: *Lavina Backman*¹; *Elizabeth Opila*¹; ¹University of Virginia

3:00 PM Invited

Redesigning Grain Boundaries in Ceramic Materials: *Clive Randall*¹; ¹Pennsylvania State University



Additive Manufacturing of Glass, Ceramics and Composites — Additive Manufacturing of Glass, Ceramics and Composites V

Program Organizers: Tobias Schaedler, Hrl Laboratories Llc; Matthew Dickerson, Air Force Research Laboratory; Rebecca Dylla-Spears, Lawrence Livermore National Laboratory; Chang-Jun Bae, Korea Institute of Materials Science (KIMS)

Wednesday PM Room: B113
October 2, 2019 Location: Oregon Convention Center

Session Chair: Tobias Schaedler, HRL Laboratories, LLC

2:00 PM

Design and Fabrication of Dense SiC Composites by a Combination of Additive Manufacturing and Reactive Melt Infiltration: *Corson Cramer*¹; Edgar Lara-Curzio¹; Amy Elliott¹; Christina Padilla¹; Alexis Flores-Betancourt¹; James Klett¹; Michael Lance¹; Derek Siddel¹; Kashif Nawaz¹; ¹Oak Ridge National Laboratory

2:30 PM

Binder-jet Printing of Silicon Carbide: Chuyuan Zheng¹; *Ian Nettleship*¹; Jung-Kun Lee¹; ¹University of Pittsburgh

2:50 PM

Binder Jetting Additive Manufacturing of Ceramics: Preparation of Feedstock Powder with High Flowability and Sinterability: *Wenchao Du*¹; Guanxiang Miao¹; Zhijian Pei¹; Chao Ma¹; ¹Texas A&M University

3:10 PM

Model-guided Powder Mixing for Feedstock Preparation of Ceramic Binder Jetting: *Mark Du*¹; Zhijian Pei²; Chao Ma²; Dileep Singh¹; ¹Argonne National Laboratory; ²Texas A&M University

3:30 PM

Mechanical Performance of Ceramic-metallic Composites Using A Binder Jetting 3D Printing Technology: *Pedro Cortes*¹; Kyle Myers²; Brian Hetzel³; Brett Conner¹; Eric MacDonald¹; ¹Youngstown State University; ²ExOne; ³Fireline, Inc.

3:50 PM Break

4:10 PM

Saturation Characteristics for Interfacial Coupling Enhancement of Cement Granules in AM Process: *Seung Yeop Chun*¹; Bora Jeong¹; Hee Soo Lee¹; Hong-Dae Kim¹; ¹Korea Institute of Industrial Technology

4:30 PM

3D Printing of High-strength Continuous Carbon Fiber Reinforced Thermoplastics: *Pedram Parandoush*¹; Dong Lin¹; ¹Kansas State University

4:50 PM

3D Printing of Multicomponent Glasses Using Phase-separating Resins: *Lorenzo Barbera*¹; David Moore¹; Kunal Masania²; Andre Studart¹; ¹ETH Zurich; ²ETH Zürich

5:10 PM

Metal-polymer Composite Medical Device Fabricated by Additive Manufacturing: *Yao Zhao*¹; Sharad Acharya¹; Weixiao Gao¹; Haoqi Li¹; Jacob Celli¹; Jezreel Konstantinos¹; Parsaoran Hutapea¹; Fei Ren¹; ¹Temple University

Additive Manufacturing of Metals: Microstructure and Material Properties of Nickel-based Alloys — AM Process - Microstructure - Properties

Program Organizers: Andrzej Wojcieszynski, ATI Specialty Materials; Ulf Ackelid, Freemelt AB; Ola Harrysson, North Carolina State University; Sudarsanam Babu, University of Tennessee, Knoxville

Wednesday PM Room: B117
October 2, 2019 Location: Oregon Convention Center

Session Chair: Ola Harrysson, North Carolina State University

2:00 PM

High-throughput Characterization of Additively Manufactured Nickel Superalloy 625 Using a Combinatorial Sample to Rapidly Screen Process-Microstructure-Mechanical Property Information: *Jordan Weaver*¹; Thien Phan¹; Adam Pintar¹; Carlos Beauchamp¹; Kil-Won Moon¹; Kerry Siebein¹; ¹National Institute of Standards and Technology

2:20 PM

Toward an Understanding of Cracking, Scan Strategy and Airfoil Geometry in Electron Beam Powder Bed Additive Manufacturing: *Yousub Lee*¹; Mike Kirka¹; Ryan Dehoff¹; ¹Oak Ridge National Laboratory

2:40 PM

Effect of Intra-build Location and Loading Direction on Quasi-static and Dynamic Response of Additively Manufactured Inconel 718: *Nadia Kouraytem*¹; Raphael Chanut¹; Dillon Watring¹; Owen Kingstedt¹; Ashley Spear¹; ¹The University of Utah

3:00 PM

Selective Laser Melting of Inconel 625 Superalloy with Enhanced Hardness: *Amir Dehghanghadikolaei*¹; Kijoon Lee¹; Vinay Doddapaneni¹; Lucas Freiberg¹; Matthew Conlyn¹; Chih-hung Chang¹; Goran Jovanovic¹; Brian Paul¹; Somayeh Pasebani¹; ¹Oregon State University

3:20 PM Break

3:40 PM

Optimization of Heat Treatment Parameters for Additive Manufacturing Hastelloy X: *Alber Sadek*¹; Hyeyun Song¹; ¹Edison Welding Institute (EWI)

4:00 PM

The Heat Treatment for Nickel-base Superalloy Fabricated by Laser-powder Bed Fusion (L-PBF) Additive Manufacturing (AM): *Hyeyun Song*¹; Paul Boulware¹; Rodrigo Enriquez²; Heimdall Mendoza¹; Alber Sadek¹; ¹EWI

4:20 PM

Residual Strain Mapping of Additively Manufactured Inconel 718 Blade: *Lianghua Xiong*¹; Andrew Chuang¹; Dileep Singh¹; ¹Argonne National Laboratory

4:40 PM

Residual Stress Measurements and Predictions for IN625 SLM Parts: *Jose Rivas*¹; Seetha Raghavan¹; ¹University of Central Florida

5:00 PM

Effect of Part Size on Powder Bed Fusion IN718 Parts: Oliver Holzmond¹; *Alex Jarama*¹; Guofeng Wang²; Xiaodong Li¹; ¹University of Virginia; ²University of Pittsburgh

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Additive Manufacturing: Design, Modeling, Simulations, Defects and Inspection

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Specialty Materials; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Wednesday PM Room: B115
October 2, 2019 Location: Oregon Convention Center

Session Chair: Ulf Ackelid, Freemelt AB

2:00 PM

A Design Framework for Lattice Structure Testing and Implementation: *Colt Montgomery*¹; Cole Britt²; Connie Dong³; Don Brown¹; Matthew Begley³; Brian Patterson¹; Allison Beese²; Robin Pacheco¹; Michael Brand¹; John Carpenter¹; ¹Los Alamos National Laboratory; ²Pennsylvania State University; ³University California Santa Barbara

2:20 PM

An Optimization Modeling Framework for Additive Manufacturing Parts Using their Reliability and Inspectability: *Behrooz Jalalahmadi*¹; ¹Sentient Science

2:40 PM

Constitutive Structural Parameter for the Work Hardening Behavior of Additively Manufactured Metal Alloys: *Alan Jankowski*¹; Wei-Yang Lu¹; Nancy Yang¹; ¹Sandia National Laboratories

3:00 PM

Designing Steels for AM- What Can We Learn from Welding?: *Niyanth Sridharan*¹; Lizhen Tan¹; Ying Yang¹; Kevin Field¹; ¹Oak Ridge National Laboratory

3:20 PM Break

3:40 PM

Effect of Interactions between Flaws and Material Properties on Component Performance: *Christopher Laursen*¹; Jay Carroll¹; Jody Bartanus²; Garrett Pataky²; ¹Sandia National Laboratories; ²Clemson University

4:00 PM

Numerical Prediction of PBF Thermal History and Microstructure: Bonnie Attard¹; S. Cruchley¹; Y. Chiu¹; M. Attallah¹; Paul Dionne²; Christoph Beetz²; Joerg Willem²; *Mustafa Megahed*²; ¹University of Birmingham; ²Esi Group

4:20 PM

Simultaneous Transformation Kinetics Model for AM: *Narendran Raghavan*¹; Srdjan Simunovic¹; Mike Kirka¹; John Turner¹; ¹Oak Ridge National Laboratory

4:40 PM

Systematic Generation of Process Parameter Induced Lack of Fusion Defects: *Brett Conner*¹; Varthula De Silva Jayasekera¹; Jeremy McKnight¹; Jared Blecher²; Griffin Jones³; Kenneth Meinert³; Austin Ngo⁴; John Lewandowski⁴; ¹Youngstown State University; ²3D Systems; ³Pennsylvania State University; ⁴Case Western Reserve University

5:00 PM

Selective Electron Beam Melting – Next Step in Metal Additive Manufacturing?: Matthias Gieseke¹; *Madison Burns*¹; Anne Rathje¹; Christoph Wangenheim¹; ¹Baker Hughes, a GE company

Additive Manufacturing of Metals: Post Processing — Surface Modification

Program Organizers: Ola Harrysson, North Carolina State University; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Metals; Sudarsanam Babu, University of Tennessee, Knoxville

Wednesday PM Room: B110
October 2, 2019 Location: Oregon Convention Center

Session Chair: Chris Rock, NC State University

2:00 PM Invited

Electrochemical Surface Finishing of Complex Additively Manufactured Parts: *Timothy Hall*¹; Jennings Taylor¹; Holly Garich¹; Danny Liu¹; Stephen Snyder¹; ¹Faraday Technology, Inc.

2:40 PM

A Comparison of Bioactive Anodization Coatings on Wrought and Additively-manufactured Ti-6Al-4V Substrates: *Haden Johnson*¹; Hayden Coffey¹; Ryan Stokes²; Haley Doude²; Amol Janorkar¹; R Williamson¹; Michael Roach¹; ¹University of Mississippi Medical Center; ²Mississippi State University

3:00 PM

Correlation between Surface Texture and Mechanical Performance of AM Components: *Agustin Diaz*¹; Patrick McFadden¹; ¹REM Surface Engineering

3:20 PM

Fatigue Behavior of Post-build Surface Processing on Electron Beam Melted Ti-6Al-4V: *Carter Keough*¹; Harvey West¹; Richard Wysk¹; Ola Harrysson¹; ¹North Carolina State University

3:40 PM Break

4:00 PM

Impact of Sensitization and Etching Parameters to Selectively Dissolve Support Structures from PBF-processed Metal Components: Pengfei Yang¹; Subbarao Raikar¹; *Owen Hildreth*¹; ¹Colorado School of Mines

4:20 PM

Multiscale Area Analysis of Surfaces Produced in a Laser Powder Bed Fusion Process: Nathaniel Rutkowski¹; Matthew White²; Timothy Horn²; Christopher Brown¹; *Sneha Prabha Narra*¹; ¹Worcester Polytechnic Institute; ²North Carolina State University

4:40 PM

Surface Finishing of DMLS and DED IN-625 for Optimal Mechanical Performance: *Patrick McFadden*¹; Agustin Diaz¹; ¹REM Surface Engineering



Additive Manufacturing: Microstructure and Material Properties of Titanium-based Alloys — Directed Energy Deposition and Other Technologies

Program Organizers: Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Powder Metals; Ola Harrysson, North Carolina State University; Sudarsanam Babu, University of Tennessee, Knoxville

Wednesday PM Room: B116
October 2, 2019 Location: Oregon Convention Center

Session Chair: Sudarsanam Babu, University of Tennessee, Knoxville

2:00 PM

As-deposited Tensile Behavior and Microstructure of MELD Solid-state Additive Manufactured Ti-6Al-4V: *M. Miller*¹; Paul Allison¹; Chase Cox²; Dustin Avery¹; Richard Martens¹; ¹The University of Alabama; ²MELD Manufacturing

2:20 PM

Demonstration of Strength-ductility Property Maps to Identify Critical Structure-property Relationships in PM/AM Ti-6Al-4V Alloys: *K. S. Ravi Chandran*¹; Pankaj Kumar²; ¹University of Utah; ²University of Nevada at Reno

2:40 PM

Fracture Toughness and Fatigue Crack Growth Rate Properties of AM Repaired Ti-6Al-4V by Direct Energy Deposition: Sulochana Shrestha¹; Manigandan Kannan¹; Joseph Rassi¹; Gregory Morscher¹; Andrew L. Gyekenyesi²; Onome Scott Emuakpor³; ¹University of Akron; ²Ohio Aerospace Institute; ³Aerospace Systems Directorate, Wright-Patterson AFB

3:00 PM

Reactive-deposition of B4C+BN Titanium-matrix Composites for High-temperature Applications: *Kellen Traxel*¹; Amit Bandyopadhyay¹; ¹Washington State University

3:20 PM Break

3:40 PM

Residual Stress Modelling of Additively Manufactured Ti6Al4V ELI Alloy Samples: *Amukelani Sydney Ngoveni*¹; ¹Tshwane University of Technology

4:00 PM

Analyses of Microstructure and Mechanical Properties of Additively Repaired Ti-6Al-4V by Direct Energy Deposition: *Sulochana Shrestha*¹; Manigandan Kannan¹; Raghav P. Panakarajupally¹; Gregory Morscher¹; Andrew L. Gyekenyesi²; Onome Scott Emuakpor³; ¹University of Akron; ²Ohio Aerospace Institute; ³Aerospace Systems Directorate, Wright-Patterson AFB

Advanced Coatings for Wear and Corrosion Protection — Advanced Coatings for Wear and Corrosion Protection III

Program Organizers: Evelina Vogli, LM Group Holdings Inc.; Fei Tang, DNV GL; Arif Mubarak, PPG; Mary Lyn Lim, PPG Industries

Wednesday PM Room: B118
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Arif Mubarak, PPG; Mary Lin Lym, PPG; Evelina Vogli, LM Group Holdings Inc.

2:00 PM Invited

On the Friction and Anti-galling Properties of Engineering Coatings and Surface Treatments: *Manuel Marya*¹; Virendra Singh¹; Hong Liang²; Yan Chen²; ¹Schlumberger Technology Corp; ²Texas A&M University, Mechanical Engineering

2:20 PM

Application of Plasma Enhanced Chemical Vapor Deposition (PECVD) to Prevent Plating of Metallic Materials for Small Caliber Suppressor Applications: *Adam Foltz*¹; Christopher Mulligan¹; ¹US Army ARDEC

2:40 PM

Tribological Performance of Alternative Die Materials for Trimming of Advanced High Strength Steels: *Zeyuan Cui*¹; Alexandra Rose¹; Daniel Green¹; Jimmy Tjong¹; Ahmet Alpas¹; ¹University of Windsor, MAME

3:00 PM

Oxidized Zirconium Alloy ZrNb7 for Tribological Applications – Diffusion Hardening Process for Improved Surface Properties: *Mike Mosbacher*¹; Uwe Glatzel¹; ¹Metals and Alloys, University Bayreuth

3:20 PM Break

3:30 PM

Characterization of as-Welded Microstructure in Fe-Cr-C-B Wear-resistant and Corrosion-resistant Welding Overlay: *Jing Li*¹; Rangasayee Kannan¹; Leijun Li¹; ¹Department of Chemical and Materials Engineering, University of Alberta

3:50 PM

Effect of Tribocorrosion on the Bond Strength of Electrodeposited Ni-graphene Composite Surface Coatings on AZ31B Mg Alloy: *Arpith Siddaiah*¹; Pankaj Kumar¹; Manoranjan Misra¹; Pradeep Menezes¹; ¹University of Nevada, Reno

4:10 PM

Corrosion and Coating Properties of Novel Treatment Solutions on Aluminum Alloys: *Betsy Brown*¹; ¹PPG Industries

4:30 PM

High Corrosion Resistant and Eco-friendly Trivalent Chromium Based Coatings for Hot-dip Zin Alloy Coated Steel Sheet: *Soo Hyoun Cho*¹; Young Jun Park¹; ¹POSCO

4:50 PM

Electrochemical Characterization of Titanium Based Graphene Nano Composites: *Muhammad Manzoor*¹; Muhammad Yasin¹; Muhammad Butt¹; Tahir Ahmad¹; Muhammad Kamran¹; Faraz Hussain¹; Fahad Riaz¹; Muhammad Hassan¹; ¹University of the Punjab

5:10 PM

Corrosion and Tribology Behaviour of TiC Thin Film on Titanium Alloys Grown by RF Magnetron Sputtering: *Olayinka Abegunde*¹; ¹University of Johannesburg

Advanced Manufacturing, Processing, Characterization and Modeling of Functional Materials — NiTiHf Alloys

Program Organizers: Mohammad Elahinia, University of Toledo; Haluk Karaca, University of Kentucky; Reza Mirzaeifar, Virginia Tech; Reginald Hamilton, Pennsylvania State University; Reza Mehrabi, University of Toledo; Hamdy Ibrahim, University of Tennessee at Chattanooga; Mohammad Mahtabi, University of Tennessee at Chattanooga; Narges Shayesteh Moghaddam, University of Texas at Arlington; Markus Chmielus, University of Pittsburgh

Wednesday PM Room: D136
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Mohammadreza Nematollahi, University of Toledo; Haluk Karaca, University of Kentucky

2:00 PM Invited

Machine Learning for Solving Metals AM Problems: *Aaron Stebner*¹; ¹Colorado School of Mines

2:30 PM

Synchrotron Radiation X-ray Diffraction Measurements on Non-metallic Inclusions and their Effect on Fatigue Life in NiTiHf High Temperature Shape Memory Alloys: *Nathan Ley*¹; Choongyep Lee¹; Robert Wheeler¹; Dimitris Lagoudas²; Marcus Young¹; ¹University of North Texas; ²Texas A&M University

3:00 PM

The Influence of Heat Treatment on the Transformation Behavior of Additively Manufactured NiTiHf Shape Memory Alloys: *Guher Pelin Tokel*¹; Mohammadreza Nematollahi²; Sayed Ehsan Saghainan¹; Othmane Benafan³; Keyvan Baghbaderani²; Mohammad Elahinia²; Haluk Karaca¹; ¹University of Kentucky; ²University of Toledo; ³NASA Glenn Research Center

3:20 PM

Effects of High Temperature Oxides on the Thermomechanical Properties of NiTiHf20 Shape Memory Alloy Wires: *Avery Young*¹; Robert Wheeler¹; Nathan Ley¹; Othmane Benafan²; Marcus Young¹; ¹University of North Texas; ²NASA Glenn Research Center

3:40 PM Break

4:00 PM

Effects of Ni during Thermo-mechanical Processing in Ni-rich NiTiHf High Temperature Shape Memory Alloy: *Faith Gantz*¹; Nathan Ley¹; Robert Wheeler¹; Marcus Young¹; ¹University of North Texas

4:20 PM

Microstructure and Thermoelectric Properties of [001]c Grain-aligned Ca₃Co₄O₉ Ceramics Prepared by Template Grain Growth: *Zongmo Shi*¹; Jie Xu¹; Feng Gao¹; Mengjie Qin¹; ¹Northwestern Polytechnical University

4:40 PM

The Influence of Thermal Cycling on the Indentation-induced Two-way Shape Memory Effect in NiTi Alloys: *Carl Frick*¹; Christopher Laursen¹; Mitchell Anderson¹; ¹University of Wyoming

5:00 PM

Numerical Modeling of Solid Scrap Melting above Bath in an Electric Arc Furnace: Yu Wang¹; Yuchao Chen¹; Armin Silaen¹; Yury Krotov²; Nicole Wiley²; Chenn Zhou¹; ¹Purdue University Northwest; ²Steel Dynamics, Inc

5:20 PM

Reactive Flash Sintering of Functional Ceramics: *Rishi Raj*¹; ¹University of Colorado

Advances in Dielectric Materials and Electronic Devices — Ferroics and Related Materials

Program Organizers: Amar Bhalla, University of Texas; Ruyan Guo, University of Texas at San Antonio; Rick Uvic, Boise State University; Danilo Suvorov, Jožef Stefan Institute

Wednesday PM Room: A105
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Steven Tidrow, Alfred University; Jose de los Santos Guerra, Universidade Federal de Uberlandia

2:00 PM Invited

Manipulating the Current-voltage (I-V) Characteristic of a Varistor to Produce Transistors and Sensors: *Raghvendra Pandey*¹; ¹Texas State University

2:20 PM

Effect of PbZrO₃-Modification on the Structure and Relaxor Properties of High-T_C BiScO₃-PbTiO₃ Ceramics and Single Crystals: *Yi Yuan*¹; Zuo-Guang Ye¹; ¹Simon Fraser University

2:40 PM

GaV₄S₈ Crystal Grain Orientation Determined by Raman Scattering: *Karel Tesar*¹; Ivan Gregora²; Pavla Beresova²; Premysl Vanek²; Petr Ondrejko²; Jiri Hlinka²; ¹Czech Technical University in Prague; ²Institute of Physics of the Czech Academy of Sciences

3:00 PM

Low Temperature Printing of SiO₂ Dielectrics from Reactive Inks: Subbarao Raikar¹; Owen Hildreth¹; ¹Colorado School of Mines

3:20 PM Break

3:40 PM

Combination of Artificial and Natural Planar Absorbers: Towards a 70% Reduction in Thickness: *Aicha El Assal*¹; Ratiba Benzerga¹; Ala Sharaiha¹; Ali Harmouch¹; Akil Jrad¹; ¹University of Rennes, IETR

4:00 PM Invited

Enhancement of Luminescence Intensity for Ln³⁺ doped Glasses: *Jakrapong Kaewkhao*¹; ¹Nakhon Pathom Rajabhat University

4:20 PM

Photochromic Effect of Transparent Lead-free Ferroelectric KSr₂Nb₅O₁₅ Ceramics: *Shuyao Cao*¹; Feng Gao¹; Jie Xu¹; Qian Chen¹; ¹School of Materials Science and Engineering, Northwestern Polytechnical University

4:40 PM

Ferroelectric Based Composites Can Build a Better Photocatalyst: *Yaodong Yang*¹; ¹Xian Jiaotong University

5:00 PM

Study of Magnetolectric and Magntodielectric and Electric Impedance under the Action of Magnetic Field Coupling in Bi_{0.8}Nd_{0.2}Fe_{1-y}CoyO₃: *Anuar J. Mincache*¹; Odair Oliveira¹; Luiz Cotica¹; Daniel Matos¹; Julio Pastoril¹; Ivair Santos¹; Gustavo Sanguino¹; ¹State University of Maringa



Advances in Understanding of Martensite in Steels — Characterization & Properties

Program Organizers: Ian Zuazo, ArcelorMittal Global R&D - (CRMC, Industeel); Amy Clarke, Colorado School of Mines; Eric Payton, Air Force Research Laboratory; Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Eric Lass, University of Tennessee, Knoxville; Mohsen Asle Zaeem, Colorado School of Mines

Wednesday PM Room: C125
 October 2, 2019 Location: Oregon Convention Center

Session Chairs: Eric Lass, National Institute of Standards and Technology; Eric Payton, Air Force Research Laboratory

2:00 PM Invited

Martensite Formation in the Intercritically Reheated Coarse Grained Heat Affected Zone of Line Pipe Steels: *Mathias Militzer*¹; Madhumanti Mandal¹; Warren Poole¹; ¹University of British Columbia

2:30 PM Invited

Understanding Martensite and Martensitic Phase Transformation under Extreme Environments: *Cheng Sun*¹; Keyou Mao²; Janelle Wharry²; Paula Freyer³; Frank Garner⁴; ¹Idaho National Laboratory; ²Purdue University; ³Westinghouse Electric Company LLC; ⁴Texas A&M University

3:00 PM

Reverse Transformation from Martensite into Austenite in a Dual Phase Steel: *Dany Andrade Centeno*¹; Hélio Goldenstein¹; ¹University of São Paulo

3:20 PM Break

3:40 PM Invited

Use of In-situ Methods to Investigate the Deformation Induced Martensitic Transformation: *Djamel Kaoumi*¹; Francois-Ligori Paul²; Yuchen Zhao¹; Matthew Frost³; Jun-Sang Park⁴; Jonathan Almer⁴; ¹North Carolina State University; ²Phelma; ³Oak Ridge National Laboratory; ⁴Argonne National Laboratory

4:10 PM

Short Cycle Tempering of an 1800 MPa Grade of Press Hardening Steel: *Claire Bourque*¹; Alexander Bardelcik¹; Mary Wells¹; Constantin Chiriac²; ¹University of Guelph; ²Ford Research & Advanced Engineering

4:30 PM

In Situ Observation and Quantification of Microstructure Features in the Heat-affected Zone of 1.25Cr-0.5Mo Steel during Simulated Welding Cycle: *Yang Shen*¹; Cong Wang¹; ¹Northeastern University

4:50 PM

Multi Length-scale Instrumented Indentation Study on Dual-phase (DP) Steels: *Ali Khosravi*¹; Charles Caliendo¹; Surya Kalidindi¹; ¹Georgia Institute of Technology

Alloy Design for Additive Manufacturing: Developing New Feedstock Materials — Computational Materials Design and Advanced Characterization

Program Organizers: Joseph McKeown, Lawrence Livermore National Laboratory; Aurelien Perron, Lawrence Livermore National Laboratory; Manyalibo Matthews, Lawrence Livermore National Laboratory; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Peter Hosemann, University of California

Wednesday PM Room: B111
 October 2, 2019 Location: Oregon Convention Center

Session Chairs: Joseph McKeown, Lawrence Livermore National Laboratory; Christian Leinenbach, Empa

2:00 PM Invited

Additive Manufacturing of Steels – Alloy Development Aided by Computational Materials Design: *Greta Lindwall*¹; Chia-Ying Chou¹; Niklas Hölländer Pettersson¹; Durga Ananthanarayanan¹; Annika Borgenstam¹; Joakim Odqvist¹; ¹KTH Royal Institute of Technology

2:30 PM

Alloy Design for Additive Manufacturing: Development and Application of a Materials Design Simulator: *Aurelien Perron*¹; Bey Vrancken¹; Nicholas Calta¹; Tien Roehling¹; John Roehling¹; Julie Soderlind¹; Thejaswi Tumkur Umanath¹; Joel Berry¹; Joseph McKeown¹; Manyalibo Matthews¹; ¹Lawrence Livermore National Laboratory

2:50 PM

ICME-based Evaluation and Optimization of Additively Manufactured High Toughness Naval Steels: *Amit Behera*¹; Vladilena Gaisina¹; Dana Frankel¹; Greg Olson¹; ¹QuesTek Innovations LLC

3:10 PM

Microsegregation-based Indicators of In-build Cracking Susceptibility under Repetitive Melting Conditions: *Ralph Napolitano*¹; Tim Prost²; Shubhra Jain¹; Emma White²; Iver Anderson²; ¹Iowa State University; ²Ames Laboratory

3:30 PM Break

3:50 PM Invited

Novel In-situ Characterization of Solidification Dynamics Relevant for Additive Manufacturing: *Amy Clarke*¹; Jonah Klemm-Toole¹; Alec Saville¹; Damien Tourret²; C. Gus Becker¹; Benjamin Ellyson¹; Yaofeng Guo¹; Chloe Johnson¹; Brian Milligan¹; Andrew Polonsky³; Kira Pusch³; Kester Clarke¹; Niranjan Parab⁴; Kamel Fezzaa⁴; Tao Sun⁴; Sven Vogel⁵; John Roehling⁶; Joseph McKeown⁶; Sudarsanam Babu⁷; Tresa Pollock³; Alain Karma⁸; ¹Colorado School of Mines; ²IMDEA; ³University of California, Santa Barbara; ⁴Argonne National Laboratory; ⁵Los Alamos National Laboratory; ⁶Lawrence Livermore National Laboratory; ⁷University of Tennessee; ⁸Northeastern University

4:20 PM

In-situ Microstructural Evolution of Rapidly Solidified Aluminum Alloys: *Chloe Johnson*¹; Chandler Becker¹; Benjamin Ellyson¹; Yaofeng Guo¹; Jonah Klemm-Toole¹; Brian Milligan¹; Alec Saville¹; Andrew Polonsky²; Kira Pusch²; Niranjan Parab³; Kamel Fezzaa³; Tao Sun³; John Roehling⁴; Kester Clarke¹; Tresa Pollock²; Joseph McKeown⁴; Amy Clarke¹; ¹Colorado School of Mines; ²University of California, Santa Barbara; ³Argonne National Laboratory; ⁴Lawrence Livermore National Laboratory

4:40 PM

Characterization of Vacuum Roll Coating Engineered Ti-6Al-4V Platelets for Metals Additive Manufacturing: *Vicky Poenitzsch*¹; *John Macha*¹; William Hickey¹; Erica Macha¹; Ken Coulter¹; Carl Popelar¹; ¹Southwest Research Institute

WEDNESDAY PM

5:00 PM

Multiscale Characterizations of the Microstructure and Mechanical Properties of Metallic Alloys Made by Laser Powder Bed Fusion: *Thomas Voisin*¹; Jean-Baptiste Forien¹; Joseph McKeown¹; Manyalibo Matthews¹; Y. Morris Wang¹; ¹Lawrence Livermore National Laboratory

5:20 PM

Effect of Trace Y Addition on the Microstructure and Mechanical Properties of the As-cast Ti-6Al-4V Alloys: *Liqing Wang*¹; Bang Xiao¹; Shaoyang Zhao¹; Jingou Yin¹; Zengfeng Li¹; Ping Tan¹; Huiping Tang¹; ¹Northwest Institute For Non-ferrous Metal Research

5:40 PM Concluding Comments

Applications of Modern Characterization Techniques to Ferrous Alloys and Steel Products — Applications of Modern Characterization Techniques to Ferrous Alloys and Steel Products I

Program Organizers: Steven Thompson, Colorado School of Mines; C. Isaac Garcia, University of Pittsburgh

Wednesday PM
October 2, 2019

Room: C124
Location: Oregon Convention Center

Session Chair: Steven Thompson, Colorado School of Mines

2:00 PM

Tracking Down Niobium Precipitation in HSLA Steels at the Atomic Level: *Johannes Weibel*¹; Dominik Britz¹; Hardy Mohrbacher²; Volker Flaxa³; Frank Mücklich¹; ¹Saarland University Saarbrücken; ²KU Leuven; ³Engineering Office and Consultant, Salzgitter

2:20 PM

Tracing Competitive Segregation Effects in Boron Containing Microalloyed Steels: *Daniela Wipp*¹; Maximilian Weiss²; Andreas Limbeck²; Alexander Gramlich³; Sabine Zamberger⁴; Matthew Galler⁵; Erwin Povoden-Karadeniz¹; ¹TU Wien, CDL-IPE; ²TU Wien; ³RWTH Aachen; ⁴voestalpine Forschungsservicegesellschaft Donawitz GmbH; ⁵voestalpine Wire Rod Austria GmbH

2:40 PM

Quantitative Analysis of Heterogeneous Solute Segregation at Austenite Grain Boundary or Austenite / Ferrite Interphase Boundaries ~ Three Dimensional Atom Probe Analysis Complemented with Austenite Reconstruction Method: *Goro Miyamoto*¹; Tadashi Furuhashi¹; ¹Tohoku University

3:00 PM

Applications of Machine Learning in Microscopy for Routine Assessment and Quality Assurance in Ferrous Alloy Production, Manufacturing and Service: *Roger Barnett*¹; Alisa Stratulat¹; ¹Carl Zeiss Microscopy

3:20 PM Break

3:45 PM

Analysis of Sigma Formation Mechanisms in Aged Hyper Duplex Stainless Steel: *Sanjeev Kumar*¹; S Krisam¹; A. Keplinger²; E. Povoden-Karadeniz³; ¹Christian Doppler Laboratory for Interfaces and Precipitation Engineering CDL-IPE TU Wien; ²Voestalpine Böhler Edelstahl GmbH & Co KG, 8605 Kapfenberg, Austria; ³Institute of Materials Science and Technology, TU Wien

4:05 PM

The Developed Orientation Relationship of the $\gamma \rightarrow \epsilon \rightarrow \alpha'$ Martensitic Transformation Using Electron Backscattered Diffraction: *Dan Field*¹; Krista Limmer²; ¹Missouri University of Science & Technology; ²U.S. Army Research Laboratory

4:25 PM

Quantitative Analysis of Inconel 718 by SEM/EDS – Challenges and Possible Solutions: *John Konopka*¹; ¹Thermo Fisher Scientific

4:45 PM

Analysis of Hardening Mechanisms in a Low-carbon Steel by Microscopy-spectroscopy and Nanoindentation Techniques: *Antonio Oliver-Reynoso*¹; Octavio Vázquez-Gómez²; Alexis Gallegos-Pérez¹; Edgar López-Martínez²; Bernardo Campillo-Illanes³; Héctor Vergara-Hernández¹; ¹Tecnológico Nacional de México / I.T. Morelia; ²Universidad del Istmo; ³Universidad Nacional Autónoma de México

Bulk Metallic Glasses and their Composites – Progresses, Outcomes and Prospects — Glass Formation, Crystallization and Serration

Program Organizers: Muhammad Rafique; Weidong Li, Corning; Junwei Qiao, Taiyuan University of Technology

Wednesday PM
October 2, 2019

Room: E146
Location: Oregon Convention Center

Session Chair: John Perepezko, The University of Wisconsin - Madison

2:00 PM Invited

Ideal Metallic Glass: *Takeshi Egami*¹; ¹University of Tennessee

2:40 PM Invited

Investigation of Crystallization and Relaxation in Metallic Glasses by High Rate Calorimetry: *John Perepezko*¹; Meng Gao¹; Wan Kim²; Eun Soo Park²; ¹University of Wisconsin - Madison; ²Seoul National University

3:20 PM Break

3:40 PM Invited

DSC and X-ray Diffraction Investigation of Crystallization of Amorphous Co-Fe-Zr Alloys: *Kil-Won Moon*¹; Fan Zhang¹; Megan Butala¹; Jason Hattrick-Simpers¹; Andrew Allen¹; Carelyn Campbell¹; ¹National Institute of Standards & Technology

4:10 PM

Partition-dependent Selection of Glass-enabled Complex Intermetallics during Crystallization of Amorphous Al-Sm Alloys: *Ralph Napolitano*¹; Fangqiang Meng²; Shihuai Zhou³; Ryan Ott⁴; Lin Zhou⁴; Matthew Kramer⁴; ¹Iowa State University; ²Sun Yat-Sen University; ³Arconic; ⁴Ames Laboratory

4:40 PM

Characterization of Localized Plastic Deformation and Serration Behaviors Associated with Dynamic Strain Aging in Pipeline Steels Using Digital Image Correlation: *Taylor Jacobs*¹; David Matlock²; Kip Findley²; ¹Los Alamos National Laboratory; ²Colorado School of Mines

5:10 PM

Relationship between the Serration Behaviors and the Structural Flow-units in Materials: *Yong Zhang*¹; ¹University of Science and Technology Beijing



Characterization of Materials and Properties through Metallography, Mechanical Testing and Analysis - From Fundamentals to the Cutting Edge — Microstructural Characterization and the Correlation of Microstructure to Mechanical Properties II

Program Organizer: Michael Keeble, Buehler

Wednesday PM Room: F152
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Dominik Britz, Universität des Saarlandes; George Vander Voort, Vander Voort Consulting L.L.C., Consultant - Struers Inc.; Andrew Havics, pH2, LLC

2:00 PM Invited

Metallographic Evaluation of Additive Manufactured 316L Parts Made by Binder Jet Printing: *Thomas Murphy*¹; Christopher Schade¹; ¹Hoeganaes Corporation

2:20 PM

Quantifying Visual Information in Powder Micrographs Using Pre-trained Convolutional Neural Networks: *Andrew Kitahara*¹; Srujana Yarasi¹; Ryan Cohn¹; Keith Kozlosky¹; Elizabeth Holm¹; ¹Carnegie Mellon University

2:40 PM

Discontinuities in Additive Manufactured (L-PBF) Components - Influence on the Mechanical Properties: Christoph Weidig¹; Christian Straube¹; *Felix Gemse*¹; ¹Günter-Köhler-Institute GmbH

3:00 PM

Interactions between Flaws, Microstructure, and Structural Properties in AM Metals: *Jay Carroll*¹; Christopher Laursen¹; Jody Bartanus²; Benjamin Smith²; Garrett Pataky²; ¹Sandia National Laboratories; ²Clemson University

3:20 PM Break

3:40 PM

Room Temperature Time Dependent Deformation in Small Springs: *Lisa Deibler*¹; John Laing¹; Christopher Finrock¹; Aron Robbins¹; ¹Sandia National Laboratories

4:00 PM

Microstructure Characterization of Titanium Following Electrified Taylor Anvil Impact Tests: *Jonathan Ligda*¹; Matthew Coppinger¹; ¹US Army Research Laboratory

4:20 PM

Microstructural Evolution and Nanoindentation Study of the Mechanical Properties of MWCNT-Ti6Al4V Nanocomposites: *Avverosuoghene Okoro*¹; Senzeni Lephuthing¹; Ronald Machaka¹; Peter Olubambi¹; ¹University of Johannesburg, South Africa

4:40 PM

Grain Boundary Morphology Evolution in Low Cycle Fatigue of High Purity Aluminum: *Xueqiao Wang*¹; Wade Lanning¹; Christopher Muhlstein¹; Joshua Kacher¹; ¹Georgia Institute of Technology

5:00 PM

HRDIC and EBSD Study of Slip-band Behavior: *David Fullwood*¹; Ryan Sperry¹; Eric Homer¹; Robert Wagoner²; Joao Quinta da Fonseca³; ¹Brigham Young University; ²Ohio State University; ³University of Manchester

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — 2D Nanomaterials & Polymer-derived Ceramics

Program Organizers: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Tech; Edward Gorzkowski, Naval Research Laboratory ; Jian Shi, Rensselaer Polytechnic Institute; Kejie Zhao, Purdue University ; Michael Naguib, Tulane University

Wednesday PM Room: D134
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Kathy Lu, Virginia Tech; Michael Naguib, Tulane University

2:00 PM Invited

Oxidation and Stabilization of 2D MXene Nanosheets: Xiaofei Zhao¹; Touseef Habib¹; Evan Prehn¹; Aniruddh Vashisth¹; Smit Shah¹; Yexiao Chen¹; Zeyi Tan¹; Jodie Lutkenhaus¹; Miladin Radovic¹; *Micah Green*¹; ¹Texas A&M University

2:30 PM

Facile and Scalable Fabrication of Free-standing Reticulated 3D Graphene Foam via Freeze Drying: *Tony Thomas*¹; Xiaolong Lu¹; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University

2:50 PM

Two-dimensional Titanium Carbonitride MXene as Electrocatalyst for Hydrogen Evolution Reaction: Kun Liang¹; Anika Tabassum¹; *Michael Naguib*¹; ¹Tulane University

3:10 PM

3-D Assembled MnO2 Nanosheets and Conversion to Tunnel-structured MnO₂: *Scott Misture*¹; Peter Metz¹; Madeleine Flint¹; Robert Koch¹; Alec Ladonis¹; Peng Gao¹; ¹Alfred University

3:30 PM Break

3:50 PM

Nanocomposites TiO₂-layered Hydroxides. Structure and Photocatalytic Decomposition of Vanillin and Methyl Orange: *Andrei Jitianu*¹; Thomas Haughey²; Naphtali O'Connor¹; Edruce Edouarzin¹; Mihaela Jitianu²; ¹Lehman College, City University of New York; ²William Paterson University

4:10 PM

Defect Effects on the Enhanced Photocatalytic Properties of 2D MoO₃ Nanoflakes: *Haitao Zhang*¹; Soheil Razmyar¹; ¹University of North Carolina at Charlotte

4:30 PM

Polymer Intercalation Synthesis of GlycoBoehmite Nanosheets: *Nelson Bell*¹; Mark Rodriguez¹; Jessica Kruichak¹; Bernadette Hernandez¹; Igor Kolesnichenko¹; Paul Kotula¹; Edward Matteo¹; ¹Sandia National Laboratories

4:50 PM

Oxygen Vacancies in Nanostructured Metal-oxide Gas Sensors: *Mohamad Al-Hashem*¹; Sheikh Akbar¹; Patricia Morris¹; ¹Ohio State University

WEDNESDAY PM

Corrosion of Additively Manufactured Metals — Corrosion of Additively Manufactured Metals II

Program Organizers: Eric Schindelholz; Rajeev Gupta, The University of Akron; Ajit Mishra, Haynes International; Amit Pandey, Ansys/Granta Design

Wednesday PM Room: B112
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Eric Schindelholz, Sandia National Laboratories; Rajeev Gupta, University of Akron

2:00 PM Invited

Electrochemical Characterization of Additively Manufactured Al-10Si-Mg in Standardized Test Solutions: *Robert Kelly*¹; Gregory Kubacki¹; ¹University of Virginia

2:20 PM

Surface Damage of an AM-ALSi10Mg Alloy Exposed to Corrosive Environments with Lack of Fusion Defects and Powder Contamination: *Holly Martin*¹; Daniel Bogen¹; Varthula De Silva Jayasekera¹; Brett Conner¹; ¹Youngstown State University

2:40 PM

Corrosion Performance of Aluminium Based Functionally Graded Materials Processed by Wire-arc Additive Manufacturing: *Amin S. Azar*¹; Martin Sunding¹; Nicky Tzima²; Spyros Diplas¹; Angeliki Lekatou²; Spyros Kleftakis²; ¹SINTEF; ²University of Ioannina

3:00 PM

Development of Wire Arc Additively Manufactured AZ 91 Alloy for Remarkable Improvement in Corrosion Resistance: *Abhishek Tiwari*¹; Saravanan Seman¹; A. Raja¹; Gaurav Singh¹; Racholsan Raj Nirmal¹; Mookara Rama Kishore¹; Murugaiyan Amirthalingam¹; R. Jayaganthan¹; ¹IIT Madras

3:20 PM Break

3:40 PM

High Temperature Oxidation and Creep Oxidation of Compositionally Graded Alloys in Air and Supercritical CO₂: Modeling and Experiment: *Christopher Taylor*¹; Brett Tossey¹; Stephen Niezgodza²; Yunzhi Wang²; ¹Dnv GI; ²Ohio State University

4:00 PM

High Temperature Oxidation of 718 Alloy Produced by Additive Manufacturing: *Tom Sanviemvongsak*¹; Daniel Monceau¹; ¹CIRIMAT

4:20 PM

The Effects of Laser Peening Parameters on the Corrosion and Hardness Properties of Ti6Al4V Alloy: *Sharlotte Kubjane*¹; *Nana Arthur*²; Bathusile Masina²; Patricia Popoola¹; Sisa Pityana²; ¹Tshwane University of Technology; ²Council for Scientific and Industrial Research

Crosscutting Issues in Corrosion of Materials: Control, Monitoring, Mitigation and Material Selection — Cross-cutting Corrosion Technologies

Program Organizers: Matthew Asmussen, Pacific Northwestern National Laboratory; Jeff Binns, Nuclear Waste Management Organization; James Neeway, Pacific Northwest National Laboratory; John Zhang, Gamry Instruments; Mary Lyn Lim, PPG; Sudhakar Mahajanam, Pinnacle ART; Eric Schindelholz, Sandia National Laboratories; Ajit Mishra, Haynes International; James Noel, Western University; Guang-Ling Song, Xiamen University; David Shoosmith, Western University; Raul Rebak, General Electric Global Research

Wednesday PM Room: B119
October 2, 2019 Location: Oregon Convention Center

Session Chair: Mary Lyn Lim, PPG Industries

2:00 PM

Application of Impedance-scanning Electrochemical Quartz Crystal Microbalance in Film Formation and Conversion on Silver: *Xueyuan Zhang*¹; ¹Gamry Instruments

2:20 PM

In Situ Raman Characterization of Aqueous Corrosion Processes: *Anna Reuter*¹; Jaime George²; Joseph Ryan²; ¹Hermiston High School; ²Pacific Northwest National Laboratory

2:40 PM

Investigating the Transport Mechanisms Governing the Oxidation of Hastelloy BC-1 by In Situ ToF-SIMS: *Jeffrey Henderson*¹; Antoine Seyeux²; Sandrine Zanna²; Mark Biesinger³; David Shoosmith¹; Philippe Marcus²; *James Noel*¹; ¹The University of Western Ontario; ²Chimie ParisTech; ³Surface Science Western

3:00 PM

Electrochemical Sensors for Multiphase Environments: *Malgorzata Ziomek-Moroz*¹; Timothy Duffy²; Derek Hall²; Serguei Lvov²; ¹National Energy Technology Laboratory; ²Pennsylvania State University

3:20 PM Break

3:30 PM

Materials Corrosion in Hot Dilute Acidic Pre-hydrolysis Biorefining Conditions: *Yimin Zeng*¹; Minkang Liu²; Jing-li Luo²; ¹NRCan, Canada; ²University of Alberta

3:50 PM

Reduction of Microbiologically Induced Corrosion (MIC) in a Seawater Injection Plant Utilizing DNA-based Molecular Technologies: *Hameed Al-Hashem*¹; Shabbir Mukadam¹; Maqsood Dabir¹; Morten Poulsen²; Thomas Lundgaard³; ¹PRC-KISR; ²Danish Technological Institute; ³Danish Technological Institute

4:10 PM

Corrosion Behaviour and Inhibition of Aluminium Alloy in Coconut Shell/H₂SO₄ Solution: *Omotayo Sanni*¹; Popoola Patricia¹; Fayomi Osi¹; ¹Tshwane University of Technology

Emergent Materials under Extremes and Decisive In-situ Characterizations — Materials under Irradiation and Beyond

Program Organizers: Xujie Lu, Center for High Pressure Science & Technology Advanced Research; Judith Driscoll, Cambridge University; Xiaofeng Guo, Washington State University; Hua Zhou, Argonne National Laboratory

Wednesday PM Room: E145
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Maik Lang, The University of Tennessee, Knoxville; Xiaofeng Guo, Washington State University

2:00 PM Invited

Exploring Radiation Resistance of Metal/Carbon Interface by In-situ Heavy Ion Irradiated Study: *Yue Liu*¹; Jin Li²; Pengzheng Tang¹; Tongxiang Fan¹; ¹Shanghai Jiao Tong University; ²Purdue University

2:30 PM Invited

Interface Design for Radiation Resistant Metallic Nanocomposites: *Youxing Chen*¹; Jian Wang²; Xinghang Zhang³; ¹University of North Carolina at Charlotte; ²University of Nebraska–Lincoln; ³Purdue University

3:00 PM

Non-destructive Multi-property Determination under Extreme Conditions with Transient Grating Spectroscopy: *Cody Dennett*¹; Khalid Hattar²; Michael Short¹; ¹Massachusetts Institute of Technology; ²Sandia National Laboratories

3:20 PM Break

3:40 PM

Self-organization of Gas Bubbles in Materials under Irradiation: *Cheng Sun*¹; ¹Idaho National Laboratory

4:10 PM Invited

Switchable In-plane Ferroelectricity in Quasi-2D Oxide: *Jie Jiang*¹; Lifu Zhang¹; Jing Feng²; Jian Shi¹; ¹Rensselaer Polytechnic Institute; ²Kunming University of Science and Technology

4:40 PM Panel Discussion

Failure Analysis & Characterization — Fatigue & Failure II

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Wednesday PM Room: F150
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Erhan Ulvan, Acuren Group Inc.; Robert O'Shea, Engineering Systems Inc; Daniel Baker, General Motors; Pierre Dupont, Schaeffler Belgium Sprl/bvba

2:00 PM

Fatigue Crack Threshold Analysis with TiAl SENT and CC Specimens – Influence of Starter Notch and Pre-cracking: *Sven Eck*¹; Jürgen Maierhofer¹; Christian Tritremmel¹; Stefan Marsoner¹; Nigel Martin²; ¹Materials Center Leoben Forschung GmbH; ²Rolls-Royce plc

2:20 PM

The Influence of Monotonic Damage on Metal Fatigue at High Stress-ratios: *Peter Huffman*¹; ¹John Deere

2:40 PM

The Effect of Microstructural Features and Composition on the Damage Behaviour of Tool Steels: *Alexandra Rose*¹; Robyn Marentette¹; Daniel Green¹; Ahmet Alpas¹; ¹University of Windsor

3:00 PM

Comparative Analysis of Converter Tubes Failed due to Thermo-mechanical Fatigue and Creep: *Kaushal Kishore*¹; Manashi Adhikary¹; Goutam Mukhopadhyay¹; Sandip Bhattacharyya¹; ¹Tata Steel Limited

3:20 PM Break

3:40 PM

Failure Analysis and Remaining Life Assessment of Reformer Outlet Manifold: *Abdulmohsen Alsahl*¹; ¹Saudi Basic Industries Corp. (Sabic)

4:00 PM

Torsional Fatigue Failure of Pump Shaft of a Gas Cleaning Plant(GCP) in Blast Furnace: *Ankita Roy*¹; ¹Tata Steel

4:20 PM

Brittle Crack Arrest Behavior of a Heavy-gauge Steel Plate: *Ohjae Lee*¹; Seok Gyu Lee¹; H.Y. Bae²; H.C. Jeong²; S.H. Lee¹; N.J. Kim¹; ¹POSTECH; ²POSCO

Failure Analysis: Industry Specific Failures — Process-Related Failures

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Wednesday PM Room: F151
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Veronique Vitry, UMONS; Charles White, Kettering University; Joel Davis, Rolls-Royce Corporation

2:00 PM

Failure Analysis on Cracked Outlet Nozzles (2 off) from a Regeneration Gas Heater Economizer: *Riza Khan*¹; Kavir Ramdass¹; ¹In-Corr-Tech Ltd.

2:20 PM

Cracking of a Heavy Dump Tractor Trailer Resulted from the HDG Process: *Martin Lazarek*¹; ¹Pario Engineering and Environmental Sciences

2:40 PM

Effect of Ti on Grain Refinement and Torsional Fatigue of Microalloy Steel: *Navinkumar Bitla*¹; Shrikant Jadhav¹; Vinayak Pawar¹; ¹Bharat Forge Limited – Kalyani Centre for Technology & Innovation (KCTI)

3:00 PM

Failure Analysis of Industrial Products and Components: From Identification to Process Based Approach: *George Pantazopoulos*¹; Athanasios Vazdirvanidis¹; Anagnostis Toulfatzis¹; Sofia Papadopoulou¹; Andreas Rikos¹; ¹ELKEME - Hellenic Research Centre for Metals S.A.

3:20 PM

Doomed ! Parts That Have Made It through Quality Control That Shouldn't: *Veronique Vitry*¹; Fabienne Delaunois¹; ¹UMONS

3:40 PM Break

4:00 PM

Does Punching Affect Forming of Blanks?: *Erhan Ulvan*¹; ¹Acuren Group Inc.

4:20 PM

Hydrogen Embrittlement Case Studies: Contributions from Material Processing: *Dan Grice*¹; Larry Hanke¹; ¹Materials Evaluation and Engineering Inc

WEDNESDAY PM

4:40 PM

Comparing Inherent Damping Capability of Additively Manufactured Stainless 316L and Inconel 718: *Onome Scott-Emuakpor*¹; Tommy George¹; Brian Runyon¹; Joseph Beck¹; ¹Air Force Research Laboratory

5:00 PM

Cutting Inserts Wear Monitoring in AISI 1045 Dry Longitudinal Turning through Cutting Forces: a Case Study: *Lucas Equeter*¹; Robin Devlaminck¹; François Ducobu¹; Clément Dutoit¹; Pierre Dehombreux¹; ¹University of Mons

Glasses, Optical Materials, and Devices: Current Issues in Science & Technology — Advances in Understanding Glassy State and Glass Transition

Program Organizers: Jincheng Du, University of North Texas; S. Sundaram, Alfred University

Wednesday PM
October 2, 2019

Room: A106
Location: Oregon Convention Center

Session Chairs: John Mauro, Pennsylvania State University; Pierre Lucas, University of Arizona

2:00 PM Invited

Fluctuations in Glass-forming Systems: *John Mauro*¹; ¹The Pennsylvania State University

2:30 PM Invited

Fragile-to-Strong Transitions in Glass Forming Liquids: *Pierre Lucas*¹; ¹University of Arizona

3:00 PM

Rheological Characterization of Calcium- and Iron-rich Silicate Slags during Solidification: Christopher Giehl¹; Mario Kleindienst¹; *Daniela Ehgartner*¹; ¹Anton Paar

3:20 PM Break

3:40 PM Invited

Rheology of Glass-forming Liquids as a Probe of the Energy Landscape: *Sabyasachi Sen*¹; ¹University of California, Davis

4:10 PM Invited

Accessing New Glassy States via Pressure Processing: *Liping Huang*¹; ¹Rensselaer Polytechnic Institute

4:40 PM Invited

Ultrafast Glass Science – Fundamentals and Applications: *S. K. Sundaram*¹; ¹Alfred University

5:10 PM

Is λ -transition in Liquid Sulfur a Fragile-to-Strong Transition?: *Bing Yuan*¹; Bruce Aitken²; Sabyasachi Sen¹; ¹University of California, Davis; ²Corning Inc.

Global Young Investigators Forum — Global Young Investigator's Forum: Session II

Program Organizers: Kathleen Shugart Cissel, UES Inc; Victoria Christensen, University of California Santa Barbara

Wednesday PM
October 2, 2019

Room: A109
Location: Oregon Convention Center

Session Chair: Victoria Christensen, University of California, Santa Barbara

2:00 PM

Analysis of the Mechanical Strength and Failure Mode of Undoped and Aluminum Titanate (Al₂TiO₅, ALT) Doped Ni-YSZ Solid Oxide Fuel Cell Anodes under Uniaxial and Biaxial Strength Testing Conditions: *Madisen Mccleary*¹; ¹Montana State University

2:20 PM

Electrode Engineering of 3D Self-architected Cathode in Proton-conducting Solid Oxide Fuel Cells at Reduced Temperatures: *Wenjuan Bian*¹; Wei Wu¹; Hanping Ding¹; Dong Ding¹; ¹Idaho National Laboratory

2:40 PM

Quantifying the Nature and Impact of Multi-scale Microstructure Heterogeneities in SOFC Electrodes: *Rubayyat Mahbub*¹; William K Epting²; Tim Hsu¹; Gregory A Hackett²; Harry Abernathy²; Shawn Litster¹; Anthony D Rollett¹; Paul A Salvador¹; ¹Carnegie Mellon University; ²U.S. DOE National Energy Technology Laboratory

3:00 PM

Rational Anode Design for Protonic Ceramic Fuel Cells by a One-step Phase Inversion Method: *Jun Gao*¹; Yuqing Meng¹; Tao Hong¹; Sungkyu Kim¹; Shiwoo Lee²; Kai He¹; Kyle Brinkman¹; ¹Clemson University; ²National Energy Technology Laboratory

3:20 PM

High Performance Roll-to-roll Printed PTB7-Th:PC₇₁BM Organic Solar Cells Enabled by Rapid Additive Removal: *Thomas Colburn*¹; ¹Stanford University

Grain Boundaries, Interfaces, and Surfaces in Functional Materials: Fundamental Structure-Property-Performance Relationships — Interface Evolution During Materials Processing and Deformation

Program Organizers: Ming Tang, Rice University; Shen Dillon, University of Illinois, Urbana-Champaign; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute of Technology

Wednesday PM
October 2, 2019

Room: E143
Location: Oregon Convention Center

Session Chairs: Edwin Garcia, Purdue University; Wolfgang Rheinheimer, Purdue University

2:00 PM Invited

Intrinsic Properties of Domain Walls in Ferroelectric Heterostructures: *Xiaoqing Pan*¹; ¹University of California, Irvine

2:30 PM Invited

Electric Field Effects on Grain Boundary Core Structures: *Klaus Van Benthem*¹; ¹University of California, Davis



3:00 PM Invited

Flash Sintering and Field Assisted Grain Growth in Perovskite Oxides: *Wolfgang Rheinheimer*¹; Xin Phuah¹; Han Wang¹; Jan Preusker¹; Haiyan Wang¹; ¹Purdue University

3:30 PM Break

3:50 PM

Mechanisms of “Strain-annealed” Grain Boundary Engineering in Hastelloy-X: *Etienne Martin*¹; Andrew Detor²; Daniel Wei¹; Ian Spinelli²; ¹University of Waterloo; ²GE Global Research

4:10 PM

Structure of the Martensitic Twin Interface and Relevance to Fatigue-activated Slip in Shape Memory Alloys: *Ahmed Sameer Khan Mohammed*¹; Huseyin Sehitoglu¹; ¹Mechanical Science and Engineering, University of Illinois Urbana-Champaign

4:30 PM

Sub-surface Measurements of the Austenite Microstructure in Response to Martensitic Phase Transformation: *Ashley Bucsek*¹; Hanus Seiner²; Hugh Simons³; Phil Cook⁴; Can Yildirim⁴; Yuriy Chumlyakov⁵; Carsten Detlefs⁶; Aaron Stebner⁶; ¹University of Minnesota; ²Academy of Sciences of the Czech Republic; ³Technical University of Denmark; ⁴European Synchrotron Radiation Facility; ⁵Tomsk State University; ⁶Colorado School of Mines

4:50 PM

Continuum Dislocation Dynamics-based Grain Fragmentation Modeling: *Georges Ayoub*¹; Ali Kobaissy²; Laszlo Toth³; Mu’Tasem Shehadeh²; Samir Mustapha²; ¹University of Michigan; ²American University of Beirut; ³Université Paul Verlaine Metz

5:10 PM

Grain Boundary Sliding and Low Friction in Metals: *Michael Chandross*¹; John Curry¹; Tomas Babuska²; Adam Hinkle¹; Nicolas Argibay¹; ¹Sandia National Laboratories; ²Lehigh University

Hybrid Organic-Inorganic Materials for Alternative Energy — Hybrids for Alternative Energy I

Program Organizers: Andrei Jitianu, Lehman College, City University of New York; Lisa Klein, Rutgers University; Lia Stanciu, Purdue University; Mihaela Jitianu, William Paterson University

Wednesday PM
October 2, 2019

Room: E147
Location: Oregon Convention Center

Session Chair: Kian Wai Tan, Toyohashi University of Technology

2:00 PM Invited

Responsive Wrinkles on Hybrid Gels/Hydrogels for Micro Soft Actuators: *Masahide Takahashi*¹; ¹Osaka Prefecture University

2:30 PM Invited

Impact-adaptive Conductive Composite: *Yue (Jessica) Wang*¹; Victor Hernandez¹; ¹University of California, Merced

3:00 PM

Property Forecasting to Accelerate Computational Design of Kinematically Active Multifunctional MOFs for Energy Applications: *Weiyi Zhang*¹; Chengxi Yang²; Alan Fern²; Seyed Aria Hosseini¹; Matt Campbell²; *Alex Greaney*¹; ¹University of California, Riverside; ²Oregon State University

3:20 PM Break

3:30 PM Invited

Understanding Photophysics of Organic Materials: Towards Stable and Sustainable Materials for (Opto)Electronics: *Oksana Ostroverkhova*¹; ¹Oregon State University

4:00 PM Invited

Inorganic-organic Hybrid Materials for Polymer Electrolyte and Alkaline Fuel Cells: *Kiyoharu Tadanaga*¹; ¹Hokkaido University

4:30 PM Invited

Interactions between Electrocatalyst, Carbon, and Electrolyte during Oxygen Electrocatalysis: *Kelsey Stoerzinger*¹; ¹Oregon State University

5:00 PM

Blister Formation and the Degradation of Organic Light Emitting Devices: *Oluwaseun Oyewole*¹; Jaya Cromwell¹; Deborah Oyewole¹; Reisia Ichwani¹; Winston Soboyejo¹; ¹Worcester Polytechnic Institute

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales — Session V

Program Organizers: M Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen’s University; Josh Kacher, Georgia Institute of Technology; Caizhi Zhou, Missouri University of Science and Technology; Lei Cao, University of Nevada, Reno

Wednesday PM
October 2, 2019

Room: G132
Location: Oregon Convention Center

Session Chairs: Amy Clarke, Colorado School of Mines; Levente Balogh, Queen’s University

2:00 PM Invited

Fluctuations in Plasticity and the Intermittent-to-smooth-transition in Microplasticity: *Robert Maass*¹; ¹University of Illinois at Urbana-Champaign

2:30 PM Invited

New Insights into Metallic Alloy Microstructural Evolution by In-situ Characterization: *Amy Clarke*¹; Jonah Klemm-Toole¹; Yaofeng Guo¹; Damien Tournet²; Seth Imhoff³; Benjamin Ellyson¹; Alec Saville¹; John Copley¹; Brian Milligan¹; Chloe Johnson¹; John Roehling⁴; Joseph McKeown⁴; Niranjan Parab⁵; Kamel Fezzaa⁵; Tao Sun⁵; Sven Vogel³; Tresa Pollock⁶; Alain Karma⁷; ¹Colorado School of Mines; ²IMDEA; ³Los Alamos National Laboratory; ⁴Lawrence Livermore National Laboratory; ⁵Argonne National Laboratory; ⁶University of California Santa Barbara; ⁷Northeastern University

3:00 PM

Multiscale Modeling and Experimental Validation of the Mechanical Properties of Alloyed Nano Foams: *Ioannis Mastorakos*¹; Hang Ke¹; Andres Jimenez¹; Cetin Cetinkaya¹; David Bahr²; ¹Clarkson University; ²Purdue University

3:20 PM Break

3:40 PM Invited

Measuring the Multiaxial Nature of Thermomechanical Constitutive Relationships of Crystalline Materials: *Aaron Stebner*¹; ¹Colorado School of Mines

4:10 PM Invited

Irradiation Defects in Zr Alloys: A Comparison between Transmission Electron Microscopy and Diffraction Line Profile Analysis: *Levente Balogh*¹; Fei Long¹; Zhongwen Yao¹; Michael Preuss²; Mark Daymond¹; ¹Queen's University; ²The University of Manchester

4:40 PM

Crystal Plasticity Modeling the Deformation in Nanodominated Heterogeneous Structures: *Tianju Chen*¹; Caizhi Zhou¹; ¹Missouri University of Science and Technology

5:00 PM Invited

Behaviors of Crystalline Metals in Highly Dynamic Processes Revealed by High-speed Synchrotron X-ray Experiments: *Tao Sun*¹; Kamel Fezzaa¹; ¹Argonne National Laboratory

5:30 PM Invited

In-situ SEM Deformation Experiments to Fracture: An Effort to Overcome Crystal Plasticity-induced Roughening Effects: *C. Tazan*¹; K. Briggs¹; I. Nakahata¹; J. Kang¹; ¹Massachusetts Institute of Technology

International Symposium on Ceramic Matrix Composites — CMC II

Program Organizers: Narottam Bansal, National Aeronautics and Space Administration; Jacques Lamon, LMT-Cachan, CNRS; Sung Choi, Naval Air Systems Command; J. P. Singh, US Army Research Laboratory (Retired)

Wednesday PM
October 2, 2019

Room: A103
Location: Oregon Convention Center

Session Chairs: Frank Zok, University of California, Santa Barbara; Yutai Katoh, Oak Ridge National Laboratory

2:00 PM Invited

Deformation, Rupture and Sliding of Fiber Coatings in Ceramic Composites: *Frank Zok*¹; Evan Callaway¹; Paul Christodoulou¹; ¹University of California, Santa Barbara

2:40 PM

Engineered Microcracks in Ceramic Metamaterials: *Ryan Cooper*¹; ¹University of Connecticut

3:00 PM Invited

Silicon Carbide-based CMC for Nuclear Applications – Opportunities and Challenges: *Yutai Katoh*¹; ¹Oak Ridge National Laboratory

3:40 PM Break

4:00 PM

Zirconium Carbide/Refractory Metal Composites Produced by the Displacive Compensation of Porosity (DCP) Process: *Mario Caccia*¹; Christopher Morrissey¹; Camilla McCormack¹; Alexander Strayer¹; Gregory Scofield¹; Kenneth Sandhage¹; ¹Purdue University

4:20 PM

Synthesis of Net Shaped SiC-TiB₂ Composites with Melt Infiltration: *Corson Cramer*¹; Richard Lowden¹; ¹Oak Ridge National Laboratory

Joining of Advanced and Specialty Materials XXI — Welding Metallurgy / Steel Welding II

Program Organizers: Mathieu Brochu, McGill University; Anming Hu, University of Tennessee; Hiroaki Mori, Osaka University; Yuri Hovanski, Brigham Young University; Darren Barborak, WeldQC Inc; Akio Hirose, Osaka University; Peng He, Harbin Institute of Technology; Zhiyong Gu, University of Massachusetts Lowell; Zhenzhen Yu, Colorado School of Mines

Wednesday PM
October 2, 2019

Room: Portland Ballroom 252
Location: Oregon Convention Center

Session Chairs: Boian Alexandrov, The Ohio State University; Vikas Patel, ArcelorMittal USA

2:00 PM Invited

Computational Modeling of Weldability Tests for Quantification of Material-specific Properties Related to Weldability: *Boian Alexandrov*¹; ¹Ohio State University

2:30 PM Invited

Weldability of HAYNES 244 Alloy – A New Low Thermal Expansion Alloy: *Jeremy Caron*¹; Michael Fahrman¹; ¹Haynes International Inc

3:00 PM

Stress Relief and Service Age Cracking in Austenitic Stainless Steels and Nickel Based Superalloys: *Jonah Duch*¹; John DuPont¹; ¹Lehigh University

3:20 PM Invited

Weld Seam Characteristics of Roll Formed TRIP690 Tubes: *Alexander Bardelcik*¹; Bharathwaj Ananthpillai¹; ¹University of Guelph

3:50 PM Break

4:10 PM

High Frequency Ultrasonic Resistance Spot Joining of Advance High Strength TRIP 780 Steel: *Umair Shah*¹; Xun Liu¹; ¹The Ohio State University

4:30 PM

Chemistry Sensitive Modelling of the Microstructure Evolution in the HAZ of Line Pipe Steels: *Nicolas Romualdi*¹; Matthias Militzer¹; Warren Poole¹; Laurie Collins²; Robert Lazor³; ¹University of British Columbia; ²Evraz, Inc.; ³TransCanada PipeLines Ltd.,

4:50 PM

Phase Transformations and Mechanical Properties of a 10 wt% Ni Steel Welding Consumable: *Erin Barrick*¹; John DuPont¹; ¹Lehigh University

5:10 PM

A Study on Effect of Multi-passes on the Microstructures and Mechanical Properties of AISI-1045 Weldment: *Fahad Riaz*¹; Muhammad Kamran¹; Tahir Ahmad¹; Faraz Hussain¹; Muhammad Umer Manzoor¹; ¹University Punjab Lahore



Journal of the American Ceramic Society Awards Symposium — JACerS Award Symposium Session II

Program Organizer: William Fahrenholtz, Missouri University of Science and Technology

Wednesday PM
October 2, 2019

Room: A107
Location: Oregon Convention Center

Session Chair: William Fahrenholtz, Missouri University of Science and Technology

2:00 PM Invited

Electronic Structure and Mechanical Properties of a Large Realistic Model of Inter-granular Glassy Film in β -Si₃N₄: *Wai-Yim Ching*¹; ¹University of Missouri

2:30 PM Invited

High-strength, Light-weight and Printable Ceramic Foams with Hierarchical Pore Structure from Boehmite Foams: Xiaoyan Zhang¹; Wenlong Huo¹; Yugu Chen¹; Jinlong Yang¹; ¹Tsinghua University

3:00 PM Invited

Thermochemical Model on the Carbothermal Reduction of Oxides During Spark Plasma Sintering of Zirconium Dioxide: David Pham¹; J Dycus²; James LeBeau²; Krishna Muralidharan¹; Venkateswara Rao Manga¹; Erica Corral¹; ¹The University of Arizona; ²North Carolina State University

3:30 PM Break

3:50 PM Invited

The Future of Grain Boundary Complexion Engineering: *Amanda Krause*¹; Patrick Cantwell²; Christopher Marvel³; Charles Compson⁴; Jeffrey Rickman³; Martin Harmer³; ¹University of Florida; ²Rose-Hulman Institute of Technology; ³Lehigh University; ⁴Almatis, Inc

4:20 PM Invited

Fabrication and Properties of Transparent Nd-doped BaF₂ Ceramics: *Yiquan Wu*¹; Jianlin Li²; Xianqiang Chen¹; ¹Alfred University; ²Hainan University

4:50 PM Invited

New Advanced Sintering Approaches Based on Spark Plasma Sintering: *Charles Maniere*¹; Geuntak Lee²; Elisa Torresani²; Claude Estournes³; Eugene A. Olevsky²; ¹Laboratoire CRISMAT; ²Powder Technology Laboratory; ³CIRIMAT

5:20 PM Invited

Sintering Forces Acting among Particles during Sintering by Grain Boundary/Surface Diffusion: *Fumihiro Wakai*¹; Gaku Okuma¹; Norimasa Nishiyama¹; Olivier Guillon²; ¹Tokyo Institute of Technology; ²Research Center Juelich

5:50 PM Invited

Sinter-cracking: Simulations and Experiments: *Joseph Carazzone*¹; Michael Bonar²; Henry Baring¹; Mark Cantu¹; Zachary Cordero¹; ¹Rice University; ²U.S. Army Research Laboratory

Light Metal Technology — Processing Technology I

Program Organizers: Xiaoming Wang, Purdue University; Alan Luo, Ohio State University; Kumar Sadayappan, Canmet MATERIALS

Wednesday PM
October 2, 2019

Room: D138
Location: Oregon Convention Center

Session Chair: Kumar Sadayappan, Canmet Materials

2:00 PM Invited

Design of an Experimental Die to Assess the Mechanical Properties of a HPDC Casting with High Flow Length within the Framework of an Internet of Production: *Maximilian Rudack*¹; Andreas Bührig-Polaczek¹; Uwe Vroomen¹; ¹Foundry Institute RWTH Aachen University

2:20 PM

Precipitation of Scandium-Containing Dispersoids in an Al-Mg-Si (Cu) 6xxx Series Alloy: *Timothy Langan*¹; Avishan Arabshomali²; Thomas Wood²; Paul Sanders²; ¹Cleantec; ²Michigan Technological University

2:40 PM

Development of a Hot Tear Test Procedure for Aluminum Casting Alloys: *Kumar Sadayappan*¹; Amanda Maia Aguiar Aguiar²; Xiaochun Zeng²; Sumanth Shankar²; ¹Canmet Materials; ²Light Metal Casting Research Centre (LMCRC)

3:00 PM Invited

Effect of Quench-rate during Solution Treatment on the Precipitation Behaviors of Al-Zn-Mg-Cu Alloy with an Addition of Ti Element: *Kwangjun Euh*¹; Saif Kayani¹; Jae-Gil Jung¹; Min-Seok Kim¹; Sang-hwa Lee¹; In-ho Jung²; ¹Korea Institute of Materials Science; ²Seoul National University

3:20 PM Break

3:40 PM

Prediction of Fluidity of Casting Aluminum Alloys Using Artificial Neural Network: Yuan Gao¹; Hengcheng Liao¹; Xiaojing Suo¹; *Qigui Wang*²; ¹School of Materials Science and Engineering, Southeast University; ²Materials Technology, GM Global Propulsion Systems

4:00 PM

Optimizing T61 Heat Treatment for LPDC Cast Aluminium Alloys: *Engin Kilinc*¹; ¹CMS Jant ve Makina Sanayii - CMS Wheels

4:20 PM

Effect of Rolling Method on Microstructural Evolution during Recrystallization in Cold Rolled AA1100: *Shi Hoon Choi*¹; Min-Seong Kim¹; Seong-Eum Lee¹; Amol Kale¹; Sang-Chul Kwon²; Sun-Tae Kim²; Hyo-Tae Jeong²; Jaiveer Singh¹; ¹Sunchon National University; ²Gangneung-Wonju National University

4:40 PM

Solidification, Microstructure and Mechanical Properties of Cast Al-Ni-Mn Alloys: *Jiao Fang*¹; Shouxun Ji¹; ¹Brunel University, London

5:00 PM

Investigation on Heat Treatment Characteristics of Carbon Nanotubes Reinforced 7075 Aluminum Matrix Composites: *Li Xing*¹; Liming Ke¹; Qiang Liu¹; ¹NanChang HangKong University

Nanostructured Materials under Extreme Environments — Materials under Radiation, High-temperature, and Other Extreme Environments

Program Organizers: Jin Li, Purdue University; Assel Aitkaliyeva, University of Florida; Youxing Chen, University of North Carolina at Charlotte; Yue Liu, Shanghai Jiao Tong University; Shuai Shao, Louisiana State University

Wednesday PM
October 2, 2019

Room: D133
Location: Oregon Convention Center

Session Chairs: Yue Liu, Shanghai JiaoTong University; Shuai Shao, Louisiana State University

2:00 PM Invited

Channeling Analysis for Palladium Implanted 4H–SiC and the Annealing Effects: *Di Chen*¹; ¹University of Houston

2:30 PM Invited

Suppressing Void Swelling in NiCoFeCr High Entropy Alloy and Nanostructured High Entropy Alloys: *Zhe Fan*¹; Tai-ni Yang²; Yuri Osetskiy¹; Ke Jin¹; Hongbin Bei¹; Lumin Wang²; William Weber³; Yanwen Zhang¹; ¹Oak Ridge National Lab; ²University of Michigan; ³University of Tennessee

3:00 PM

Mechanical Hardness and Microstructure of Nanostructured V-Y Alloys: *Anit Giri*¹; Billy Hornbuckle¹; AJ Roberts¹; Albert Ostlind²; Blake Fullenwider²; Kris Darling¹; ¹CCDEVCOM Army Research Laboratory; ²ORAU

3:20 PM

A Thermodynamic Approach for Multi-solute Grain Boundary Segregation in Nanocrystalline Alloys: *Mostafa Saber*¹; Ronald Scattergood²; Carl Koch²; ¹Oregon Institute of Technology; ²North Carolina State University

3:40 PM Break

4:00 PM

True Thermal Stability in a Nanocrystalline Alloy: *B. Hornbuckle*¹; Anthony Roberts¹; Josh Smeltzer²; Anit Giri¹; Kris Darling¹; ¹U.S. Army Research Laboratory; ²Lehigh University

4:20 PM Invited

Stress-assisted Structural Phase Transformation in Mo/Cu Bicontinuous Intertwined Composites: *Lijie He*¹; *Niaz Abdulrahim*¹; ¹University of Rochester

4:40 PM Invited

Pressure-induced Dramatic Changes of Halide Perovskites with Different Dimensionality: *Xujie Lu*¹; ¹Center for High Pressure Science & Technology Advanced Research

5:00 PM

Science-based Advancement of Polymeric Materials for Hydrogen Technologies: *Kevin Simmons*¹; Wenbin Kuang¹; Nalini Menon²; Bart Smith³; ¹Pacific Northwest National Laboratory; ²Sandia National Laboratory; ³Oak Ridge National Laboratory

5:20 PM

Improving Solid-state Reaction and Electrochemical Performance of NaCrO₂ Cathode for Na-ion Batteries through Mechanical Activation: *Mei Luo*¹; Angel Ortiz²; Fangmin Guo³; Zhepu Shi¹; Yang Ren³; Zonghai Chen³; Wei Chen¹; Leon Shaw¹; ¹Illinois Institute of Technology; ²Universidad de Extremadura; ³Argonne National Laboratory

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry — Session III

Program Organizers: Navin Manjooan, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Wednesday PM
October 2, 2019

Room: C126
Location: Oregon Convention Center

Session Chairs: Hang Yu, Virginia Polytechnic Institute and State University; Gary Pickrell, Virginia Tech; Navin Manjooan, Solve Technology and Research, Inc.

2:00 PM Keynote

Effect of CuO/MgO Ratio on the Gene Expression, Cytocompatibility, and Antibacterial/Analgesic/ Anticancerous Drug Loading Kinetics for the Mesoporous Bioactive Glasses: *Gurbinder Kaur*; V. Kumar¹; ¹Thapar University

2:40 PM

Inhibition of Gram-negative and Fungi Strains of Microbes Inducing Microbiologically-Influenced-Corrosion by Tectona grandis Capped Fe-Nanoparticle: *Joshua Okeniyi*¹; Esther Akinlabi²; Stephen Akinlabi²; Elizabeth Okeniyi²; ¹Covenant University; ²University of Johannesburg

3:00 PM

Modeling Dialium Guineense Mediated Zn-nanoparticle Growth Inhibition on Gram-positive Microbes Inducing Microbiologically-Influenced-Corrosion: *Joshua Okeniyi*¹; Elizabeth Okeniyi¹; Esther Akinlabi²; ¹Covenant University; ²University of Johannesburg

3:20 PM

Nanosensors to Build a Nervous System for the Planet: *Shobhan Paul*¹; ¹Zetanostics Inc.

3:40 PM Break

4:00 PM

Nanostructured Aluminum Alloys for Power Generation Applications: *Anit Giri*¹; AJ Roberts¹; Billy Hornbuckle¹; Scott Grendahl¹; Kris Darling¹; ¹CCDEVCOM Army Research Laboratory

4:20 PM

Preparation and Electrochemical Performance of CuS-CoS Double-layer Composite: *Yu Zhang*¹; ¹Hubei University of Automotive Technology

4:40 PM

Ionic Transport in Alkali Intercalated C₆₀ Molecular Solids: Applications for Electrochemical Energy Storage: *Rachel Gorelik*¹; Venkateswara Manga¹; Krishna Muralidharan¹; ¹Department of Materials Science and Engineering, University of Arizona

5:00 PM Concluding Comments



Next Generation Biomaterials — Next Generation Biomaterials V

Program Organizers: Roger Narayan, University of North Carolina; Federico Rosei, INRS Centre for Energy, Materials and Telecommunications

Wednesday PM Room: C122
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Jae-Chul Pyun, Yonsei University; Jamiu Odusote, University of Ilorin

2:00 PM
Synthesis and Characterization of Hydroxyapatite from Eggshell for Biomedical Applications: *Jamiu Odusote*¹; Ganiyat Odedele¹; Toyeebah Abdullateef²; ¹University of Ilorin; ²Offa and University of Ilorin

2:20 PM
Implantable 3D Polycaprolactone Nanocomposites Structures for Drug and Heat Delivery in the Localized Treatment of Breast Cancer: John Obayemi¹; *Ali Salifu*¹; Sandra Jusu²; Maria Chinyere Onyekanne²; Vahid Rahneshein¹; Yiporo Danyuo³; Kwabena Kan-Dapaah⁴; Winston Soboyejo¹; ¹Worcester Polytechnic Institute (WPI); ²African University of Science and Technology; ³Ashesi University; ⁴University of Ghana

2:40 PM
In-vitro Prodigiosin Kinetics Release Studies from Poly(lactide-co-glycolide) (PLGA) and Poly(ethylene glycol) (PEG) blend Microparticles for Controlled and Targeted Drug Delivery: *Sandra Jusu*¹; John Obayemi²; Chukwudalu Nwazojie¹; Ali Salifu²; Vanessa Uzonwanne²; Olushola Odusanya³; Winston Soboyejo²; ¹African University of Science and Technology; ²Worcester Polytechnic Institute; ³Biotechnology and Genetic Engineering Advanced Laboratory, Sheda Science and Technology Complex (SHESTCO)

3:00 PM
A Next Generation 3D Bioprinted Cardiac Patch with Human Cardiomyocytes and Fibroblasts: *Matthew Alonzo*¹; Shweta Anil Kumar¹; Mummun Chattopadhyay²; Yoshihiro Ito³; Stephanie Willerth⁴; Laura Suggs⁵; Binata Joddar¹; ¹University of Texas at El Paso; ²Texas Tech University Health Sciences Center; ³RIKEN Cluster for Pioneering Research; ⁴University of Victoria; ⁵The University of Texas at Austin

3:20 PM Break

3:40 PM
Structure, Properties and Synthesis of Silk, a Biocompatible Performance Material: Qijue Wang¹; *Hannes Schniepp*¹; ¹The College of William & Mary

4:00 PM Invited
Laser Desorption/Ionization (LDI) Mass SpectrometryBased on Nanomaterials: *Jae-Chul Pyun*¹; Jong-Min Park¹; Min-Jung Kang¹; ¹Yonsei University

4:20 PM
Layer-by-layer Assembled Nanoparticle for Chemoradiation Treatment of Colorectal Cancer: *Justin Rosch*¹; Madeleine Landry¹; Conroy Sun¹; ¹Oregon State University

4:40 PM
Mechanical and Thermal Properties of Superparamagnetic Magnetite-polycaprolactone Nanocomposites for Laser Hyperthermia and Ablation: John Obayemi¹; *Maria Chinyere Onyekanne*²; Jingjie Hu³; Vahid Rahneshein¹; Ali Salifu¹; Kwabena Kan-Dapaah⁴; Winston Soboyejo¹; ¹Worcester Polytechnic Institute (WPI); ²African University of Science and Technology; ³Princeton University; Mayo Clinic; ⁴University of Ghana

Phase Transformations in Ceramics: Science and Applications — Prediction and Novel Methods I

Program Organizers: Pankaj Sarin, Oklahoma State University; Waltraud Kriven, University of Illinois at Urbana-Champaign; Sanjay Khare, University of Toledo; Yu Zhong, Worcester Polytechnic Institute

Wednesday PM Room: A104
October 2, 2019 Location: Oregon Convention Center

Session Chair: Pankaj Sarin, Oklahoma State University

2:00 PM Invited
In-situ X-ray Characterization of Phase Evolution during Solid-state Synthesis of Multicomponent Systems: *Sanjit Ghose*¹; ¹Brookhaven National Laboratory

2:30 PM Invited
Exploring 3-D Reciprocal Space: a Powerful Tool to Answer Basic and Applied Materials Science Questions at 33BM APS: *Evgenia Karapetrova*¹; ¹Argonne National Laboratory

3:00 PM
Unraveling Stress-induced Structure Evolution in Functional Oxides using In-situ Neutron Diffraction: *Yan Chen*¹; Ke An¹; ¹Oak Ridge National Laboratory

3:20 PM Invited
Advances in Experimental Techniques for Investigating Microstructure Dependent Phase Transformations: *Raman Singh*¹; Daniel Lowry¹; Pankaj Sarin¹; ¹Oklahoma State University

3:50 PM Break

4:10 PM Invited
Single Phase Spinel Produced from Powders of Alumina and Magnesia in Reactive Flash Sintering: *Rishi Raj*¹; ¹University of Colorado

4:40 PM
Reactive Texturing of Yttria and Ceria TZP in a Strong Magnetic Field: *Omer Van Der Biest*¹; Despoina Vriami¹; ¹K U Leuven Department Mtm

5:00 PM
Investigations on the Glass Transition and Crystallisation Behavior of Glasses by Oscillatory Rheometry: Christopher Giehl¹; Mario Kleindienst¹; *Daniela Ehgartner*¹; ¹Anton Paar

5:20 PM
Direct Conversion of Heat to Electricity using First-order Phase Transformations in Ferroelectrics: *Ashley Bucsek*¹; William Nunn¹; Bharat Jalan¹; Richard James¹; ¹University of Minnesota

Powder Metallurgy of Light, Reactive and Other Non-ferrous Metals — Powder Metallurgy of Titanium, Aluminium, Magnesium and Calcium II

Program Organizers: Ma Qian, Royal Melbourne Institute of Technology; Zak Fang, University of Utah; David Yan, San Jose State University; James Paramore, U.S. Army Research Laboratory

Wednesday PM Room: D135
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Biao Chen, Northwestern Polytechnical University; Peng Chen, University of Auckland

2:00 PM Keynote

Powder sintering involving TiH₂: An Update Overview: *Gang Chen*¹; Peng Cao²; Klaus-Dieter Liss³; Graeme Auchterlonie⁴; Xuanhui Qu¹; ¹University of Science and Technology Beijing; ²The University of Auckland; ³Israel Institute of Technology; ⁴The University of Queensland

2:40 PM

Development of Magnesium and Magnesium Alloy Materials through Press and Sinter Powder Processing: *Steven Johnson*¹; Jason Alvarez¹; ¹Central Connecticut State University

3:00 PM Invited

Strong and Ductile Novel Aluminium Metal Matrix Composites Reinforced with Ex-situ Carbon Nanotubes and In-situ Alumina Nanoparticles: *Biao Chen*¹; Katsuyoshi Kondoh²; ¹Northwestern Polytechnical University; ²Osaka University

3:30 PM Break

3:50 PM Keynote

Thermodynamic Model for Predicting the Embodied Energy of Titanium Alloys Produced by Powder Metallurgy: *James Paramore*¹; Brady Butler¹; Matthew Dunstan¹; Z. Zak Fang²; ¹US Army Research Laboratory; ²University of Utah

4:30 PM Invited

Improved Exothermic Reactivity of Surface-mediated Fine Aluminum Powders: *Kyung Tae Kim*¹; Injoon Son²; ¹Korea Institute of Materials Science; ²Kyungpook National University

5:00 PM

Preparation of Mo₂C by Reduction and Carbonization of MoO₂ with Ethanol: *Zepeng Lv*¹; Jie Dang¹; Chenguang Bai¹; ¹Chongqing University

PSDK XIV: Phase Stability and Diffusion Kinetics — Applications of Thermodynamics and Diffusion

Program Organizers: Michael Gao, National Energy Technology Laboratory; Hans Seifert, Karlsruhe Institute of Technology; Zi-Kui Liu, Pennsylvania State University; Fan Zhang, CompuTherm LLC; Richard Otis, Jet Propulsion Laboratory; Aurelien Perron, Lawrence Livermore National Laboratory

Wednesday PM Room: E144
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Yunzhi Wang, Ohio State University; Ichiro Takeuchi, University of Maryland

2:00 PM Invited

Segregation, Segregation Transition and Localized Phase Transformation at Stacking Faults: Longsheng Feng¹; You Rao¹; Ashton Egan¹; Maryam Ghazisaeidi¹; Michael Mills¹; *Yunzhi Wang*¹; ¹Ohio State University

2:20 PM

Divergent Pearlite Growth in Fe-Mn-C Steel: Phase-field Simulations: *Leslie Mushongera*¹; ¹University of Nevada Reno

2:40 PM

Phase Field Study of Nucleation, Growth, and Reversion in a Ternary IN625 Analogue: *Trevor Keller*¹; Nana Ofori-Opoku¹; Greta Lindwall¹; Ursula Kattner¹; Jonathan Guyer¹; ¹National Institute of Standards and Technology

3:00 PM Invited

Machine Learning Representations for Grain Boundaries: *Gus Hart*¹; Andrew Nguyen²; Eric Homer¹; Derek Hensley¹; Conrad Rosenbrock¹; ¹Brigham Young University; ²Nguyen Research

3:20 PM Invited

Defects Diffusion in Concentrated Alloys: Percolation Effects, Sluggish and Chemically Biased Atomic Transport and Phase Stability: *Osetskiy Yury*¹; Alexander Barashev²; James Morris¹; Yanwen Zhang¹; ¹Oak Ridge National Laboratory; ²University of Michigan

3:40 PM Break

4:00 PM Invited

Combinatorial Experimentation and Machine Learning for Materials Discovery: *Ichiro Takeuchi*¹; ¹University of Maryland

4:20 PM Invited

Model Sensitivity Scores for Calculated Phase Equilibria: *Richard Otis*¹; ¹Jet Propulsion Laboratory

4:40 PM Invited

Multi-Physics Modeling for Analysis of Material Degradation in Advanced Test Reactors: *Michael Glazoff*¹; Jeffrey Brower¹; Thomas Eiden²; ¹Idaho National Laboratory ²Atomic Alchemy, Inc.

5:00 PM

Time-temperature-precipitation Characteristics of Nitride Penetration in Austenitic Stainless Steel: *Alice Young*¹; Milo Kral¹; Catherine Bishop¹; ¹University of Canterbury



Sandphobic Thermal/Environmental Barrier Coatings — Sandphobic Thermal/Environmental Barrier Coatings I

Program Organizers: Michael Walock, U.S. Army Research Laboratory; Andy Nieto, US Army Research Laboratory; Clara Mock, US Army Research Laboratory; Anindya Ghoshal, US Army Research Laboratory; Muthuvel Murugan, US Army Research Laboratory; Marc Pepi, US Army Research Laboratory

Wednesday PM Room: C120
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Marc Pepi, US Army Research Laboratory; Clara Mock, US Army Research Laboratory

2:00 PM Introductory Comments: Summarize Dongming's Career/Contributions to T/EBCs and CMAS

2:10 PM Progress and Challenges in Understanding CMAS Attack and Developing CMAS-phobic T/EBCs: *Andy Nieto*¹; Clara Hofmeister-Mock²; Richa Agrawal¹; Luis Bravo²; Anindya Ghoshal²; Michael Walock²; Muthuvel Murugan²; ¹Naval Postgraduate School; ²US Army Research Laboratory

2:30 PM Invited Turbulence Modulation Effects in Particle-laden Shear Driven Flows and its Impact on Material Deposition: Luis Bravo¹; *Nishan Jain*²; Prashant Khare³; Anindya Ghoshal¹; Muthuvel Murugan¹; Alison Flatau²; ¹US Army Research Laboratory; ²University of Maryland; ³University of Cincinnati

3:00 PM Invited Development of Novel CMAS/VA Resistant TBCS: Influence of Chemical Composition and the Microstructure: *Ravisankar Naraparaju*¹; Juan Gomez Chavez²; Christoph Mikulla¹; Mohammad Rizviul Kabir¹; Philipp Niemeyer¹; Peter Mechnich¹; Uwe Schulz¹; ¹German Aerospace Center; ²University of Texas El Paso

3:30 PM Break

3:50 PM Carbon Nanotube (CNTs) Reinforced Ceramic Thin Films as Thermal/Environmental Barrier Coatings (T/EBCs) for Aerospace Applications: *Cheryl Xu*¹; Bill Nickerson²; ¹NC State University; ²Office of Naval Research

4:10 PM Invited Multilayer, Multifunctional, Thermo-structural Coatings to Mitigate Molten Silicate Attack in Aeroengines: *Sanjay Sampath*¹; Edward Gildersleeve¹; ¹Stony Brook University

4:40 PM Invited Multiphase Thermal Barrier Coatings for Broad-base Resistance to Silicate Deposits: *David Poerschke*¹; ¹University of Minnesota

5:10 PM Effects of Silicate Melt Chemistry on Thermochemical Interactions with Thermal Barrier Oxides: *Najeb Abdul-Jabbar*¹; Paul Kuhn²; Sarah Miller²; Carlos Levi²; ¹Los Alamos National Laboratory; ²University of California, Santa Barbara

Semiconductor Heterostructures: Theory, Growth, Characterization, and Device Applications — Semiconductor Heterostructures

Program Organizers: John Ayers, University of Connecticut; Phil Ahrenkiel, South Dakota School of Mines and Technology; Ganesh Balakrishnan, University of New Mexico

Wednesday PM Room: C121
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Phil Ahrenkiel, South Dakota School of Mines and Technology; Ganesh Balakrishnan, University of New Mexico; John Ayers, University of Connecticut

2:00 PM Introductory Comments

2:20 PM Invited Advances in Compositionally Graded Buffers for Ultrahigh Efficiency III-V Multijunction Solar Cells: *Ryan France*¹; ¹National Renewable Energy Laboratory

3:00 PM Control of Ordering in III-V Alloys using Plasma-enhanced MOCVD and the Measurement of Order Parameter by Electron Diffraction: *Phil Ahrenkiel*¹; Nathan Smaglik¹; Xavier Pasala¹; Nikhil Pokharel¹; Kirstin Alberi²; Kamran Forghani³; ¹South Dakota School of Mines & Technology; ²National Renewable Energy Laboratory; ³MicroLink Devices, Inc.

3:20 PM Nanoscale Tomography of Functional Properties for Superlattice Heterostructures: Thomas Moran¹; *Jingfeng Song*¹; James Steffes¹; Tadasu Hosokura²; Yen Lin Huang³; Koji Murayama²; Nobuhiko Tanaka⁴; Ramamoorthy Ramesh³; Keigo Suzuki⁴; Bryan Huey¹; ¹University of Connecticut; ²Murata Manufacturing Co., Ltd.; ³Materials Science and Engineering, University of California, Berkeley; ⁴Murata Manufacturing Co., Ltd.,

3:40 PM Break

4:00 PM Investigating Dislocation Networks in the Growth of GaSb on GaAs using Transmission Electron Microscopy: *Ganesh Balakrishnan*¹; Darryl Shima¹; Sadvikas Addamane¹; ¹University of New Mexico

4:20 PM Criterion for Dislocation Compensation in a Semiconductor Heterostructure Utilizing a Buffer Layer: *Tedi Kujofsa*¹; Md Islam¹; John Ayers¹; ¹University of Connecticut

4:40 PM Nanoscale Semiconducting Metal Oxide Heterostructures for Gas Sensing Applications: *Janine Walker*¹; Sheikh Akbar¹; Patricia Morris¹; ¹Ohio State University

5:00 PM Effect of Heterojunction Interface on Gas Sensing Properties of Hetero-Nanostructured Oxides: *Priyanka Karnati*¹; Sheikh Akbar¹; Patricia Morris¹; ¹Ohio State University

WEDNESDAY PM

Sintering and Related Powder Processing Science and Technologies — Advanced Sintering Techniques

Program Organizers: Wolfgang Rheinheimer, Purdue University; Zachary Cordero, Rice University; Ricardo Castro, University of California, Davis; Eugene Olevsky, San Diego State University

Wednesday PM Room: E142
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Eugene Olevsky, San Diego State University; Wolfgang Rheinheimer, Purdue University

2:00 PM Invited

Cold Sintering of Ceramic Materials, Devices and Novel Nanocomposites: *Clive Randall*¹; ¹Penn State University

2:30 PM Invited

Controlling Factors in Flash Sintering of Ceramics: *Richard Todd*¹; Wei Ji²; Zhengyi Fu³; Yinsheng Li¹; Yasuhiro Kubota¹; Andrew Gibson¹; ¹University of Oxford; ²University of Oxford/Wuhan University of Technology; ³Wuhan University of Technology

3:10 PM

Staged Microstructural Study of Flash Sintered Titania: *Xin Li Phuah*¹; Han Wang¹; Harry Charalambous²; Shikhar Jha²; Jin Li¹; Thomas Tsakalakos²; Xinghang Zhang¹; Haiyan Wang¹; ¹Purdue University; ²Rutgers University

3:30 PM Break

3:50 PM

Room Temperature Plasticity in Flash-sintered TiO₂: *Jin Li*¹; Jaehun Cho¹; Jie Ding¹; Harry Charalambous²; Sichuang Xue¹; Han Wang¹; Xin Li Phuah¹; Thomas Tsakalakos²; R. Edwin García¹; Amiya K. Mukherjee³; Noam Bernstein⁴; C. Stephen Hellberg⁴; Haiyan Wang¹; Xinghang Zhang¹; ¹Purdue University; ²Rutgers University; ³University of California, Davis; ⁴U.S. Naval Research Laboratory

4:10 PM

Analysis of SPS Parameters and Resultant Electrical Response of SPS Sintered Specimens: Rosario Gerhardt¹; *Thomas Rudzik*¹; ¹Georgia Institute of Technology

Surface Protection for Enhanced Materials Performance: Science, Technology, and Application — Ceramic Coatings Formed by Aerosol Deposition II / Coatings and Surface Modifications for Oxidation, Corrosion, and Wear Resistance

Program Organizers: Kang Lee, NASA Glenn Research Center; Jun Song, McGill University; Yutaka Kagawa, University of Tokyo; Rodney Trice, Purdue University; Daniel Mumm, University of California, Irvine; Mitchell Dorfman, Oerlikon Metco (US) Inc.; Christian Moreau, Concordia University; Emmanuel Boakye, UES Inc.; Edward Gorzkowski, Naval Research Laboratory; Scooter Johnson, Naval Research Laboratory; Stephen Yue, McGill University; Richard Chromik, McGill University

Wednesday PM Room: D137
October 2, 2019 Location: Oregon Convention Center

Session Chairs: Scooter Johnson, Naval Research Laboratory; Valerie Wiesner, NASA Glenn Research Center; Daniel Mumm, University of California, Irvine

2:00 PM

Effects of Aerosol Deposited Coatings on Substrate Materials: *Eric Patterson*¹; Heonjune Ryou²; Scooter Johnson¹; Edward Gorzkowski¹; ¹U.S. Naval Research Laboratory; ²ASEE Post-Doctoral Fellow

2:20 PM

Nanostructured Cu-Al₂O₃ Thick Films Produced through Aerosol Deposition of Composite Powder: *Kevin Anderson*¹; Eric Patterson¹; Scooter Johnson¹; Edward Gorzkowski¹; Helen Chan²; ¹U.S. Naval Research Laboratory; ²Lehigh University

2:40 PM Invited

Predicting Coating Lifetime of Diffusion and Overlay Coatings: From Manufacturing to Service: *Rishi Pillai*¹; Beth Armstrong¹; Sebastien Dyepondt¹; Bruce Pint¹; ¹Oak Ridge National Laboratory

3:10 PM

Aluminizing Co-base Superalloys: *Kailey Hanan*¹; Prafull Pandey²; Kamanio Chattopadhyay²; Vilupanur Ravi¹; ¹Cal Poly Pomona; ²Indian Institute of Science

3:30 PM Break

3:50 PM

Electrodeposited Nanostructured Aluminum Coatings for Cadmium Replacement: Joshua Abbott¹; *Robert Hilty*¹; Weilong Zhange²; Weina Li²; ¹Xtalic Corporation; ²United Technologies Research Center

4:10 PM

Sublimation Protection Coatings for Thermoelectric Materials for Space Power Applications: *Kang Lee*¹; Bernadette Puleo¹; John Setlock²; ¹NASA Glenn Research Center; ²University of Toledo

4:30 PM

Exploiting Suspension Plasma Spraying for Oxide and Carbide Based Wear Resistant Coatings: Wael Algenaid¹; Satyapal Mahade¹; Govindarajan Sivakumar²; Karthik Narayanan¹; Nicholas Curry³; *Shrikant Joshi*¹; ¹University West; ²ARCI; ³Treibacher Industrie AG

4:50 PM

Corrosion Inhibition of Stainless Steel (AISI 316) by Environmental Friendly Inhibitor in Chloride Medium: Electrochemical and Physical Study: *Omotayo Sanni*¹; Popoola Patricia¹; ¹Tshwane University of Technology, Pretoria, South Africa



5:10 PM

Obtaining Surface Coatings Providing Protection Against Extreme Conditions of Coke Production: *Borys Sereda*¹; Dmytro Sereda¹; Alexander Gaydaenko¹; Irina Kruglyak¹; ¹Dneprovsky State Technical University

Synthesis, Characterization, Modeling and Applications of Functional Porous Materials — Porous Materials II

Program Organizers: Lan Li, Boise State University; Winnie Wong-Ng, National Institute of Standards and Technology (NIST); Kevin Huang, University of South Carolina

Wednesday PM
October 2, 2019

Room: D139
Location: Oregon Convention Center

Session Chairs: Kevin Huang, University of South Carolina; Matthew Lawson, Boise State University

2:00 PM Invited

Defect-driven Metal Oxide Electrodes for Lithium Ion Batteries: *Hui Xiong*¹; Pete Barnes¹; Kiev Dixon¹; Yunxing Zuo²; Shyue Ping Ong²; ¹Boise State University; ²University of California - San Diego

2:20 PM

Phase Field Simulation of Ni Coarsening in the Porous Anode of Solid Oxide Fuel Cell: *Yinkai Lei*¹; Tian-Lei Cheng¹; Harry Abernathy¹; Gregory Hackett¹; Youhai Wen¹; ¹US Department of Energy National Energy Technology Laboratory

2:40 PM

An Attempt to Interpret Pressure and Temperature Dependent Elasticity of Porous Ceramics using Resonant Ultrasound Spectroscopy: *Ashoka Karunaratne*¹; Joseph Gladden¹; Gautam Priyadarshan¹; ¹University of Mississippi

3:00 PM

Organic Functionalized One-step Filtration-catalysis Photoresponsive Titania Membranes: *Evan Hyde*¹; Matthew Beck¹; ¹University of Kentucky

3:20 PM Break

3:40 PM

3D Morphology and Mechanical Behavior of Porous Cu Fabricated by Chemical De-Alloying Method: *Fei Chen*¹; Lijie Zou¹; Hao Wang¹; Yu-chen Karen Chen-Wiegart²; Qiang Shen¹; Lianmeng Zhang¹; ¹Wuhan University of Technology; ²Stony Brook University/Brookhaven National Laboratory

4:00 PM

Structure-mechanical Properties in Solid Solution Strengthened Nanoporous Copper Alloys: *Alexandra Yaluth Louiza Lopera*¹; Jung-Ting Tsai¹; David Bahr¹; ¹Purdue University

4:20 PM

Studying the Scaling Laws and Mechanical Properties of Nano Porous (NP) Metals: *Ankit Gupta*¹; Antonia Antoniou²; Garritt Tucker¹; ¹Colorado School of Mines; ²Georgia Institute of Technology

4:40 PM

The Formation of Intermetallic Catalysts Porous Structures: *Borys Sereda*¹; Yuriy Belokon¹; Karina Belokon¹; Irina Krugljak¹; Dmytro Sereda¹; Aleksandr Korobochka¹; ¹Dneprovsky State Technical University

5:00 PM

Tensile Behavior of Stitched Log-pile Structures Developed via Direct Laser Writing: *Alina Garcia Taormina*¹; Andrea M. Hodge¹; ¹University of Southern California

Thermal Protection Materials and Systems — TPS Materials Development and Testing II

Program Organizers: Jeff DeMange, Integration Innovation, Inc. (i3); Frances Hurwitz, NASA Glenn Research Center; Arturs Jasjukevics, ArianeGroup; Thomas Reimer, German Aerospace Center

Wednesday PM
October 2, 2019

Room: B114
Location: Oregon Convention Center

Session Chairs: Jeff DeMange, Integration Innovation, Inc. (i3); Thomas Reimer, German Aerospace Center

2:00 PM

Testing of Cork-based Spray-on Thermal Protection Materials in an Arc-Jet Environment: *Thomas Reimer*¹; ¹DLR

2:30 PM

Thermal Stability Improvement of Fungal Mycelium: *Xijin Zhang*¹; Chanjuan Han¹; Gary Wnek¹; Xiong (Bill) Yu¹; ¹Case Western Reserve University

2:50 PM

Investigation of Strength Characteristics of Styrofoam and Gum Arabic in Biodegradable Materials for Lagging Purposes: Sulaiman Abdulkareem¹; Mustapha Ndagi¹; *Abdulrahim Abdulbaqi*²; Tajudeen Ajiboye¹; ¹University of Ilorin; ²University of Maiduguri, P.M.B 1069, Bama Road, Maiduguri, Nigeria

3:20 PM Concluding Comments

Thermomechanical Processing in Shaping and Forming of Steels — Thermomechanical Processing in Shaping and Forming of Steels I

Program Organizers: Evgueni Poliak, Arcelormittal; Amy Clarke, Colorado School of Mines; Kester Clarke, Colorado School of Mines; Pello Uranga, CEIT and TECNUN (University of Navarra)

Wednesday PM
October 2, 2019

Room: C123
Location: Oregon Convention Center

Session Chairs: Evgueni Poliak, ArcelorMittal East Chicago; Pello Uranga, CEIT; Kester Clarke, Colorado School of Mines; Amy Clarke, Colorado School of Mines

2:00 PM

Yield Strength Improvement in 3rd Generation AHSS Through Warm Rolling: *Alla Sergueeva*¹; Andrew Frerichs¹; Brian Meacham¹; Sheng Cheng¹; Daniel Branagan¹; ¹NanoSteel Company Inc

2:20 PM

Effect of Thermomechanical Strategy and Mo-Nb-B Alloying Additions on High Strength Medium Carbon Q/Q&T Steels: Irati Zurutuza¹; Nerea Isasti¹; Eric Detemple²; Volker Schwinn²; Hardy Mohrbacher³; *Pello Uranga*¹; ¹CEIT and TECNUN (University of Navarra); ²AG der Dillinger Hüttenwerke; ³NobelCon bvba

2:40 PM

Effects of Thermomechanical Processing, Microalloying, and Rapid Heat Treatment on Microstructural Development, Carbonitride Precipitation, and Mechanical Behavior of Medium Carbon Steels: *Blake Whitley*¹; John Speer²; Robert Cryderman²; Kip Findley²; ¹Exponent; ²Colorado School of Mines

3:00 PM

Deformation Behavior of Non-metallic Inclusions during the Hot Torsion Process of Carbon Steel: Kaiyu Peng¹; Wen Yang¹; *Lifeng Zhang*¹; ¹University of Science and Technology Beijing

WEDNESDAY PM

3:20 PM Break

3:40 PM

Microstructural Evolution of Two Automotive Steels Induced by Warm Forging and Subcritical Annealing: *Wilson Alexander Hormaza Rodríguez*¹; Carlos Augusto Oliveira²; Gabriel Castro Güiza³; Luis Miguel Méndez Moreno⁴; ¹Universidad de Ingeniería y Tecnología - UTEC; ²Universidade Federal de Santa Catarina; ³Universidad Central; ⁴Universidad Nacional de Colombia

4:00 PM

Ferrite and Bainite Transformation from Austenite Grain Boundary in 0.6 wt.% C Steel: *Shotaro Jimbo*¹; Shoichi Nambu¹; ¹University of Tokyo

4:20 PM

Formation of Polygonized Structures and Nuclear Recrystallization under Controlled Rolling of Low-carbon Steels: *Sergey Shejko*¹; Valerii Mishchenko¹; George Sukhomlin²; ¹Zaporizhzhia National University; ²Pridneprovsk State Academy of Civil Engineering and Architecture

11th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Design and Development of Sustainable Technologies

Program Organizers: Surojit Gupta, University of North Dakota; Yiquan Wu, Alfred University; Hisayuki Suematsu, Nagaoka University of Technology; John Wolodko, University of Alberta; Christopher Taylor, DNV GL; Junichi Tatami, Yokohama National University; Enrico Bernardo, University of Padova; Zhengyi Fu, Wuhan University of Technology; Rajiv Asthana, University of Wisconsin; Allen Apblett, Oklahoma State University; Richard Sisson, Worcester Polytechnic Institute; Tatsuki Ohji, National Institute of Advanced Industrial Science and Technology; Mritunjay Singh, Ohio Aerospace Institute

Thursday AM
October 3, 2019

Room: Portland Ballroom 255
Location: Oregon Convention Center

Session Chairs: Allen Apblett, Oklahoma State University; Basak Anameric, University of Minnesota; Sabah Javaid, University of North Dakota; Maharshi Day, University of North Dakota

8:00 AM

Reduction and Immobilization of Chromate Using Nanometric Pyrite: *Allen Apblett*¹; Zach Brown¹; Amelia Bergeson²; ¹Oklahoma State University; ²Tulane University

8:20 AM

Selective Carbothermic Reduction and Smelting (SCRS) Process for Beneficiation of Low-grade Iron-manganese Mineral Deposits: *Basak Anameric*¹; ¹NRRI Coleraine Labs

8:40 AM

Molecular Imprinted Polymer (MIP) for the Selective Separation of Vanadium from Acidic Aqueous Solution: *Mengnan Wang*¹; Jose Gonzalez-Rodriguez¹; Terence Makanyire²; ¹University of Lincoln; ²GSA Environmental Ltd

9:00 AM

Relations between Microstructure and Mechanical Properties of Post-sintered RBSN with Sintering Additives of Re₂O₃-MgO/SiO₂: *Jae-Woong Ko*¹; Mi-Ju Kim¹; Ha-Neul Kim¹; Young-Jo Park¹; ¹Korea Institute of Materials Science

9:20 AM

The Behavior of Supersonic Oxygen Gas Injection in Steelmaking Converter: Jeong Han¹; *Jae-Hong Kwon*¹; Ji-A Lee¹; Chang-soo Ha²; ¹Inha University; ²POSCO

9:40 AM

Manufacture of the Invar Fine Metal Mask for the OLED Display Using an Electroforming Technique: *Yong Bum Park*¹; In Gyeong Kim¹; ¹Sunchon National University

10:00 AM Break

10:20 AM

On the Design of Novel PLA/PHA and Lignin-based Composites: *Saud Abu Aldam*¹; Kathryn Hall¹; Maharshi Dey¹; Surojit Gupta¹; ¹University of North Dakota

10:40 AM

A Kinetic Model for Interaction of Iron Powder with Alumina Refractory Relevant to the Novel Flash Ironmaking Technology (FIT): *Rahul Sarkar*¹; Hong Yong Sohn¹; ¹University of Utah

11:00 AM

Boron Removal from Si-Cu-Sn Alloy in Metallurgical Refining Process of Silicon: *Tomohiro Mizutani*¹; ¹The University of Tokyo

11:20 AM

Effect of Ambient Parameters on Electric Field Induced Localized Chemical Etching of Cr Film for Micro-nano Patterning: *Sumit Kumar*¹; Praveen Kumar¹; Rudra Pratap¹; ¹IISc Banaglore

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Additive Manufacturing of Composite Materials and Composite Like Structures

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Specialty Materials; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Thursday AM
October 3, 2019

Room: B115
Location: Oregon Convention Center

Session Chair: Prashanth Konda Gokuldoss, Tallinn University of Technology

8:00 AM

Alloy Synthesis for Additive Manufacturing using Directed Energy Deposition: *Amrita Basak*¹; ¹Pennsylvania State University

8:30 AM

Additive Manufactured SS316 and C300 Maraging Steel Functionally Composition Graded Joint: *Peter Hosemann*¹; Ashley Richard²; Adi Benartzy¹; ¹University of California, Berkeley; ²Space X

8:50 AM

Additive Manufacturing of C103 for Aerospace Applications: *Brady Dowdell*¹; Tim Horn¹; ¹North Carolina State University

9:10 AM

Additive Manufacturing of Reinforced 316L Stainless Steel: *Maija Nyström*¹; Hannu Heikkinen¹; Antti Mutanen¹; Antti Pörhönen¹; ¹Electro Optical Systems Finland Oy

9:30 AM

High-temperature Mechanical Properties and Microstructure of Additively Manufactured 304L Stainless Steel ODS Alloy: *Milad Ghayoor*¹; Kijoon Lee¹; Yujuan He²; Chih-Hung Chang²; Brian K. Paul¹; Somayeh Pasebani¹; ¹School of Mechanical, Industrial and Manufacturing Engineering, Oregon State University; ²School of Chemical, Biological and Environmental Engineering, Oregon State University

9:50 AM

Hybrid Tooling Using Laser Powder Bed Fusion: Microstructural Analysis of the Interface: *Sandra Megahed*¹; Maximilian Voshage¹; Raphael Koch²; Thomas Brenker²; Johannes Schleifenbaum³; ¹RWTH Aachen University; ²Ford John Andrews Research Centre; ³RWTH Aachen University; Fraunhofer-Institute for Laser Technology ILT

10:10 AM Break

10:30 AM

Improving the High-temperature Mechanical Properties of Additively Manufactured 316L Stainless Steel through Nanoparticles Reinforcement: *Bandar AlMangour*; Young-Kyun Kim¹; Dariusz Grzesiak²; Kee-Ahn Lee¹; ¹Department of Materials Science and Engineering, Inha University; ²Department of Mechanical Engineering and Mechatronics, West Pomeranian University of Technology

10:50 AM

Influence of AM Microstructural Features on 316L Mechanical Properties and Corrosion Behavior: *Richard Fonda*¹; Jerry Feng¹; Krystaufeux Williams²; ¹Naval Research Laboratory, Materials Science & Technology Division; ²Naval Research Laboratory, Chemistry Division

11:10 AM

Additive Manufacturing of AF9628 Steel: E.M. Hager¹; P.J. Flater¹; *Vikas Sinha*²; E.J. Payton¹; R.A. Kemnitz³; R.P. O'Hara³; ¹Air Force Research Laboratory; ²Air Force Research Laboratory/UES, Inc. ; ³Air Force Institute of Technology

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Additive Manufacturing: Materials, Solidification, Controlled Growth, Properties and Testing

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Specialty Materials; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Thursday AM
October 3, 2019

Room: B114
Location: Oregon Convention Center

Session Chair: Sudarsanam Suresh Babu, The University of Tennessee, Knoxville

8:00 AM

Analysis of Three-dimensional Interface Texture in Additively Manufactured 316L: *David Rowenhorst*¹; Aerial Murphy-Leonard¹; Richard Fonda¹; ¹US Naval Research Laboratory

8:20 AM

Using Ultrasonic Compaction Technique in Laser Powder Bed Fusion Additive Manufacturing: *Hyeyun Song*¹; Paul Boulware¹; Heimdall Mendoza¹; Rodrigo Enriquez¹; Amin Moghaddas¹; ¹EWI

8:40 AM

On-demand Magneto-hydrodynamic Droplet Jetting of 6061 Aluminum: *Denis Cormier*¹; Usama Rifat¹; Khushbu Zope¹; Paarth Mehta¹; ¹Rochester Institute of Technology

9:00 AM

Single Crystalline Stainless Steel 316L Thin Struts Processed by Laser Powder Bed Fusion: *Xianglong Wang*¹; Jose Alberto Muñoz-Lerma¹; Oscar Sanchez-Mata¹; Mohammad Attarian Shandiz¹; Nicolas Brodusch¹; Raynald Gauvin¹; Mathieu Brochu¹; ¹McGill University

9:20 AM

Additive Manufacturing ICME Platform: From Powder Feed Stock to Heat Treated Final Product: *Mustafa Megahed*¹; Joerg Willem¹; Hans-Wilfried Mindt¹; Jiadong Gong²; Abhinav Saboo²; Greg Olson²; ¹Esi Group; ²Questek

9:40 AM

Impacts of Microstructure on Mechanical Behavior of Additively Manufactured Metals: *Allison Beese*¹; ¹Pennsylvania State University

10:00 AM

Solid-State Additive Manufacturing of Aluminum based Alloys and Aluminum Matrix Composites Using Additive Friction Stir Deposition: Joey Griffiths¹; Hunter Rauch¹; Yunhui Zhu¹; *Hang Yu*¹; ¹Virginia Polytechnic Institute

Additive Manufacturing of Metals: Post Processing — Various Post Treatments

Program Organizers: Ola Harrysson, North Carolina State University; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Metals; Sudarsanam Babu, University of Tennessee, Knoxville

Thursday AM
October 3, 2019

Room: B110
Location: Oregon Convention Center

Session Chair: Ola Harrysson, North Carolina State University

8:00 AM

In-situ Synthesis of a High Strength Oxide Dispersion Strengthened Alloy by Selective Laser Melting: *Chunlei Qiu*¹; ¹Beihang University

8:20 AM

Laser Beam Powder Bed Fusion and Post Processing of Alloy 247LC: *Olutayo Adegoke*¹; Joel Andersson¹; Olarenwaju Ojo²; Håkan Brodin³; Robert Pederson¹; ¹University West; ²University of Manitoba; ³Siemens Industrial Turbomachinery AB

8:40 AM

Laser-MIG Hybrid Welding of AlSi10Mg Parts Produced by Selective Laser Melting: *Li Cui*¹; Yaoqing Chang¹; Hongxi Chen¹; Dingyong He¹; ¹Beijing University of Technology

9:00 AM

Microstructural Evolution in Laser Powder Bed Fusion AlSi10Mg: *Bryan Mcenerney*¹; Robert Dillon¹; John Paul Borgonia¹; Molly Hwang¹; ¹NASA Jet Propulsion Laboratory

9:20 AM

Post Processing AM-made Rotorplates for Axial Flux Permanent Magnet Motors: Successes and Challenges: *Samuel Hocker*¹; Christopher Stelter¹; ¹NASA

Additive Manufacturing: Microstructure and Material Properties of Titanium-based Alloys — Laser Powder Bed Fusion - Session II

Program Organizers: Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Powder Metals; Ola Harrysson, North Carolina State University; Sudarsanam Babu, University of Tennessee, Knoxville

Thursday AM Room: B116
October 3, 2019 Location: Oregon Convention Center

Session Chair: Andrzej Wojcieszynski, ATI Powder Metals

8:00 AM

Experimental and Numerical Studies on Micro-cracking of PBF-processed TiAl Single Tracks: *Yoon Suk Choi*¹; Seulbi Lee¹; Jaewoong Kim¹; Jae-Keun Hong²; Dae-Geun Nam³; ¹Pusan National University; ²Korea Institute of Materials Science; ³Korea Institute of Industrial Technology

8:20 AM

Fatigue Life Prediction of Additively Manufactured Ti-6Al-4V under Machined and as-Built Surface Conditions: *Sushant Jha*¹; John Ruschau¹; Sarah Kuhlman¹; Mark Benedict²; Thad Kacsandy¹; Jessica Orr¹; ¹University of Dayton Research Institute; ²US Air Force Research Laboratory

8:40 AM

Investigating the Overlap Regions of the EOS M400-4: *Robin Pacheco*¹; Michael Brand¹; Colt Montgomery¹; John Carpenter¹; Robert Forsyth¹; Jessica Lopez¹; Carl Cady¹; ¹Los Alamos National Laboratory

9:00 AM

Oligocrystalline Structure Formation in an Additive Manufactured Beta Titanium Alloy: Rodolfo Batalha¹; Simon Pauly²; Cláudio Kiminami³; *Piter Gargarella*³; ¹Posgraduate Program in Materials Science and Engineering/Federal University of São Carlos; ²IFW-Dresden and University of Applied Sciences Aschaffenburg; ³Materials Engineering Department/Federal University of São Carlos

9:20 AM

The Microstructure and Mechanical Properties of TiNbTaZr ??-Titanium Alloy Fabricated by Laser Powder Bed Fusion: *Weihuan Kong*¹; Parastoo Jamshidi¹; Sophie Cox¹; Moataz Attallah¹; ¹University of Birmingham

9:40 AM

Wear-corrosion Synergism Behavior of Additive Manufactured Ti-6Al-4V Alloy: *Pankaj Kumar*¹; Arpith Siddaiah¹; Ashish Kasar¹; Javed Akram²; Pradeep Menezes¹; Mano Misra¹; ¹University of Nevada, Reno; ²Ansys

Advanced Manufacturing, Processing, Characterization and Modeling of Functional Materials — Magnetic and Other SMAs

Program Organizers: Mohammad Elahinia, University of Toledo; Haluk Karaca, University of Kentucky; Reza Mirzaeifar, Virginia Tech; Reginald Hamilton, Pennsylvania State University; Reza Mehrabi, University of Toledo; Hamdy Ibrahim, University of Tennessee at Chattanooga; Mohammad Mahtabi, University of Tennessee at Chattanooga; Narges Shayesteh Moghaddam, University of Texas at Arlington; Markus Chmielus, University of Pittsburgh

Thursday AM Room: D136
October 3, 2019 Location: Oregon Convention Center

Session Chairs: Moataz Attallah, University of Birmingham; Keyvan Safaei Baghbaderani, University of Toledo

8:00 AM

Optimization of Process Parameters for Additive Manufacturing of High Temperature Shape Memory Alloys: *Mohammadreza Nematollahi*¹; Guher P. Toker²; S. Ehsan Saghayan²; Keyvan Safaei Baghbaderani¹; Othmane Benafan³; Haluk E. Karaca²; Mohammad Elahinia¹; ¹University of Toledo; ²University of Kentucky; ³NASA Glenn Research Center

8:30 AM

Effects of Hot-isostatic Pressing on the Microstructural and Magnetic Properties Development in Permalloy-80 Manufactured by Laser Powder Bed Fusion: *Ji Zou*¹; Abdel-Moez Mohamed¹; Chiu Tang²; Sheng Li¹; Kai Bongs¹; Moataz Attallah¹; ¹University of Birmingham; ²Diamond Light Source

8:50 AM

Epitaxial Growth of a Magnetic Shape-memory Alloy: Laser Metal Deposition of Ni-Mn-Ga: *Jakub Toman*¹; Peter Müllner²; Markus Chmielus¹; ¹University of Pittsburgh; ²Boise State University

9:10 AM

Magnetic Shielding Promotion in Laser Powder Bed Fusion of NiFeMo Permalloy via Directional Grain Formation and Thermal Post Processing: *Abdel-Moez Mohamed*¹; Richard Sheridan¹; Ji Zou¹; Kai Bongs¹; Moataz Attallah¹; ¹University of Birmingham

9:30 AM

Laser- and Binder-based Additive Manufacturing and Post-processing of Functional Magnetic Materials: *Markus Chmielus*¹; Jakub Toman¹; Runbo Jiang¹; Pierangeli Rodriguez De Vecchis¹; Amir Mostafaei²; Rafael Rodriguez De Vecchis¹; Aaron Acierno¹; Katerina Kimes¹; Erica Stevens¹; ¹University of Pittsburgh; ²Carnegie Mellon University

9:50 AM Break

10:10 AM

On the Effect of the Build Direction in Mechanical Fatigue Life of the SLM Fabricated NiTi: *Parisa Bayati*¹; Ahmadreza Jahadakbar¹; Mohammadreza Nematollahi¹; Mohammad J. Mahtabi¹; Mohammad Elahinia¹; ¹The University of Toledo

10:30 AM

Investigation of the Deposition Mechanism of Nano-CeO₂ Catalyst within SOFC Electrodes using Bio-adhesive Catechol Surfactants: Ozcan Ozmen¹; Shiwoo Lee²; Gregory Hackett²; Harry Abernathy²; *Edward Sabolsky*¹; ¹West Virginia University; ²US DOE-National Energy Technology Laboratory

10:50 AM

Optimizing Additive Manufacturing of NiTi by Controlling Linear and Volumetric Energy Densities: *Sayed Ehsan Saghaian*¹; M. Nematollahi²; G.P. Toker¹; A. Hinojos³; M.J. Mills³; M. Elahinia; M. Elahinia²; H. Karaca¹; ¹University of Kentucky; ²University of Toledo; ³Ohio State University

11:10 AM

Protonic Ceramic Electrolyzer Cells Manufactured by a Novel Laser 3D Printing Technique: *Jianhua "Joshua" Tong*¹; ¹Clemson University

11:30 AM

Integrated Heat Transfer and Material Model to Predict Magnetic Field-induced Strain in an Additively Manufactured Magnetic Shape Memory Alloy: *Yao Xu*¹; Sneha Narra¹; ¹Worcester Polytechnic Institute

Advances in Understanding of Martensite in Steels — Transformations & Crystallography

Program Organizers: Ian Zuazo, ArcelorMittal Global R&D - (CRMC, Industeel); Amy Clarke, Colorado School of Mines; Eric Payton, Air Force Research Laboratory; Janelle Wharry, Purdue University; Kester Clarke, Colorado School of Mines; Eric Lass, University of Tennessee, Knoxville; Mohsen Asle Zaeem, Colorado School of Mines

Thursday AM
October 3, 2019

Room: C125
Location: Oregon Convention Center

Session Chairs: Ian Zuazo, ArcelorMittal Global R&D; Janelle Wharry, Purdue University

8:30 AM Invited

Variation Structure of Martensite and Bainite in Steels: *Goro Miyamoto*¹; Tadashi Furuhashi¹; ¹Tohoku University

9:00 AM Invited

Phase Transformation Behaviors in Sandwich-like Clad Sheet Composed of Low and High Carbon Steels: *Rintaro Ueji*¹; Tadanobu Inoue¹; ¹National Institute for Materials Science

9:30 AM

Substructure of Lenticular Martensite Formed from Austenite Containing Hydrogen in Fe-31Ni Alloy: *Akinobu Shibata*¹; Masanori Enoki²; Nahoko Saji¹; Hirotaaka Tai¹; Motomichi Koyama²; Hiroshi Ohtani²; Kaneaki Tsuzaki³; Nobuhiro Tsuji¹; ¹Kyoto University; ²Tohoku University; ³Kyushu University

9:50 AM

Probabilistic Reconstruction of Prior Austenite Microstructure in Steels after Microstructure Refinement: *Eric Payton*¹; Alexander Brust²; Stephen Niezgodza²; Vikas Sinha¹; ¹Air Force Research Laboratory; ²The Ohio State University

10:10 AM Break

10:30 AM Invited

Microstructural Evolution of Conventionally and Rapidly Tempered Martensite in Medium-carbon Steels: *Amy Clarke*¹; Virginia Judge¹; Jonah Klemm-Toole¹; Kester Clarke¹; Robert Field¹; Dan Coughlin²; Bjorn Clausen²; Dean Pierce²; Paul Gibbs²; Jonathan Poplawsky³; Don Williamson¹; Don Brown²; Jonathan Almer⁴; David Alexander²; Kip Findley¹; David Matlock¹; George Krauss¹; John Speer¹; ¹Colorado School of Mines; ²Los Alamos National Laboratory; ³Oak Ridge National Laboratory; ⁴Argonne National Laboratory

11:00 AM

Influence of Quenching Rate on Microstructure in High Carbon Steels: *Thomas Kohne*¹; Peter Hedström¹; Annika Borgenstam¹; ¹KTH Royal Institute of Technology

11:20 AM

Martensite Morphology in an Additively Manufactured Hot-work Tool Steel: *Niklas Pettersson*¹; Greta Lindwall¹; ¹KTH Royal Institute of Technology

Applications of Modern Characterization Techniques to Ferrous Alloys and Steel Products — Applications of Modern Characterization Techniques to Ferrous Alloys and Steel Products II

Program Organizers: Steven Thompson, Colorado School of Mines; C. Isaac Garcia, University of Pittsburgh

Thursday AM
October 3, 2019

Room: C124
Location: Oregon Convention Center

Session Chair: Steven Thompson, Colorado School of Mines

8:00 AM

Neutron Scattering Characterization of Steel Alloys: *Jeffrey Bunn*¹; ¹Oak Ridge National Laboratory

8:20 AM

Elevated Temperature Mechanical Property-Microstructure Relationships of X70 Pipeline Steels: *Taylor Jacobs*¹; David Matlock²; Kip Findley²; ¹Los Alamos National Laboratory; ²Colorado School of Mines

8:40 AM

Synchrotron Radiation X-ray Diffraction Studies of Carbide Evolution in Fe-Mn-Al-C Steel: *Nathan Ley*¹; Marcus Young¹; B. Chad Hornbuckle²; Daniel Field²; Krista Limmer²; ¹University of North Texas; ²CCDC Army Research Laboratory

9:00 AM

The Reduction Performance of the Ca₂(Fe₂-xAl_x) O₅ Solid Solution: *Fei Liao*¹; ¹University of Science and Technology Beijing

9:20 AM

Microstructural and Physicochemical Properties of Iron-cerium Alloy: Baoyu Liu¹; Lingxiao Cui¹; Yaqiong Li¹; *Lifeng Zhang*¹; ¹University of Science and Technology Beijing

9:40 AM

An Improved Method for Characterization of Inclusions in Steels with X-ray Diffraction: *Yang Liu*¹; Pei Wang¹; Dianzhong Li¹; ¹Institute of Metal Research, Chinese Academy of Sciences

Bulk Metallic Glasses and their Composites – Progresses, Outcomes and Prospects — Helium Irradiation Effects in Materials

Program Organizers: Muhammad Rafique; Weidong Li, Corning; Junwei Qiao, Taiyuan University of Technology

Thursday AM
October 3, 2019

Room: E146
Location: Oregon Convention Center

Session Chairs: Yongqiang Wang, Los Alamos National Laboratory; Feng Ren, Wuhan University

8:00 AM Invited

Suppressing Helium Cavity Growth in Ni-based Concentrated Solid Solution Alloys: *Zhe Fan*¹; X. Wang¹; S. Zhao¹; K. Jin¹; D. Chen²; Yury Osetskiy¹; Y. Wang²; H. Bei¹; W.J. Weber³; K.L. More¹; Y. Zhang¹; ¹Oak Ridge National Laboratory; ²Los Alamos National Laboratory; ³University of Tennessee; Oak Ridge National Laboratory

8:30 AM

Effect of Helium Morphology on Materials Strength in Pure Metals: Application of Richtmyer-Meshkov Instability to Bulk Measurement of Irradiated Properties: *Calvin Lear*¹; Saryu Fensin¹; ¹Los Alamos National Laboratory

8:50 AM

Hydrogen and Tritium Effects on Type 309L Stainless Steel: *Paul Korinko*¹; Michael Morgan¹; Scott West¹; ¹Savannah River National Laboratory

9:10 AM Invited

Enhanced Radiation Tolerance of Nanochannel W Films: *Feng Ren*¹; Wenjing Qin¹; R. P. Doerner²; Huiqiu Deng³; Yongqiang Wang⁴; ¹Wuhan University; ²University of California, San Diego; ³Hunan University; ⁴Los Alamos National Laboratory

9:40 AM

In situ TEM Observation of Helium Bubble Formation under Dual Ion Beam Irradiation: *Meimei Li*¹; Wei-Ying Chen¹; Shilei Li¹; ¹Argonne National Laboratory

10:00 AM Break

10:20 AM Invited

Confinement of He Precipitates Growth within Metal Nano-layers and Implications to Radiation Damage: *Yongqiang Wang*¹; Di Chen²; Nan Li¹; Dina Yuryev³; Kevin Baldwin¹; Michael Demkowicz⁴; ¹Los Alamos National Laboratory; ²University of Houston; ³Massachusetts Institute of Technology; ⁴Texas A&M University

10:50 AM

In-situ Observations of Bubble Evolution in Pd during He Implantation at Cryogenic Temperatures in a H₂ Environment: *Samuel Briggs*¹; Anthony Monterrosa²; Caitlin Taylor²; Graeme Greaves³; Jonathan Hinks³; Khalid Hattar²; ¹Oregon State University; Sandia National Laboratories; ²Sandia National Laboratories; ³University of Huddersfield

11:10 AM Invited

Helium Bubble Evolution in Implanted Erbium Deuteride Bulk and Multilayered Structures: *Caitlin Taylor*¹; Brittany Muntiferling¹; Ron Goeke¹; Yongqiang Wang²; Anthony Monterrosa¹; Bethany Matthews³; Khalid Hattar¹; Bruce Arey³; Dale Zschiesche¹; ¹Sandia National Laboratories; ²Los Alamos National Laboratory; ³Pacific Northwest National Laboratory

11:40 AM

Nanobubbles and Nanocavities in Palladium as a Function of He: *Trevor Clark*¹; Caitlin Taylor¹; David Robinson¹; Joshua Sugar¹; Khalid Hattar¹; ¹Sandia National Laboratories

Characterization of Materials and Properties through Metallography, Mechanical Testing and Analysis - From Fundamentals to the Cutting Edge — Microstructural Characterization and the Correlation of Microstructure to Mechanical Properties III

Program Organizer: Michael Keeble, Buehler

Thursday AM

October 3, 2019

Room: F152

Location: Oregon Convention Center

Session Chairs: Mike Keeble, Buehler, a Division of ITW; Don Susan, Sandia National Laboratories; James Martinez, NASA Lyndon B. Johnson Space Center

8:00 AM

Strength and Fatigue Life Characteristics of Cold Rolled AA1200 Aluminium Alloy: *Olusegun Oyekeye*¹; Samson Adeosun¹; Joseph Ajiboye¹; Ademola Agbeleye¹; ¹University of Lagos

8:20 AM

Measurement of the Unaffected Pores in Dynamic Impact Loading on the Fractured Surface of Selective Laser Melting Built Aluminum Specimens: *Md Salah Uddin*¹; Brahmananda Pramanik¹; ¹Montana Technological University

8:40 AM

In-situ Corrosion Fatigue in Ar and s-CO₂ Environments: *Andrew Brittan*¹; Lucas Teeter¹; Camila Toledo Torres¹; Samuel Briggs¹; Guillaume Mignot¹; Sebastien Teyssyre¹; Julie Tucker¹; ¹Oregon State University

9:00 AM

Microstructural Evaluation of Welded Nickel-based Superalloy Inconel 740H with Nimonic 263 after Creep Testing: *Kinga Unocic*¹; Xiang Chen¹; Peter Tortorelli¹; ¹Oak Ridge National Laboratory

9:20 AM

Characterization of Microstructural Evolution in the IN718/Alvac 718Plus EB Welded Joint during Post-weld Heat Treatment Using Electron Microscopy and Tomography Techniques: *Adam Kruk*¹; Oskar Dziuba¹; Grzegorz Cempura¹; Agnieszka Wusatowska-Sarneck²; ¹AGH University of Science and Technology; ²Pratt & Whitney

9:40 AM

Arc Weldability of Incoloy 825 to AISI 321 Stainless Steel Welds: *Navid Sayyar*

10:00 AM Break

10:20 AM

Microstructure and Mechanical Properties of Ni-Al Bronze with Addition of Zr: *Yoonsung Shim*¹; Dongwook Kim¹; Cheol Hyun Bae¹; Jee Hyuk Ahn²; Seung Zeon Han²; Sung-Mo Lee¹; ¹Korea Shipbuilding & Offshore Engineering Co., Ltd; ²Korea Institute of Materials Science

10:40 AM

Effect of Austenite Reverted Transformation Annealing Time on Microstructure, Mechanical, and Electrochemical Properties of Medium Manganese Steel: Muhammad Hafeez¹; *Ameeq Farooq*¹; ¹The University of the Punjab

11:00 AM

Effect of Plastic Deformation on the Microstructure and Electrochemical Behavior of 316L: *Ameeq Farooq*¹; Abdul Basit¹; ¹University of the Punjab

Crosscutting Issues in Corrosion of Materials: Control, Monitoring, Mitigation and Material Selection — Crosscutting Issues in Lightweight Alloy Corrosion

Program Organizers: Matthew Asmussen, Pacific Northwestern National Laboratory; Jeff Binns, Nuclear Waste Management Organization; James Neeway, Pacific Northwest National Laboratory; John Zhang, Gamry Instruments; Mary Lyn Lim, PPG; Sudhakar Mahajanam, Pinnacle ART; Eric Schindelholz, Sandia National Laboratories; Ajit Mishra, Haynes International; James Noel, Western University; Guang-Ling Song, Xiamen University; David Shoemith, Western University; Raul Rebak, General Electric Global Research

Thursday AM Room: B119
October 3, 2019 Location: Oregon Convention Center

Session Chairs: Matthew Asmussen, Pacific Northwestern National Laboratory; Wilfred Binns, Nuclear Waste Management Organization

8:00 AM

Interaction of Water, Chloride, and Acetic Acid on the Corrosion Behavior of Aluminum in Ethanol Blended Gasoline Fuels: *Ruediger Reitz*¹; ¹Technische Universität Darmstadt

8:20 AM

Understanding the Effect of Anodic Polarization on SCC Resistance of AA6111 to Simulate Coupling with CFRP for Automotive Applications: *Katrina Catledge*¹; Jenifer (Warner) Locke¹; ¹The Ohio State University

8:40 AM

Corrosion Fatigue Performance of AA5456-H116 for In-service versus Laboratory Accelerated Sensitization: *Allison Akman*¹; David Schrock¹; Jenifer (Warner) Locke¹; ¹The Ohio State University

9:00 AM Invited

Characterization, Understanding, and Mitigation of Stress Corrosion Cracking in Al-Mg Alloys: *James Burns*¹; ¹University of Virginia

9:40 AM

Determination of Corrosion Fatigue Crack Growth Rates of AA 7085-T7451 Utilized in Atmospheric Conditions: *Brandon Free*¹; Sarah Galyon Dorman²; Jason Niebuhr²; Jenifer Locke¹; ¹Fontana Corrosion Center, The Ohio State University; ²SAFE Inc.

10:00 AM Break

10:15 AM

Effect of Zn²⁺ Ions on the Corrosion Behavior of the Pure Magnesium in NaCl Solutions: *Jufeng Huang*¹; Yixing Zhu¹; Dajiang Zheng¹; Guang-Ling Song¹; ¹Xiamen University

10:35 AM

Interactions of Aqueous Surface Treatments with Magnesium Alloy: *Rachel Harris*¹; Kristi Allen¹; ¹PPG Industries

10:55 AM

Simultaneously Achieving Superior Mechanical Properties and Corrosion Resistance in Mg Alloys by Advanced Solid Phase Processing: *Vineet Joshi*¹; Dalong Zhang¹; Jens Darsell¹; Darrell Herling¹; ¹Pacific Northwest National Laboratory

11:15 AM

Surface Alloying of Mg Alloy for Improving Corrosion Resistance and Mechanical Performance: *Yixing Zhu*¹; Jufeng Huang¹; Guangling Song¹; ¹Xiamen University

Emergent Materials under Extremes and Decisive In-situ Characterizations — Pressure-induced Dramatic Changes in Structures and Properties II

Program Organizers: Xujie Lu, Center for High Pressure Science & Technology Advanced Research; Judith Driscoll, Cambridge University; Xiaofeng Guo, Washington State University; Hua Zhou, Argonne National Laboratory

Thursday AM Room: E145
October 3, 2019 Location: Oregon Convention Center

Session Chairs: Choong-Shik Yoo, Washington State University; Jesse Smith, Argonne National Laboratory

8:00 AM Invited

Exploring Materials Synthesis, Properties, and Metastability through Rapid (De)Compression: *Jesse Smith*¹; Guoyin Shen¹; ¹HPCAT, Argonne National Laboratory

8:30 AM Invited

Structural Transformations Induced at Extreme Conditions: Coupling High-pressure Cells with Energetic Ion Beams: *Maik Lang*¹; Fuxiang Zhang²; Christina Trautmann³; Rodney Ewing⁴; ¹University of Tennessee; ²Oak Ridge National Laboratory; ³GSI Helmholtzzentrum für Schwerionenforschung; ⁴Stanford University

9:00 AM

Pressure-induced Dramatic Changes in Optoelectronic Properties of 2D Halide Perovskites: *Songhao Guo*¹; Yongsheng Zhao¹; Wenge Yang¹; Xujie Lü¹; ¹HPSTAR

9:20 AM Invited

Structural Stability and Optical Behaviors of Lead Halide Perovskite Nanocrystals at Extremes: *Guanjun Xiao*¹; Bo Zou¹; ¹Jilin University

9:50 AM Invited

Pressure-induced Solidification of Water in Dynamic-DAC: *Choong-Shik Yoo*¹; ¹Washington State University

10:20 AM Break

10:40 AM Panel Discussion

Failure Analysis & Characterization — Microanalysis, Microscopy and Metallography in Failure Analysis (Joint FAS-IMS)

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Thursday AM Room: F150
October 3, 2019 Location: Oregon Convention Center

Session Chairs: Daniel Dennies, DMS, Inc.; Dana Medlin, EAG Laboratories, Inc.; Andrew Havics, PH2, LLC; Burak Akyuz, Applied Technical Services Inc

8:00 AM

Using High-Energy X-ray Diffraction Microscopy to Study In-situ Damage Initiation Mechanisms in Al-Li 2099: *Darren Pagan*¹; Kelly Nygren¹; Wesley Tayon²; ¹Cornell High Energy Synchrotron Source; ²NASA Langley Research Center

8:20 AM Invited

Case Studies on Aluminum Failures Caused by Microstructural Abnormalities: *Burak Akyuz*¹; ¹Applied Technical Services

8:40 AM

A Case of Aluminum Nitride Embrittlement of Heavy Wall Cast Steel: *Joe Maciejewski*¹; ¹Applied Technical Services

9:00 AM Invited

Investigation of Corrosion of a Hot Water Heater Hose: *Daniel Dennies*¹; ¹DMS Inc

9:20 AM

Failure Analysis Techniques for Potable Water Components: *Eric Weishaupt*¹; Ellen Solomon¹; ¹ESI

9:40 AM Invited

Microscopical Coating Investigations: *Andrew Havics*¹; ¹PH2 LLC

10:00 AM Break

10:20 AM Invited

Evidence Preservation: ASTM E-1351 Replica Methods & Case History Practice: *Frederick Schmidt*¹; Brian Schmidt¹; ¹Advanced APPLIED Services, Inc

10:40 AM

Formation of Defects during Liquid Metal Processing: Consequences and Solutions: *Martin Detrois*¹; Paul Jablonski¹; Jeffrey Hawk¹; ¹National Energy Technology Laboratory

11:00 AM

Crack Propagation in Advanced Materials: Characterizing the Importance of Strain and Chemistry Using EBSD and EDS: *Michael Hjelmstad*¹; Pat Trimby¹; Ali Gholinia²; Phil Withers²; ¹Oxford Instruments; ²Manchester University

11:20 AM Invited

On the Different Rolling Contact Fatigue Theories and their Use in Industrial Design & FA: *Pierre Dupont*¹; ¹UMONS, Faculté Polytechnique de MONS (FPMs)

Failure Prevention and Unconventional Failures — Failure Prevention

Program Organizers: Andrew Havics, PH2 LLC; James Lane, Rimkus Consulting Group Inc; Burak Akyuz, Applied Technical Services Inc; Pierre Dupont, UMONS, Faculté Polytechnique de MONS (FPMs)

Thursday AM
October 3, 2019

Room: F149
Location: Oregon Convention Center

Session Chairs: Ronald Parrington, ESI; Michael Connelly, Connelly Consulting; Daniel Grice, Materials Evaluation & Engineering; Mark Russell, Engineering Design & Testing Corporation

8:00 AM

Using Material Science to Understand Seemingly Random Product Failures: *Jeff Ellis*¹; ¹Battelle

8:20 AM

Human Factors in Control Systems: *Taylor Russell*¹; ¹Engineering Design & Testing Corp

8:40 AM

Failure Severity Mitigation through the Use of Exception-Handling Devices: *Mark Russell*¹; ¹Engineering Design & Testing, Corp

9:00 AM

Laboratory Testing of Major Components in Support of Continued Operation: *Michelle Ireland*¹; Eric Tulk¹; David Rouison¹; ¹Kinectrics Inc

9:20 AM Invited

Failure Prevention of High Strength Bolts: *Michael Connelly*¹; ¹Connelly Consulting

9:40 AM

The Failure Analysis & Prevention of a Large and Critical Extrusion Gearbox : Part 3 - Material, Microstructure & Heat Treatment : Curiosities of Some Gear Teeth: Pierre Dupont¹; *Donato Firrao*²; Paolo Matteis²; Maria Rosa Pinasco²; Giuseppina Ienco²; Fabienne Delaunois¹; Véronique Vitry¹; ¹UMONS, Faculté Polytechnique de MONS (FPMs); ²Politecnico di Torino, Italy

10:00 AM Break

10:20 AM

Radiant Tube Heater Failure Analysis and Resulting Changes to NFPA 54: *Dan Grice*¹; Larry Hanke¹; ¹Materials Evaluation and Engineering Inc

10:40 AM

Electrochemical Measurement of Corrosion Protection Using Vapor Corrosion Inhibitors: *Florent Bocher*¹; ¹Southwest Research Institute

11:00 AM

NTSB Recommendations to Prevent Future Transportation Accidents: *Erik Mueller*¹; ¹National Transportation Safety Board

11:20 AM

Cold Spray for Cavitation Erosion Protection for Hydropower Applications: *Xujuan Jiang*¹; Nicole Overman¹; Kenneth Ross¹; ¹Pacific Northwest National Laboratory

Glasses, Optical Materials, and Devices: Current Issues in Science & Technology — Novel Processing and Functional Applications of Glass Materials

Program Organizers: Jincheng Du, University of North Texas; S. Sundaram, Alfred University

Thursday AM
October 3, 2019

Room: A106
Location: Oregon Convention Center

Session Chairs: S. K. Sundaram, Alfred University; Jingshi Wu, Corning Inc.

8:00 AM Invited

Managing Laser Damage on Glass Optics in the National Ignition Facility (NIF) Laser: *Tayyab Suratwala*¹; ¹Lawrence Livermore National Laboratory

8:30 AM Invited

Glass Composition and Temperature Effects on the Result of Ion-exchange Stiffing Process: *Jingshi Wu*¹; Timothy Gross¹; Charlene Smith¹; ¹Corning Inc.

9:00 AM

A Polymer Coating System for Inhibiting Contact-induced Damage in Glass: *Gregory Glaesemann*¹; Donald Clark¹; Michael DeRosa¹; James Matthews¹; Jennifer Lyon¹; Kimberly Keegan¹; ¹Corning Incorporated

9:20 AM

New Moldable Glasses for Multispectral Optics: *Shyam Bayya*¹; Daniel Gibson¹; Vinh Nguyen¹; Jay Vizgaitis²; Jas Sanghera¹; ¹Naval Research Laboratory; ²Optx Imaging Systems

9:40 AM

A New Method for the Continuous Production of Glass Nanofibres: Continuous Fiberizing by Laser Melting and Supersonic Dragging (CoFibLaS): Félix Quintero¹; Joaquín Penide¹; Antonio Riveiro¹; Jesús del Val¹; Rafael Comesaña¹; Fernando Lusquiños¹; *Juan Pou*¹; ¹University of Vigo

10:00 AM Break

10:20 AM Invited

Borophosphate Glasses for Biomedical Applications: *Richard Brow*¹; Parker Freudenberg¹; Rebekah Blatt¹; Julie Semon¹; ¹Missouri University of Science and Technology

10:50 AM

Laser Spinning of 13-93 Bioactive Glass Nanofibers: *Antonio Riveiro*¹; Félix Quintero¹; Jesús del Val¹; Rafael Comesaña¹; Fernando Lusquiños¹; Juan Pou¹; ¹University of Vigo

11:10 AM

Microstructure Evolution in Quick-setting Dental Pulp-capping Materials Made from Calcium Phosphate and Sodium Silicate Glass Microspheres: *Levi Gardner*¹; Jerry Howard¹; Krista Carlson¹; ¹University of Utah

11:30 AM

Investigation of Femtosecond Laser Irradiation of Rare-earth Aluminosilicate Glasses: *David Dobesh*¹; S.K. Sundaram¹; ¹Alfred University

Hybrid Organic-Inorganic Materials for Alternative Energy — Hybrids for Alternative Energy II

Program Organizers: Andrei Jitianu, Lehman College, City University of New York; Lisa Klein, Rutgers University; Lia Stanciu, Purdue University; Mihaela Jitianu, William Paterson University

Thursday AM
October 3, 2019

Room: E147
Location: Oregon Convention Center

Session Chair: Sayantani Ghosh, University of California, Merced

8:00 AM Invited

Preparation of Hybrid Nanomaterials and Nanostructured Thin Films using Microreactor-assisted Nanomaterial Synthesis and Deposition Process: *Chih-Hung Chang*¹; ¹Oregon State University

8:30 AM Invited

The Viability of Hybrid Organic-inorganic Perovskites in Solar Energy Harvesting: *Sayantani Ghosh*¹; ¹University of California Merced

9:00 AM Invited

Metal Promoted Mo6S8 Clusters: A Platform for Probing Ensemble Effects on the Selective Conversion of CO2 and CO to Methanol: *Jesus Velazquez*¹; Joseph Perryman¹; Forrest Hyler¹; Jessica Ortiz¹; Ambarish Kulkarni¹; ¹University of California, Davis

9:30 AM

Effects of Pressure on the Photoconversion Efficiencies of Perovskite Solar Cells: *Oluwaseun Oyewole*¹; Omolara Oyelade¹; Deborah Oyewole¹; Sharafadeen Adeniji¹; Winston Soboyejo¹; ¹Worcester Polytechnic Institute

9:50 AM

Effect of Thermal Annealing and Pressure Enhancement of the Efficiency of Bulk Heterojunction Organic Solar Cells: *Deborah Oyewole*¹; Oluwaseun Oyewole¹; Kenneth Evans-Lutterodt²; Winston Soboyejo¹; ¹Worcester Polytechnic Institute; ²Brook-Haven National Laboratory

10:10 AM

A First-principles Study on Improvement of Perovskite-based Solar Cell Materials: *Evan Wang*¹; Xuan Luo¹; ¹National Graphene Research and Development Center

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales — Session VI

Program Organizers: M Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen's University; Josh Kacher, Georgia Institute of Technology; Caizhi Zhou, Missouri University of Science and Technology; Lei Cao, University of Nevada, Reno

Thursday AM
October 3, 2019

Room: G132
Location: Oregon Convention Center

Session Chairs: Jette Oddershede, Xnovo Technology ApS; Jean-Charles Stinville, University of California, Santa Barbara

8:00 AM Invited

Measurements of Plastic Localization in Polycrystalline Materials in Relation to 3D Microstructure: *Jean-Charles Stinville*¹; P. G. Callahan¹; M. A. Charpagne¹; M. P. Echlin¹; E.R. Yao¹; J. Shin¹; F. Wang¹; P. Villechaise²; J. Cormier²; D. Texier²; V. Valle²; D.S. Gianola¹; T. M. Pollock¹; ¹University of California, Santa Barbara; ²Institut P' - UPR 3346, CNRS - Université de Poitiers - ENSMA; ³Institut Clément Ader - UMR CNRS 5312

8:30 AM Invited

Towards Rapid Throughout Measurement of Grain Boundary Properties: Jin Zhang¹; David Rowenhorst²; Akinori Yamanaka³; Henning Poulsen⁴; *Peter Voorhees*¹; ¹Northwestern University; ²Naval Research Laboratory; ³Tokyo University of Agriculture and Technology; ⁴Technical University of Denmark

9:00 AM

Orientation Specific Deformation Behavior of Twins in Mg Alloy AZ31: *Chaitanya Paramatmuni*¹; Fionn Dunne¹; ¹Imperial College London

9:20 AM

A New Method for Calculating Stress Fields Generated from Heterogeneous Plastic Deformation Using High-Energy X-ray Diffraction and Field Dislocation Mechanics: *Darren Pagan*¹; Armand Beaudoin²; ¹Cornell High Energy Synchrotron Source; ²University of Illinois at Urbana-Champaign

9:40 AM

Measurement of the Thermal Expansion of Ti-7Al using High Energy X-Ray Diffraction Microscopy: *Rachel Lim*¹; Darren Pagan²; Joel Bernier³; JY Peter Ko²; Anthony Rollett¹; ¹Carnegie Mellon University; ²Cornell High Energy Synchrotron Source; ³Lawrence Livermore National Laboratory

10:00 AM Break

10:20 AM Invited

Mapping Grain Morphology and Orientation by Laboratory Diffraction Contrast Tomography: *Jette Oddershede*¹; Jun Sun¹; Florian Bachmann¹; Hrishikesh Bale²; William Harris²; Erik Lauridsen¹; ¹Xnovo Technology; ²Carl Zeiss X-ray Microscopy Inc.

10:50 AM Invited

Mapping of Geometrically Necessary Dislocation Densities using Electron Backscattering Diffraction: *Travis Skippon*¹; ¹Canadian Nuclear Laboratories

11:20 AM

Backtracking 5DOF Grain Boundary Hydrogen Diffusivities in Iron: Experimentation, Localization Techniques, and Inverse Problem Theory: *Sterling Baird*; Christian Kurniawan¹; Tyler Critchfield¹; David Page¹; Katie Varela¹; David Fullwood¹; Eric Homer¹; Oliver Johnson¹; ¹Brigham Young University

11:40 AM

Imaging Microplasticity Events by Combining High Energy Diffraction Microscopy and Bragg Coherent Diffraction Imaging: *Matthew Wilkin*¹; Anthony Rollett¹; ¹Carnegie Mellon University

International Symposium on Ceramic Matrix Composites — CMC III

Program Organizers: Narottam Bansal, National Aeronautics and Space Administration; Jacques Lamon, LMT-Cachan, CNRS; Sung Choi, Naval Air Systems Command; J. P. Singh, US Army Research Laboratory (Retired)

Thursday AM Room: A103
October 3, 2019 Location: Oregon Convention Center

Session Chair: Elizabeth Opila, University of Virginia

8:30 AM Invited

Oxidation Behavior and Mechanical Properties of Melt-infiltrated SiC/SiC Ceramic Matrix Composites over a Wide Temperature Range: Kaitlin Detwiler¹; Megan Wilson¹; Jennifer Pierce²; *Elizabeth Opila*¹; ¹University of Virginia; ²University of Dayton Research Institute

9:10 AM

Processing and Corrosion Behavior of Zirconium-based Composites: *Michael Kloesel*¹; Christopher Kha¹; Spencer Swartzbaugh¹; Vilupanur Ravi¹; ¹Cal Poly Pomona

9:30 AM

Orientation Dependence of Indentation Behavior in PVD Nitrides Nanoscale Multilayer Coatings: *Jiao Chen*¹; Jun Yang¹; Lu Zhang¹; ¹Xi'an Jiaotong University

9:50 AM

Higher Temperature Composites based on Zirconium Cements: *Nicolai Ilyoukha*¹; ¹Academic Ceramic Ctr

10:10 AM

Development of Sugarcane Bagasse Reinforced Onibode Clay Composite for High Voltage Insulation: Joseph Agboola¹; Suleiman Hassan²; Afeez Luqman³; ¹Federal University of Technology, Minna; ²Nigerian Institute of Mining and Geosciences; ³University of Lagos

Joining of Advanced and Specialty Materials XXI — Dissimilar Materials Joining

Program Organizers: Mathieu Brochu, McGill University; Anming Hu, University of Tennessee; Hiroaki Mori, Osaka University; Yuri Hovanski, Brigham Young University; Darren Barborak, WeldQC Inc; Akio Hirose, Osaka University; Peng He, Harbin Institute of Technology; Zhiyong Gu, University of Massachusetts Lowell; Zhenzhen Yu, Colorado School of Mines

Thursday AM Room: Portland Ballroom 252
October 3, 2019 Location: Oregon Convention Center

Session Chair: Zhenzhen Yu, Colorado School of Mines

8:00 AM Invited

Effects of Weld Cladding Processes on Wear Behaviour of Overlays for Mining Applications: *Sheng-Hui Wang*¹; ¹National Research Council Canada

8:30 AM

Development of Dissimilar Metal Joints Porosity Evaluation Method: *Dmitrii Kurushkin*¹; Igor Mushnikov¹; Evgenii Rylkov¹; Fedor Isupov¹; Oleg Panchenko¹; ¹Peter the Great Saint Petersburg Polytechnic University

8:50 AM

Mechanical Performance of Welded INCONEL® Alloy 740H® Product Forms: *John Shinglededecker*¹; John deBarbadillo²; Brian Baker²; ¹Epri; ²Special Metals Corp.

9:10 AM

Dissimilar Joining of Steel and Aluminum Alloys by Electrically Assisted Pressure Joining: *Shengwei Zhang*¹; Sung-Tae Hong¹; Kun Gao¹; Heung Nam Han²; ¹University of Ulsan; ²Seoul National University

9:30 AM

Process-structure-property Relationship in Dissimilar Al-high Strength Steel Impact Spot Welds: *Angshuman Kapil*¹; Anupam Vivek¹; Glenn Daehn¹; ¹Ohio State University

9:50 AM

Direct Fabrication of Bimetallic Ti6Al4V+Al12Si Structures via Additive Manufacturing: *Yanning Zhang*¹; Amit Bandyopadhyay¹; ¹Washington State University

10:10 AM Break

10:30 AM

Effect of Nb Interlayer on the Stability Against High-temperature Exposure in Impact Spot Welding of Ti to Stainless Steel: *Jianxiang Li*¹; Anupam Vivek¹; Glenn Daehn¹; ¹Ohio State University

10:50 AM

Effect of Surface Roughness on Bonding Behavior of Steel and Ni by Ultrasonic Welding: *Shoichi Nambu*¹; Jheyu Lin¹; Toshihiko Koseki¹; ¹The University of Tokyo

Light Metal Technology — Processing Technology II

Program Organizers: Xiaoming Wang, Purdue University; Alan Luo, Ohio State University; Kumar Sadayappan, Canmet MATERIALS

Thursday AM Room: D138
October 3, 2019 Location: Oregon Convention Center

Session Chair: Lukas Bichler, University of British Columbia

8:00 AM

Computational Simulation and Experimental Validation of Precipitation Microstructure and Strengthening in Mg-Al-Sn Based Alloys: *Alan Luo*¹; Jiashi Miao¹; Chuan Zhang²; Fan Zhang²; ¹Ohio State University; ²CompuTherm LLC

8:20 AM

Investigation on Graphene Reinforced Magnesium Matrix Composites Synthesized by Powder Metallurgical Method: *Zhaohui Wang*¹; Yong Zhuang¹; Xian Du¹; Wenbo Du¹; ¹Beijing University of Technology

8:40 AM

The use of Laser Ultrasonics for Metallurgy for *In-situ* Measurements of Phase Transformation Kinetics in Titanium Alloys: *Mariana Rodrigues*¹; Matthias Militzer¹; ¹The University of British Columbia

9:00 AM

A Discrete Dislocation Loop Based Model to Study Elastic Response of a Twin: *Yubraj Paudel*¹; Christopher Barrett¹; Haitham El Kadiri¹; ¹Mississippi State University

9:20 AM

Effect of Rare Earth Oxide Nanoparticles on the Mechanical and Biological Properties of Magnesium: *Milli Suchita Kujur*¹; Vyasraj Manakari²; Gururaj Parande²; Somasundaram Prasad²; Raymond Wong²; Ashis Mallick³; Manoj Gupta²; ¹Indian Institute of Technology (Indian School of Mines); National University of Singapore; ²National University of Singapore; ³Indian Institute of Technology (Indian School of Mines)

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry — Session IV

Program Organizers: Navin Manjooan, Solve Technology and Research, Inc.; Gary Pickrell, Virginia Tech

Thursday AM Room: C126
October 3, 2019 Location: Oregon Convention Center

Session Chairs: Gurbinder Kaur; James Cahoon, UNC Chapel Hill; Gary Pickrell, Virginia Tech; Navin Manjooan, Solve Technology and Research, Inc.

8:00 AM Keynote

Designing Silicon Nanostructures to Harvest Energy: From Asymmetric Electron Ratchets to Decuple-junction Photovoltaics: *James Cahoon*¹; ¹University of North Carolina at Chapel Hill

8:40 AM

Using Energy Filtering to Change the Thermoelectric Design Paradigm: Seyed Aria Hosseini¹; Devin Coleman¹; Lorenzo Mangolini¹; *Alex Greaney*¹; ¹University of California, Riverside

9:00 AM

Synthesis, Characterization, and Catalytic Activity of Bismuth Ruthenium Oxide Nanoparticles for Oxygen Evolution and Reduction: Chinami Iketani¹; Shohei Yamaguchi¹; Kenji Kawaguchi¹; *Masatsugu Morimitsu*¹; ¹Doshisha University

9:20 AM

Ternary Hierarchical Microstructures for Supercapacitor Applications: *Aadithya Jeyaranjan*¹; Tamil Selvan Sakthivel¹; Sudipta Seal¹; ¹Univ of Central Florida

9:40 AM

The Preparation and Electrochemical Performance of Tin based Material:SnTe: *Xiong Zhang*¹; ¹Hubei University of Automotive Technology

10:00 AM Break

10:20 AM

Thermally Tailoring the Crystal Structure and Defect Disorder in Titanium Oxide Nanotubes for Enhanced Electrocatalysis While Maintaining the Nanostructure: *Hammad Malik*¹; Krista Carlson¹; Swomitra Mohanty¹; ¹University of Utah

10:40 AM

Self-Assembled Li3V2(PO4)3/Reduced Graphene Oxide Multilayer Nanocomposite Prepared by Sequential Adsorption for Lithium Ion Storage: *Kwang-Bum Kim*¹; ¹Yonsei University

11:00 AM Concluding Comments

Next Generation Biomaterials — Next Generation Biomaterials VI

Program Organizers: Roger Narayan, University of North Carolina; Federico Rosei, INRS Centre for Energy, Materials and Telecommunications

Thursday AM Room: C122
October 3, 2019 Location: Oregon Convention Center

Session Chairs: Hitesh Vora, Oklahoma State University; Vamsi Balla, CSIR-Central Glass & Ceramic Research Institute; Xanthippi Chatzistavrou, Michigan State University

8:00 AM

Synthesis of PLA-Steel Polymeric Composite through Fused Deposition Modeling based Additive Manufacturing Process for Bio Applications: Jon Bramsch¹; *Hitesh Vora*¹; ¹Oklahoma State University

8:20 AM Invited

Micro-to-nano-scale Surface Roughening of 3Y-TZP for Improved Osseointegration and Antibacterial Response: Andraz Kocjan¹; Juliane Moritz²; *Anže Abram*¹; Aleš Dakskobler³; Karolina Ivicak Kocjan⁴; ¹Jožef Stefan Institute; ²Fraunhofer IWS; ³Vall-Cer d.o.o.; ⁴National Institute of Chemistry

8:40 AM

Soft-tissue Mimicking Simulants using SEBS as Next Generation Biomaterial for Medical Applications: *Yao Chen*¹; Mahdieh Babaiasl¹; Fan Yang¹; John Swensen¹; Jow-Lian Ding¹; ¹Washington State University

9:00 AM

Highly Elastomeric Poly (Glycerol Sebacate)-co-Poly(Methyl Acrylate) Copolymer Based Electrospun Nanofibrous Patch for Tissue Engineering Applications: Aniruddha Pal¹; Aishwarya Satpathy¹; Chandra Khatua¹; *Vamsi Balla*²; Ananya Baru³; Subhadip Bodhak¹; ¹CSIR-Central Glass and Ceramic Research Institute; ²University of Louisville; ³Indian Institute of Engineering Science and Technology

9:20 AM

Liquid Crystal Elastomers as a Biomaterial and Applications: *Mitchell Anderson*¹; Carl Frick¹; ¹University of Wyoming

9:40 AM

Lost Salt Templating of Zn Porous Scaffolds for Bone Tissue Engineering: Irsalan Cockerill¹; *Marcus Young*¹; Donghui Zhu¹; ¹University of North Texas

10:00 AM Break

10:20 AM

Investigation on In Vitro and In Vivo Biological Response of Ti-Ta Alloys: *Indranath Mitra*¹; Amit Bandyopadhyay¹; Susmita Bose¹; ¹Washington State University

10:40 AM Invited

Acoustic Radiation Force-Derived Bone Formation within a Biodegradable Hydrogel Enhances Bone Formation: *Yusuf Khan*¹; ¹University of Connecticut

11:00 AM Invited

Design of Biomaterials by Simulation and Experiment: Molecular Recognition, Assembly, and Applications: *Hendrik Heinz*¹; ¹University of Colorado-Boulder

11:20 AM Invited

Imaging Live Cell-Nanopatterned Substrate Interactions Utilizing Reflective Confocal Microscopy: *Emily Kinser*¹; ¹3 M Company

11:40 AM Invited

Innate Glycosidic Activity in Metallic Implants for Device Targeted Therapy: *Jeremy Schaffer*¹; Marja ter Meer²; Ross Dillion¹; Signe Maria Nielsen³; Raoul Walther³; Rikke Meyer³; Willeke Daamen²; Lambertus van den Heuvel⁴; J. Adam van der Vliet²; Roger Lomme²; Yvonne Hoogeveen²; Leo Schultze Kool²; Alexander Zelikin³; ¹Fort Wayne Metals Research Products Corp.; ²Radboud University Medical Center; ³Aarhus University; ⁴Radboud University Medical Center; Catholic University Leuven

Phase Transformations in Ceramics: Science and Applications — Prediction and Novel Methods II

Program Organizers: Pankaj Sarin, Oklahoma State University; Waltraud Kriven, University of Illinois at Urbana-Champaign; Sanjay Khare, University of Toledo; Yu Zhong, Worcester Polytechnic Institute

Thursday AM

Room: A104

October 3, 2019

Location: Oregon Convention Center

Session Chairs: Sanjay Khare, University of Toledo; Waltraud Kriven, University of Illinois at Urbana-Champaign

8:00 AM Invited

First-principles Investigation of Phonon Instabilities and Displacive Phase Transitions in CaTiO₃-perovskites: *Venkateswara Manga*¹; Thomas Zega¹; Krishna Muralidharan¹; ¹University of Arizona

8:40 AM Invited

First Principles Investigation into the Phase Stability and Enhanced Hardness of TiN-ScN and TiN-YN Alloys: Vijaya Adhikari¹; Nathan Szymanski¹; Indiras Khatri¹; Daniel Gall²; *Sanjay Khare*¹; ¹University of Toledo; ²Rensselaer Polytechnic Institute

9:10 AM Invited

Prediction of Diffusionless Phase Transformation by Determination of the Orientation Relationship, Shear, and Motif Translation with the Smallest Atom Shuffles: *Randall Hay*¹; Emmanuel Boakye¹; Pavel Mogilevsky¹; Thomas Key¹; ¹USAF

9:50 AM Break

10:10 AM Invited

Topotactic Motif and Orientation Relation Extraction for Phase Transformations from In-situ X-ray Powder Diffraction: Scott Mc Cormack¹; *Waltraud Kriven*¹; ¹University of Illinois at Urbana-Champaign

10:50 AM Invited

In-situ Phase Diagram Determination of the HfO₂-Ta₂O₅-TiO₂ Ternary Up to 3000 °C: *Scott McCormack*¹; Ben Hulbert¹; Richard Weber²; Sergey Ushakov³; Alexandra Navrotsky³; Waltraud Kriven¹; ¹University of Illinois Urbana-Champaign; ²Materials Development Inc.; ³University of California Davis

Powder Metallurgy of Light, Reactive and Other Non-ferrous Metals — Powder Metallurgy of Superalloys, Amorphous Metal Powder and Molybdenum-Silicon-Boron Alloy

Program Organizers: Ma Qian, Royal Melbourne Institute of Technology; Zak Fang, University of Utah; David Yan, San Jose State University; James Paramore, U.S. Army Research Laboratory

Thursday AM

Room: D135

October 3, 2019

Location: Oregon Convention Center

Session Chair: Peng Yu, Southern University of Science and Technology

8:00 AM

The Research on Improve the Mechanical Property by Selective Formation of Y-Ti-O Complex Oxide in Ni-based ODS Alloy: *Chun Woong Park*¹; Won June Choi¹; Jong Min Byun²; Young Do Kim¹; ¹Hanyang University; ²Seoul National University of Science and Technology

8:20 AM Invited

Soft Magnetic Properties of Amorphous Metal Powders Fabricated by Gas-atomization Process: *Yong-Jin Kim*¹; Jae Won Chung¹; Dong-Yeol Yang¹; Sangsun Yang¹; Ki Bong Kim¹; Min Ha Lee²; Hwi Jun Kim²; ¹Korea Institute of Materials Science; ²Korea Institute of Industrial Technology

8:40 AM Invited

The Influence of Atomisation Route and Powder Characteristics on the Microstructural and Mechanical Properties Development of HIPped IN625 Ni-Superalloy: Alessandro Sergi¹; Alessandro Abena¹; Raja Khan²; Khamis Essa¹; *Moataz Attallah*¹; ¹University of Birmingham; ²TWI Ltd

9:00 AM Invited

Powder Processing Mo-Si-B for High Strength and Low Temperature Toughness: *Peter Marshall*¹; Sharvan Kumar²; Xiang Yu²; ¹Imaging Systems Technology; ²Brown University

PSDK XIV: Phase Stability and Diffusion Kinetics — Software Development

Program Organizers: Michael Gao, National Energy Technology Laboratory; Hans Seifert, Karlsruhe Institute of Technology; Zi-Kui Liu, Pennsylvania State University; Fan Zhang, CompuTherm LLC; Richard Otis, Jet Propulsion Laboratory; Aurelien Perron, Lawrence Livermore National Laboratory

Thursday AM Room: E144
October 3, 2019 Location: Oregon Convention Center

Session Chairs: Richard Otis, The Jet Propulsion Laboratory; Fan Zhang, CompuTherm LLC

8:00 AM Invited

Automated CALPHAD Modeling and Uncertainty Quantification of a Ternary System Using ESPEI: *Brandon Bocklund*¹; Richard Otis²; Zi-Kui Liu¹; ¹Pennsylvania State University; ²California Institute of Technology

8:30 AM Invited

High-speed High-throughput Thermodynamic and Phase Equilibrium Calculation and Its Application in Phase Field Simulation: *Shuanglin Chen*¹; Dongke Sun²; Weisheng Cao¹; Duchao Lv¹; Fan Zhang¹; Kamal Kadirvel³; Yunzhi Wang³; ¹CompuTherm LLC; ²Southeast University; ³Ohio State University

9:00 AM Invited

PFHub: The Phase Field Community Hub: *Daniel Wheeler*¹; ¹National Institute of Standards & Tech

9:30 AM Invited

Using Thermodynamic Databases in Mesoscale Microstructure Modeling with MOOSE: *Daniel Schwen*¹; Chao Jiang¹; Larry Aagesen¹; ¹Idaho National Laboratory

10:00 AM Break**10:20 AM Invited**

Development of an Integrated FEM and Phase Field Approach for Modeling Additive Manufacturing: *Daniel Lewis*¹; Antoinette Maniatty¹; ¹Rensselaer Polytechnic Institute

10:50 AM Invited

PDUQ – Phase Diagram Uncertainty Quantification in Python: *Noah Paulson*¹; Brandon Bocklund²; Richard Otis³; Zi-Kui Liu²; Marius Stan¹; ¹Argonne National Laboratory; ²Pennsylvania State University; ³Jet Propulsion Laboratory, California Institute of Technology

Sandphobic Thermal/Environmental Barrier Coatings — Sandphobic Thermal/Environmental Barrier Coatings II

Program Organizers: Michael Walock, U.S. Army Research Laboratory; Andy Nieto, US Army Research Laboratory; Clara Mock, US Army Research Laboratory; Anindya Ghoshal, US Army Research Laboratory; Muthuvel Murugan, US Army Research Laboratory; Marc Pepi, US Army Research Laboratory

Thursday AM Room: C120
October 3, 2019 Location: Oregon Convention Center

Session Chairs: Andy Nieto, Naval Postgraduate School; Nishan Jain, University of Maryland

8:00 AM

Army Advances in Sandphobic Thermal/Environmental Barrier Coatings: Michael Walock¹; *Clara Mock*¹; Andy Nieto²; Andrew Wright³; Anindya Ghoshal¹; Jian Luo³; Muthuvel Murugan¹; Marc Pepi¹; ¹US Army Research Laboratory; ²Naval Postgraduate School; ³University of California at San Diego

8:20 AM Invited

CMAS-Resistant YSZ-rare Earth Oxide Composite Coatings: *Clara Mock*¹; Michael Walock²; Anindya Ghoshal²; Muthuvel Murugan²; Marc Pepi²; ¹ORAU; ²U.S. Army Research Laboratory

8:50 AM Invited

Numerical Investigation of Particle Deposition in Gas Turbine Blades: *Nishan Jain*¹; Luis Bravo²; Anindya Ghoshal²; Muthuvel Murugan²; Alison Flatau¹; Michael Walock²; ¹University of Maryland; ²U.S. Army Research Laboratory

9:20 AM Invited

Non-silicate Ceramic T-EBC Coatings for SiC CMCs: *Larry Fehrenbacher*¹; ¹Technology Assessment & Transfer Inc.

9:50 AM Break**10:00 AM Invited**

CMAS Removal by Spectrally Guided Laser Ablation: *Eric Jordan*¹; Michael Renfro²; ¹University of Connecticut; ²University Kentucky

10:30 AM

Processing of Laser Surface Modification of Functionally Graded Alumina/CYSZ Thermal Barrier Coating: *Fatih Kirbiyik*¹; Gultekin Goller¹; ¹Istanbul Technical University

10:50 AM Invited

High Resolution Non-invasive Characterization of Calcium-magnesium-alumino-silicate Infiltration in Thermal Barrier Coatings: Zachary Stein¹; Sandip Haldar¹; Chance Barrett¹; Johnathan Hernandez¹; Laurene Tetard¹; Ravisankar Naraparaju²; Uwe Schulz²; *Seetha Raghavan*¹; ¹University of Central Florida; ²DLR-German Aerospace Center

11:20 AM Concluding Comments**Sintering and Related Powder Processing Science and Technologies — SPS Sintering**

Program Organizers: Wolfgang Rheinheimer, Purdue University; Zachary Cordero, Rice University; Ricardo Castro, University of California, Davis; Eugene Olevsky, San Diego State University

Thursday AM Room: E142
October 3, 2019 Location: Oregon Convention Center

Session Chairs: Ricardo Castro, University of California, Davis; Rosario Gerhard, GeorgiaTech

8:00 AM

Spark Plasma Sintered Aluminum Oxide Filter for Hot Gas Applications: *Catalina Young*¹; Cheng Zhang¹; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University

8:20 AM

Spark Plasma Sintering of Soft Magnetic Materials: *Taban Larimian*¹; Tushar Borkar¹; ¹Cleveland State University

8:40 AM

Characterization of Functionally Graded Rods with High Strength, Good Wear Resistance and Ductility of Titanium Matrix Composites Prepared by Spark Plasma Extrusion: *Keisuke Kanazawa*¹; Naoya Hosokawa¹; Hiroki Saito¹; Hiroshi Izui¹; Yoshiki Komiyama¹; ¹Nihon University

9:00 AM

Development of Tungsten Based Plates by Spark Plasma Sintering: *Dibyendu Chakravarty*¹; Vijay Ravula¹; ¹ARCI

9:20 AM

A Novel Approach to Boriding of TZM by Spark Plasma Sintering Method: *Baris Yavas*¹; Gultekin Goller¹; ¹Istanbul Technical University

9:40 AM

Production and Characterization of AlON Ceramics with Different Amount of MgO Addition via Reactive Spark Plasma Sintering: *Demet Aydogmus*¹; Gultekin Goller¹; Onuralp Yucel¹; Filiz Sahin¹; ¹Istanbul Technical University

10:00 AM Break

10:20 AM

Kinetics and Densification Behavior during Reaction Sintering of Bulk Titanium Boride (TiB) Nanoceramics by Spark Plasma Sintering (SPS): Jun Du¹; *K.S. Ravi Chandran*¹; ¹University of Utah

10:40 AM

Microstructural Observation and Mechanical Properties of B4C Based Composites Reinforced with CrCoFeMoNi High Entropy Alloy Prepared by Spark Plasma Sintering: *Burak Cagri Ocak*¹; Gultekin Goller¹; ¹Istanbul Technical University

11:00 AM

Investigation the Effect of CNT and GNP Additions on Densification, Microstructure and Mechanical Properties of B4C Prepared by Spark Plasma Sintering: *Erdem Balci*¹; Onuralp Yucel¹; Ipek Akin¹; Filiz Sahin¹; Gultekin Goller¹; ¹Istanbul Technical University

11:20 AM

Production and Characterization of B4C- ZrB2 Composites via Spark Plasma Sintering Method: *Leyla Yanmaz*¹; Gultekin Goller¹; Onuralp Yucel¹; Filiz Sahin¹; ¹Istanbul Technical University

11:40 AM

Spark Plasma Sintering of Titanium Diboride Ceramics with Different Amount of Titanium Addition: *Tugce Dedeagaci*¹; Gultekin Goller¹; Onuralp Yucel¹; Filiz Sahin¹; ¹Istanbul Technical University

Synthesis, Characterization, Modeling and Applications of Functional Porous Materials — Porous Materials III

Program Organizers: Lan Li, Boise State University; Winnie Wong-Ng, National Institute of Standards and Technology (NIST); Kevin Huang, University of South Carolina

Thursday AM

Room: D139

October 3, 2019

Location: Oregon Convention Center

Session Chair: Winnie Wong-Ng, National Institute of Standards and Technology

8:00 AM Invited

Physisorbent Coated Sensors for Remote Leak Detection of CH₄: *Jeffrey Culp*¹; Tao Hong¹; Ki-Joong Kim¹; Jagannath Devkota¹; Paul Ohodnicki¹; ¹National Energy Technology Laboratory

8:20 AM Invited

3-D Topology of Micropores, Voids, and Channels in Selected Crystalline Porphyrins: *Lawrence Cook*¹; Greg Brewer¹; Winnie Wong-Ng²; Matthew Lawson³; Lan Li³; ¹The Catholic University of America; ²The National Institute of Standards and Technology; ³Boise State University

8:40 AM

A Modified Scaling Law for Stiffness of Nanoporous Materials Accounting for Deformation Mode Effects of Nodes and Ligaments: Haomin Liu¹; *Niaz Abdolrahim*¹; ¹University of Rochester

9:00 AM

Stochastic Mechanical Modeling of Nanoporous Materials Accounting for Connectivity and Mixed Loading States: *Mujan Seif*¹; Skylar Mays¹; Thomas Balk¹; Matthew Beck¹; ¹University of Kentucky

9:20 AM

Oriented Growth of Covalent Organic Framework (COF) Films on Metal-hydroxides Thin Film: *Ken Ikigaki*¹; Kenji Okada¹; Yasuaki Tokudome¹; Paolo Falcaro²; Christopher Coleman³; Andrew Tarzia³; Christian Doonan³; Masahide Takahashi¹; ¹Osaka Prefecture University; ²Graz University of Technology; ³University of Adelaide

9:40 AM

Modeling of the Processes of Obtaining Porous Materials under SHS Conditions: *Borys Sereda*¹; Yuriy Belokon¹; Dmytro Sereda¹; Irina Kruglyak¹; Karina Belokon¹; ¹Dneprovsky State Technical University

10:00 AM Concluding Comments

Thermomechanical Processing in Shaping and Forming of Steels — Thermomechanical Processing in Shaping and Forming of Steels II

Program Organizers: Evgueni Poliakov, ArcelorMittal; Amy Clarke, Colorado School of Mines; Kester Clarke, Colorado School of Mines; Pello Uranga, CEIT and TECNUN (University of Navarra)

Thursday AM

Room: C123

October 3, 2019

Location: Oregon Convention Center

Session Chairs: Kester Clarke, Colorado School of Mines; Evgueni Poliakov, ArcelorMittal East Chicago; Pello Uranga, CEIT; Amy Clarke, Colorado School of Mines

8:00 AM

Characterizing Longitudinal Defects in Steel Continuous Casting: *Matthew Zappulla*¹; Brian Thomas¹; ¹Colorado School of Mines

8:20 AM

Effect of Vanadium and Aluminum Grain Refining Treatment on Steel Machinability: Xueliang Zhang¹; *Simon N. Lekakh*¹; Ronald J. O'Malley¹; Eduardo Scheid²; Mark Emmendorfer³; Mike Fox⁴; ¹Missouri University of Science and Technology; ²Gerdau Special Steel North America; ³Metaltel International; ⁴Gerdau Long Steel North America

8:40 AM

Evolution of Inclusions in Solid Steel during Reheating Process: Weifu Li¹; Ying Ren¹; Jujin Wang¹; *Lifeng Zhang*¹; ¹University of Science and Technology Beijing

9:00 AM

Some Aspects of Industrial Thermomechanical Processing of Steels: *Evgueni Poliakov*¹; ¹ArcelorMittal

POSTER SESSION WITH PRESENTERS

The poster session is divided into 3 separate presentation times (P1, P2, and P3) and grouped by topic area.

Poster Presenters only need to stand by their poster during their designated presentation time.

All poster sessions will be held on Tuesday, October 1

Poster Session I (P1) – 11:00 a.m. – 12:00 p.m.

- Biomaterials
- Ceramic and Glass Materials
- Electronic & Magnetic Materials
- Failure Analysis
- Modeling
- Nanomaterials
- Special Topics

Poster Session II (P2) – 12:00 p.m. – 1:00 p.m.

- Fundamentals and Characterization
- Processing and Manufacturing

Poster Session III (P3) – 4:45 p.m. – 5:45 p.m.

- Additive Manufacturing
- Energy
- Iron and Steel (Ferrous Alloys)
- Materials-Environmental Interactions

Advanced Biomaterials for Biomedical Implants and Biosensing Devices — Poster Session

Program Organizers: Tolou Shokuhfar, University of Illinois at Chicago; Sahar Vahabzadeh, Northern Illinois University

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-1: Electrochemical Evaluation of Ti-13Nb-13Zr-B Alloys for Knee Implants:

*Thu Nguyen*¹; Jacob Giacomo¹; Armando Shehi¹; Vilupanur Ravi¹; ¹Cal Poly Pomona

P1-2: The Consequence of Microwave Settings on Condensation of HAP:

*Aida Faeghinia*¹; Touraj Ebadzadeh¹; ¹Materials and Energy Research Center

Advances in Dielectric Materials and Electronic Devices — Poster Session

Program Organizers: Amar Bhalla, University of Texas; Ruyan Guo, University of Texas at San Antonio; Rick Ubc, Boise State University; Danilo Suvorov, Jožef Stefan Institute

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-39: 1-3 Magnetolectric Composites for Magnetic Field Detection:

Julio Cesar Pastoril¹; Anuar Mincache¹; Gustavo Dias¹; Ivair Santos¹; Ruyan Guo²; Amar Bhalla²; Luiz Cotica¹; ¹State University of Maringá; ²University of Texas at San Antonio

P1-40: Bio-based Composite for Anechoic Chamber Absorbers Application:

*Ratiba Benzerga*¹; Chloé Méjean¹; Ala Sharaiha¹; ¹University of Rennes, IETR

P1-41: CoFe2O4:BaTiO3 Magnetolectric Nanocomposites: Ferroic Properties:

*Denise Alanis*¹; Gustavo Dias¹; Ivair Santos¹; Ruyan Guo²; Amar Bhalla²; Luiz Cótica²; ¹State University of Maringá; ²University of Texas at San Antonio

P1-42: Dipole Engineering: Increasing Material Breakdown Strength and Capacitor Energy:

*Liam Saccucci-Bryan*¹; Genevieve Delfin¹; Andrew Christie¹; Dakota Spencer¹; Kaijie Ning¹; Soutik Betal¹; Holly Shulman¹; Walter Schulze¹; Steven Pilgrim¹; Steven Tidrow¹; ¹Alfred University

P1-43: Effect of Chemical Dispersant and Solvent on the Elaboration of Composites:

*Hanadi Breiss*¹; Ratiba Benzerga¹; Ala Sharaiha¹; Ali Harmouch¹; Akil Jrad¹; ¹University of Rennes, IETR

P1-44: Electronic Structure of Ceramic Magnets: M- and W-type Hexaferrites:

*Minyeong Choi*¹; Yang-Ki Hong¹; Hoyun Won¹; Woncheol Lee²; ¹University of Alabama; ²Samsung Electro-Mechanics Co., Ltd.

P1-45: Extrinsic p-type Doping of Few Layered WS₂ by Pulsed Laser Deposition:

*Nigel Shepherd*¹; Urmilaben Rathod¹; Andrey Voevodin¹; ¹University of North Texas

P1-46: Genetic Algorithm for Multilayer Absorption Performance Optimization:

*Aicha El Assal*¹; Ratiba Benzerga¹; Hanadi Breiss¹; Ala Sharaiha¹; Ali Harmouch¹; Akil Jrad¹; ¹University of Rennes, IETR

P1-47: Glass Foam Composites for High Power Microwave Absorption:

*Ratiba Benzerga*¹; Vincent Laur²; Ronan Lebullenger³; Laurent Le Gendre¹; Ala Sharaiha¹; ¹University of Rennes, IETR; ²LabSTICC; ³ISCR

P1-48: Influence of Fiber Length and Dispersion Process on Dielectric Properties of Carbon Based Composites:

Mathieu Badard¹; Chloé Méjean¹; Ratiba Benzerga¹; Hanadi Breiss¹; Claire Le Paven¹; Ala Sharaiha¹; ¹University of Rennes, IETR

P1-49: Influence of the PbO-excess in the Ferroelectric Phase Stabilization of PLZT Ceramics:

Atair Carvalho da Silva¹; Elton Carvalho de Lima²; Ruyan Guo³; Amar Bhalla³; Jose de los Santos Guerra¹; ¹Universidade Federal de Uberlândia; ²Universidade Federal do Tocantins; ³The University of Texas at San Antonio

P1-50: Inkjet Printable Metal Organic Framework Materials: Ferroelectric UiO-66-(Hf) as Flexible Pressure Sensor:

*Maria Monroy Gonzalez*¹; Bryan Gamboa¹; Ruyan Guo¹; Amar Bhalla¹; ¹University of Texas at San Antonio

P1-51: Original Stoichiometric Perovskite Films Produced by Controlled Oxidation of Oxynitride Material:

Mohamad Haydoura¹; Claire Le Paven¹; Laurent Le Gendre¹; Ratiba Benzerga¹; Florent Marlec¹; Francois Chevire²; Franck Tessier²; Alain Moreac³; ¹University of Rennes, IETR; ²University of Rennes, ISCR; ³University of Rennes, IPR

P1-53: Pulsed Laser Deposition of KxNa1-xNbO3 Films on Platinized Silicon Substrates:

*Donovan Moses*¹; Carl Morandi²; Kathleen Coleman¹; Nathan Bishop¹; Leonard Jacques¹; Susan Trolier-McKinstry¹; ¹Penn State University; ²Georgia Tech

P1-54: Reduction Kinetics of Reactive Silver Inks:

Avinash Mamidanna¹; Owen Hildreth¹; ¹Colorado School of Mines

P1-55: Roadway Energy Harvesting Module Design, Prototype, and Testing for Traffic Data Collection and Optimized Energy Harvesting:

George Nall¹; Bryan Gamboa¹; Maximilian Estrada¹; Ruyan Guo¹; Amar Bhalla¹; ¹University of Texas, San Antonio

P1-56: Structural, Dielectric and Ferroelectric Properties of Morphotropic Phase Boundary in Lead-free Na_{0.4}K_{0.1}Bi_{0.5}TiO₃ System:

*N Shara Sowmya*¹; Pravin Varade¹; N. Venkataramani¹; Ajit R. Kulkarni¹; ¹Indian Institute of Technology - Bombay

P1-57: Study of the Optical Properties of PVDF Neodymium Doped Samples:

*Evaristo Falcao*¹; Lais Aguiar²; Ruyan Guo³; Amar Bhalla³; ¹Federal University of Grande Dourados; ²State University of Maringá; ³University of Texas at San Antonio

P1-58: Thermopower Determination Using Pyrolytic Graphite and Aluminum Thermocouple:

*Abdul-Sommed Hadi*¹; Bryce Hill¹; ¹Montana Technological University

P1-59: Update: Capacitive Thermal-to-Electric Energy Conversion Devices:

*Soutik Betal*¹; Walter Schulze¹; Steven Pilgrim¹; Steven Tidrow¹; ¹Alfred University

P1-60: X-ray Absorption Near K-edge in Rrare-earth Doped Barium Titanate:

*Abrahan Pablo Aslla Quispe*¹; Roberto Hiroki Miwa¹; Jose de los Santos Guerra¹; ¹Universidade Federal de Uberlândia

P1-129: Study of the Multi-phase Aqueous Solutions for Non-isothermal Conditions Using the Complex Permittivity in the Microwave Range:

*Carlos Acosta*¹; Amar Bhalla¹; Ruyan Guo¹; ¹University of Texas at San Antonio

P1-130: Study of the Optical and Electrical Properties of KNbO3-based Ferroelectric Ceramics:

*Jose de los Santos Guerra*¹; A. C. Silva²; M. A. Oliveira²; Y. Mendez-González³; A. F. G. Monte²; J. -C. M'Peko⁴; A. C. Hernandez⁴; ¹Universidade de São Paulo; ²Universidade Federal de Uberlândia; ³Universidade Federal de Uberlândia; ⁴Universidad de La Habana; ⁵Universidade de São Paulo

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials — Poster Session

Program Organizers: Haitao Zhang, University of North Carolina at Charlotte; Gurpreet Singh, Kansas State University; Kathy Lu, Virginia Tech; Edward Gorzkowski, Naval Research Laboratory; Jian Shi, Rensselaer Polytechnic Institute; Kejie Zhao, Purdue University; Michael Naguib, Tulane University

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-102: Effect of Ca Addition on Grain Refinement of Fe-B-P-Cu Alloys: *Je hyuk Oh*¹; Dae-Geun Nam¹; ¹Korea Institute of Industrial Technology (KITECH)

P1-103: Gas Phase Sodium Flame Synthesis of Non-oxide Metallic Powders: Larry Wang¹; Aamir Abid¹; *Mary Krause*¹; Geoffrey Smith¹; Nick Yin¹; Craig Sungail¹; Gordon Smith¹; ¹Global Advanced Metals

P1-104: Structural and Magnetic Properties of NiO@MnxNi1-xO Core-Shell Nanoparticles Synthesized at Varying pH Values: *Abdullah Shafe*¹; Robert Mayanovic¹; Richard Wirth²; ¹Missouri State University; ²GFZ German Research Centre for Geosciences

P1-106: Electrochemical Performances of Biomass Carbons Derived from Cassava and Bamboo as Advanced Electrode Materials: Beatriz Vessall¹; *Shakir Bin Mujib*²; Waldir Bizzo³; Talita Mazon¹; Gurpreet Singh²; ¹Centro de Tecnologia da Informação Renato Archer (CTI); ²Kansas State University; ³University of Campinas

P1-108: Carbon Rich SiOCN Fibers from Silazane/PAA Hybrid Polymer: *Zhongkan Ren*¹; Christel Gervais²; Gurpreet Singh¹; ¹Kansas State University; ²Sorbonne Université, Collège de France

P1-109: Particle and Grain Size Relationships in Environmentally Controlled - Pressure Assisted Sintering: *Kevin Anderson*¹; James Wollmershauser¹; Edward Gorzkowski¹; Boris Feigelson¹; ¹U.S. Naval Research Laboratory

P1-110: Understanding Crystallization Behavior within Microfluidic Droplets: *Shohom Bose-Bandyopadhyay*¹; Kiryakos Mutafooulos²; Ashley Vu³; David Weitz²; Susmita Bose³; ¹Pullman High School; ²Harvard University; ³Washington State University

P1-111: Study on the Safety and Longevity of Nanometer Insulation Materials: *Yu Yanwen*¹; ¹Baoshan Iron Steel Co.Ltd

Glasses, Optical Materials, and Devices: Current Issues in Science & Technology — Poster Session

Program Organizers: Jincheng Du, University of North Texas; S. Sundaram, Alfred University

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-21: Characterization of Potentially Antibacterial Glass Powders Prepared by Zn²⁺ Ion Exchange: Duygu Güldiren¹; Ipek Erdem²; Caner Kuzu²; *Suheyra Aydin*²; ¹Sisecam Science, Technology and Design Center; ²Istanbul Technical University

P1-22: Effect of Al₂O₃:K₂O Ratio on Sintering and Crystallization Behaviour of Lithium Disilicate Glass Ceramics: *Santa Kolay*¹; Parag Bhargava¹; ¹IIT Bombay

Global Young Investigators Forum — Poster Session

Program Organizers: Kathleen Shugart Cissel, UES Inc; Victoria Christensen, University of California Santa Barbara

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-125: Infiltration Studies to Assess the Stability and Performance of BaCo_{0.4}Fe_{0.4}Zr_{0.1}Y_{0.1}O_{3-δ} Cathode: *Jack Duffy*¹; Yuqing Meng²; Shiwoo Lee³; Harry Abernathy³; Gregory Hackett⁴; Kyle Brinkman¹; ¹National Energy Technology Laboratory, Clemson University; ²Clemson University; ³National Energy Technology Laboratory, Leidos Research Support Team; ⁴National Energy Technology Laboratory

Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales — Poster Session

Program Organizers: M Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Levente Balogh, Queen's University; Josh Kacher, Georgia Institute of Technology; Caizhi Zhou, Missouri University of Science and Technology; Lei Cao, University of Nevada, Reno

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-72: A Study on Finite Deformation of Copper Crystals Using the Principles of Crystal Plasticity: Experiments and Simulations: *Suman Paik*¹; Bijan K Dutta²; Durgaprasad P V¹; ¹Bhabha Atomic Research Centre; ²Homi Bhabha National Institute

P1-73: Atomic Simulation of Dynamic Recrystallization Initiated by Direct Grain Reorientation at High-angle Grain Boundary in Alpha-titanium: *Hao Wang*¹; ¹Institute of Metal Research

P1-74: Crystal Plasticity Finite Element Analysis of Commercially Pure Titanium: *Ji Hoon Kim*¹; Hye In Jung¹; Joo-Hee Kang²; Chang-seok Oh²; ¹Pusan National University; ²Korea Institute of Materials Science

P1-75: Diffuse-interface Approach to Modeling Plasticity, Interfacial Sliding and Coherency Loss: *Tianle Cheng*¹; Youhai Wen¹; Jeffrey Hawk¹; ¹US DOE, National Energy Technology Laboratory

P1-76: Evaluation of Van Der Waals Interactions in Uranium Phases using Density-functional Theory (DFT) using the Exchange-hole Dipole Moment (XDM) Dispersion Correction: *Matthew Christian*¹; Erin Johnson²; Theodore Besmann²; ¹University of South Carolina; ²Dalhousie University

P1-77: Interface Formation during FCO to BCC Phase Transformation: Yipeng Gao¹; *Yongfeng Zhang*¹; Benjamin Beeler¹; Bei Ye²; ¹Idaho National Laboratory; ²Argonne National Laboratory

P1-78: Linking Microscale Experiments and Modeling to Predict Macroscale Mechanical Properties in Iron: *Allyssa Bateman*¹; Geeta Monpara²; Ray Fertig²; Yaqiao Wu¹; Brian Jaques¹; ¹Boise State University; ²University of Wyoming

P1-79: Microstructural Evolution Simulation for Property Prediction in Solid State Additive Manufacturing: *Danielle Cote*¹; Chris Massar¹; Bryer Sousa¹; Kyle Tsakopoulos¹; Victor Champagne²; ¹Worcester Polytechnic Institute; ²U.S. Army Research Laboratory

P1-80: Modeling Temperature-dependent Yield Stress of FCC High-entropy Alloys with Experimental Validation: *Zongrui Pei*¹; Martin Detrois¹; Paul Jablonski¹; Jeffrey Hawk¹; Ömer Dogan¹; David Alman¹; Michael Gao¹; ¹National Energy Technology Laboratory

P1-84: Phase Field Modeling of the Influence of Thermo-mechanical Conditions on Phase Transformation in Titanium Alloys: *Arun Baskaran*¹; Daniel Lewis¹; ¹Rensselaer Polytechnic Institute

P1-86: Particle Effect on the Behavior and Spreading Kinetics of a Nano-suspension Drop: MD Simulations: *Baiou Shi*¹; Weizhou Zhou²; Edmund Webb²; ¹Penn State Erie; ²Lehigh University

International Symposium on Ceramic Matrix Composites — Poster Session

Program Organizers: Narottam Bansal, National Aeronautics and Space Administration; Jacques Lamon, LMT-Cachan, CNRS; Sung Choi, Naval Air Systems Command; J. P. Singh, US Army Research Laboratory (Retired)

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

Session Chair: Narottam Bansal, NASA Glenn Research Center

P1-24: Relating Damage Progression in SiC/SiC CMCs to Microstructural Features using X-ray Tomography Techniques: *Ashley Hilmas*¹; Kathleen Sevens¹; ¹University of Michigan

P1-25: Corrosion and Erosion Studies of Ceramic Matrix Composites: *Spencer Swartzbaugh*¹; Josh Diaz¹; John Kasraei¹; Vilupanur Ravi¹; ¹Cal Poly Pomona

P1-26: Computational Analysis of Spark Plasma Sintering: Heat Transfer and Temperature Distribution: *Rodolfo Fernandez*¹; ¹Florida International University

Modeling Variability of Mechanical Behavior through ICME Techniques with Emphasis on Verification, Validation & Uncertainty Quantification — Poster Session

Program Organizers: Jacob Hochhalter, University of Utah; Michael Sangid, Purdue University; Corbett Battaile, Sandia National Laboratories; Barron Bichon, Southwest Research Institute

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-87: Coupled Thermo-metallo-mechanical Analyses of Heat Treatment of Low Alloy Steel Crank Throws: *Mengnie Li*¹; Hengyong Bu¹; ¹Kunming University of Science and Technology

Multi-scale Modeling of Microstructure Deformation in Material Processing — Poster Session

Program Organizers: Lukasz Madej, AGH University of Science and Technology; Jaimie Tiley, Air Force Office of Scientific Research (AFOSR/RTA); Krzysztof Muszka, AGH University of Science and Technology; Danuta Szeliga, AGH University of Science and Technology

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-88: Application of Embedded-Atom-Method for Characterizing the Atomic Deformation Behavior under Tensile Loading of a Simple Aluminum and Magnesium Cubic System: *Md Salah Uddin*¹; Brahmananda Pramanik¹; ¹Montana Technological University

P1-89 Dislocation Density-based Modeling of Deformation Behavior of Magnesium Alloy: *Krzysztof Muszka*¹; Danuta Szeliga¹; Paulina Lisiecka-Graca¹; Maciej Pietrzyk¹; Dariusz Kuc²; ¹AGH University of Science and Technology; ²Silesian University of Technology

P1-90: Evaluation of Local Hardening Behavior of Titanium Alloys based on Nanoindentation and Inverse Analysis: *Lukasz Madej*¹; Mateusz Mojzeszko¹; Mohan Setty²; Krzysztof Muszka¹; ¹AGH University of Science and Technology; ²Deakin University, Institute for Frontier Materials

P1-91: Modeling of Processes for the Production of Bessed Alloys TiAl and NiAl in the Conditions of SHS for Aerospace Applications: *Borys Sereda*¹; Yuriy Belokon¹; Dmytro Sereda¹; Irina Kruglyak¹; ¹Dneprovsky State Technical University

Next Generation Biomaterials — Poster Session

Program Organizers: Roger Narayan, University of North Carolina; Federico Rosei, INRS Centre for Energy, Materials and Telecommunications

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

Session Chair: Roger Narayan, North Carolina State University

P1-3: Development of Biocompatible Ceramic Powders Designed for Additive Manufacturing: A Preliminary Study: *Christos Sofias*¹; Sooraj Nandyala¹; Ifty Ahmed²; Artemis Stamboulis¹; ¹University of Birmingham; ²University of Nottingham

P1-4: Effect of Biofunctionalization of Gingerol / ZnO / Polydopamine Composite on Biological Properties of CaP Coated Ti Implants: *Arjak Bhattacharjee*¹; Susmita Bose¹; ¹Washington State University

P1-5: Effects of Cissus Quadrangularis and Polydopamine Coated 3D Printed Scaffolds on Dynamic and Static Bone Cell Cultures: *Sam Robertson*¹; Susmita Bose¹; ¹Washington State Univ

P1-6: Ginger and Garlic Extract Enhance Bone Tissue Formation in Rat Distal Femur Model Using 3D Printed Tricalcium Phosphate Scaffolds: Susmita Bose¹; *Ashley Vu*²; Dishary Banerjee¹; ¹Washington State University; ²University of Birmingham

P1-7: Liposome-encapsulated Curcumin Loaded 3D Printed Scaffold for Bone Tissue Engineering: *Naboneeta Sarkar*¹; Susmita Bose¹; ¹Washington State University



P1-8: Microstructure and Mechanical Properties of Cold-Rolled β Metastable Titanium Ti-24Nb-4Mo-xZr Alloys for Orthopedic Applications:

*Aline Raquel Nunes*¹; Maycon Junior Moraes de Pinho²; Caio Marcello Cossú³; Sinara Borborema²; Jean Dille¹; Luiz Henrique de Almeida¹; ¹COPPE/UFRJ/Brazil; ²FAT/UERJ; ³EEL/USP

P1-9: The Diffusion of Oxygen and Glucose into Artificial Pancreas: Modeling of Reaction-diffusion Transport into a Core-shell Geometry: *Clarence King*¹; Scott Beckman¹; ¹Washington State University

P1-126: Numerical and Experimental Investigation on the Mechanical Behaviour of 3D Printed Multi-component Ceramics: *Rezvan Gharehbaghi*¹; Stuart Blackburn²; David Grossin³; Artemis Stamboulis¹; ¹School of Metallurgy and Materials, University of Birmingham; ²School of Chemical Engineering, University of Birmingham; ³CIRIMAT Université de Toulouse, CNRS, INPT, UPS, ENSIACET

P1-127: Ultrahigh Strength Rare Earth Free Resorbable Mg Alloys Produced via Non-equilibrium Methods: *Ehsan Mostaed*¹; Malgorzata Sikora-Jasinska¹; Jaroslaw W. Drelich¹; ¹Michigan Technological University

P1-131: Effect of Cationic and Anionic Co-doping on Mechanical and Biological Properties of Hydroxyapatite-coated Titanium: *Arjak Bhattacharjee*¹; Sam Robertson¹; Amit Bandyopadhyay¹; Susmita Bose¹; ¹Washington State University

Semiconductor Heterostructures: Theory, Growth, Characterization, and Device Applications — Poster Session

Program Organizers: John Ayers, University of Connecticut; Phil Ahrenkiel, South Dakota School of Mines and Technology; Ganesh Balakrishnan, University of New Mexico

Tuesday AM Room: Exhibit Hall CD
October 1, 2019 Location: Oregon Convention Center
11:00 AM-12:00 PM

Session Chairs: Phil Ahrenkiel, South Dakota School of Mines and Technology; Ganesh Balakrishnan, University of New Mexico; John Ayers, University of Connecticut

P1-61: A Modeling Study of Dislocation Filtering using InGaAs/GaAs (001) Strained-Layer Superlattices: *Md Islam*¹; Tedi Kujofsa¹; John Ayers¹; ¹University of Connecticut

P1-62: Comparison of a DTKA Plastic Flow Model for InGaAs/GaAs (001) Heterostructures to Experimental Results: *Kevin Lindstrom*¹; James Wales¹; Tedi Kujofsa¹; John Ayers¹; ¹University of Connecticut

P1-63: Model for Dislocation Pinning in InGaAs/GaAs (001) Heterostructures: *Tedi Kujofsa*¹; John Ayers¹; ¹University of Connecticut

P1-64: X-ray Diffraction Analysis of InGaAs/GaAs Multi Quantum Wells Grown on a GaAs (001) Substrate: *Fahad Althowibi*¹; ¹Taif University

Surface Properties of Biomaterials — Poster Session

Program Organizers: Ryan Bock, SINTX Technologies; Jason Langhorn, DePuy Synthes Joint Reconstruction; Susmita Bose, Washington State University; Amit Bandyopadhyay, Washington State University; Mangal Roy, Indian Institute of Technology-Kharagpur; Venu Varanasi, University of Texas at Arlington

Tuesday AM Room: Exhibit Hall CD
October 1, 2019 Location: Oregon Convention Center
11:00 AM-12:00 PM

P1-10: 3D Printing of Bioglass-TCP Scaffolds: Biological and Mechanical Property Evaluation: *Arjak Bhattacharjee*¹; Dishary Banerjee¹; Aldo Boccaccini²; Amit Bandyopadhyay¹; Susmita Bose¹; ¹Washington State University; ²University of Erlangen-Nuremberg

P1-11: Bio-tribocorrosion of Metals and Alloys: *Jose Avila*¹; Amit Bandyopadhyay¹; Susmita Bose¹; ¹Washington State University

P1-12: Designing Alloys Using Additive Manufacturing for Orthopedic Applications: *Indranath Mitra*¹; Susmita Bose¹; Amit Bandyopadhyay¹; ¹Washington State University

P1-13: Effects of Crocin and Bicarbonate as Anti-inflammatory Agents and Osteogenic Factors for In Vivo Bone Formation: *Sam Robertson*¹; Caitlin Koski¹; Susmita Bose¹; ¹Washington State University

P1-14: Effects of Garlic Extract Released from Calcium Phosphate Scaffolds for Bone Tissue Engineering Applications: *Ashley Vu*¹; Susmita Bose¹; ¹Washington State University

P1-15: Evaluation of Bioactivity and Mechanical Properties of Silica-based Ceramic for Using in Tissue Engineering Application: *Fariborz Tavangarian*¹; Sorour Sadeghzade²; Rahmatollah Emadi²; ¹Pennsylvania State University, Harrisburg; ²Isfahan University of Technology

P1-16: Evaluation of Mechanical Properties, Biodegradability and Bioactivity of Forsterite-Diopside Scaffolds Coated by Polycaprolacton Fumarate: *Sorour Sadeghzade*¹; Rahmatollah Emadi¹; Fariborz Tavangarian²; ¹Isfahan University of Technology; ²Pennsylvania State University, Harrisburg

P1-17: Novel Dual-drug Delivery System from HA Coated Ti Implant for Enhanced In Vitro Osteogenesis and Chemoprevention: *Naboneeta Sarkar*¹; Susmita Bose¹; ¹Washington State University

Late News Poster Session — Biomaterials

Tuesday AM Room: Exhibit Hall CD
October 1, 2019 Location: Oregon Convention Center
11:00 AM-12:00 PM

P1-18: Bond Strength of Denture Teeth to Heat-cured, CAD-CAM and 3D Printed Denture Acrylics: *Joanne Choi*¹; Caira Ellyse Uy¹; Polina Plaksina¹; Rishi Ramani¹; Ritu Ganjigatti¹; Neil Waddell¹; ¹University of Otago

P1-19: Enhancing Hydrophilicity of Prosthetic Eyes: *Karnika De Silva*¹; Keith Pine²; ¹University of Auckland, New Zealand; ²The New Zealand Prosthetic Eye Service

P1-20: Superior Mechanical and Anti-corrosion Properties of Biocompatible Coatings on Ti Alloy: *Yan Bao*¹; ¹City University of Hong Kong

Late News Poster Session — Ceramic and Glass Materials

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-27: Drilling Study of Multi-directional Carbon Fiber Reinforced Polymers: *Kamlesh Phapale*¹; ¹Bharat Forge Ltd

P1-28: Enhanced Optical Nonlinearity in Rare-earth Element and Gold Nanoparticles Co-doped Bismuth Borosilicate Glass: *Shivani Singla*¹; Om Pandey¹; Gopi Sharma²; ¹Thapar Institute of Engineering & Technology; ²Kanya Maha Vidyalaya

P1-30: On the Decomposition of Cerium Aluminate into Aluminum Oxide and Cerium Oxide: *Aaron Johnston-Peck*¹; Russell Maier¹; ¹National Institute of Standards and Technology

P1-31: Oxidation Kinetics of C/C Ceramic Matrix Composites Using Thermogravimetric Analysis: *Muhammad Imam*¹; Vinay Damodaran¹; Pavana Prabhakar¹; ¹University of Wisconsin-Madison

P1-32: Plasma Arc Jet Oxidation of Vacuum Plasma Sprayed Hafnium Nitride: *Archana Loganathan*¹; Cheng Zhang¹; Luiza Fontoura¹; Benjamin Boesl¹; Arvind Agarwal¹; ¹Florida International University

P1-33: Pressure Induced Tuning of Lattice Distortion: Amorphization and Band Gap Engineering in a High-entropy Oxide: *Qiaoshi Zeng*¹; ¹Hpstar

P1-34: Sintering Additives NiO and CuO: Solid Solubility in BaZr_{0.85}Y_{0.15}O_{3-δ} Estimated from Magnetometry: *Michael Knight*¹; Ivar Reimanis¹; ¹Colorado School of Mines

P1-35: Structure Evolution of Novel SiBZrOC Ceramics Derived by Sol-gel Method: *Chen Liu*¹; ¹Harbin Institute of Technology

P1-37: Synthesis and Characterization of Ceramic Syntactic Foams for Use as Catalysts and Catalyst Support: *Micah Armstrong*¹; Sarah Nealy¹; Courtney Severino¹; Waldemar Maniukiewicz²; Magdalena Modelska²; Michal Binczarski²; Izabela Witonska²; Krishan Chawla¹; Andrei Stanishevsky¹; ¹University of Alabama at Birmingham; ²Lódz University of Technology

P1-38: The Roles of Interface Compatibility, Grain Constraint, and Volume Change on the Martensitic Transformation in ZrO₂-based Shape-memory Ceramics: *Edward Pang*¹; Christopher Schuh¹; ¹Massachusetts Institute of Technology

P1-128 Finite Element Analysis of Heat Transfer through the Laser Scan on Alumina (Al₂O₃) during Additive Manufacturing Process: *Mohammad Ali Ausaf Qureshi*¹; William David Griffiths¹; Artemis Stamboulis¹; ¹University of Birmingham

Late News Poster Session — Electronic and Magnetic Materials

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-65: Exploration of Thin Films as a Potential Material for Ceramic Low-dielectric Applications: *Eric Ngo*¹; Mat Ivill¹; Samuel Hirsh¹; Daniel Shreiber¹; Clifford Hubbard¹; Govind Mallick¹; John Carroll¹; ¹U.S. Army Research Laboratory

P1-66: Fabrication of Stress Free Ni-Co Coatings Using Electroplating Method: *Yong-Su Lee*¹; *Jaeho Lee*¹; ¹Hongik University

P1-67: Microstructural Comparison of Deformation Processing Effects on Aluminum/Calcium Metal-metal Composite Conductor Wires: *Dustin Hickman*¹; Charles Czahor¹; Trevor Riedemann²; Iver Anderson¹; ¹Iowa State University; ²Ames Laboratory

P1-68: Semiconducting Single-wall Carbon Nanotube/BiFeO₃ Heterostructure for Enhanced Photovoltaic Effect by Wide-range Light Absorption and Efficient Charge Separation: *Taejib Choi*¹; ¹Sejong University

Late News Poster Session — Failure Analysis

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-69: Cracking in Forged 1½” dia SA 182 F304L Integrally Reinforced Nozzles from a Fourth Stage CO₂ Compressor Suction Separator: *Riza Khan*¹; ¹In-Corr-Tech Ltd

P1-70: Fatigue Cracking of Several Passenger Bus Steel Frame Crossbars: Hector Castelblanco¹; *Gabriel Castro Güiza*¹; ¹Universidad Central

P1-71: Microstructural Evaluation of an Overheated Gas Turbine Blade: Xiaotong Guo¹; Weiwei Zheng¹; Longfei Li¹; Stoichko Antonov¹; Yunrong Zheng¹; *Qiang Feng*¹; ¹University of Science and Technology Beijing

Late News Poster Session — Modeling

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-92: Crystal Structure Prediction through Density Functional Theory Combined with Unsupervised Machine Learning: A Vitamin B2 Case Study: *Thiago Henrique da Silva*¹; Matthew King¹; ¹Boise State University

P1-93: Development of EAM Interatomic Potentials of Aluminides and Carbides for Ni-based Superalloys: *Muztoba Rabbani*¹; Sabila Kader Pinky¹; Nirmal Baishnab¹; Tyler McGilvry James¹; Ridwan Sakidja¹; ¹Missouri State University

P1-94: Effect of Virtual Spherical Indenter Stiffness on Atomistic Simulations of Nanoindentation: *Zhenhai Xu*¹; Debin Shan¹; ¹Harbin Institute of Technology

P1-95: Modeling Ductile Failure of High Strength Aluminum Alloy: Balaji Selvarajou¹; Mark Jhon¹; *Siu Sin Quek*¹; ¹Institute of High Performance Computing

P1-96: Modeling of Phase Transformation Kinetics in Post Heat-treated Resistance Spot Welds of AISI 1010 Mild Steel: *Blériot Vincent Feujofack Kenda*¹; Nouredine Barka¹; Mohammad Jahazi²; Denis Osmani³; ¹Université du Québec à Rimouski; ²École de Technologie Supérieure; ³AMH Canada Ltée

P1-97: Numerical Methods Applications in Crystal Plasticity Finite Element Method: *Theodore Zirkle*¹; Bill Locke²; Ben Anglin²; Clint Geller²; David McDowell¹; ¹Georgia Institute of Technology; ²Bettis Laboratories

P1-98: Simulation and Optimization of Magnetically-assisted Welding of Stainless Steel 316L: *Kevin Carpenter*¹; Ali Tabei¹; Saereh Mirzababaei¹; Somayeh Pasebani¹; ¹Oregon State University

P1-100: Void Growth in Bicrystalline and Polycrystalline Ni-based Superalloy: Atomistic Calculation: *Sabila Kader Pinky*¹; *Ridwan Sakidja*¹; ¹Missouri State University

Late News Poster Session — Nanomaterials

Tuesday AM
October 1, 2019
11:00 AM-12:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P1-112: Bioprocess-inspired Fabrication of Multi-layered TiO₂/Polymer Composites with Enamel-like Structure and High Mechanical Properties: *Liwen Lei*¹; *Zhengyi Fu*¹; *Jinjiang Wei*¹; ¹Wuhan University of Technology

P1-113: Catalytic Property of Vanadium-based Composite Material on NH₃-SCR: *Bora Jeong*¹; *Jin-Sun Cha*²; *Duck Hyun Lee*¹; *Hong-Dae Kim*¹; ¹Korea Institute of Industrial Technology/Green Materials & Processes Group; ²Korea Testing Laboratory

P1-114: Controlling Nanostructures of Si-based Ceramics via Carbothermal Reduction of Mesoporous Silica-Carbon Nanocomposites: *Kun Wang*¹; ¹Wuhan University of Technology

P1-115: Effect of Consolidation Conditions on the Densification of a Nanostructured Oxide-dispersion Strengthened FeNiZr Alloy via the Field Assisted Sintering Technology: *Sean Fudger*¹; *Thomas Luckenbaugh*²; *Chad Hornbuckle*¹; *Efrain Hernández-Rivera*¹; *A.J. Roberts*¹; *Chris Haines*¹; *Kris Darling*¹; ¹U.S. Army Research Laboratory; ²Bowhead Total Enterprise Solutions LLC

P1-116: Electrochemical Evaluation of Titanium Oxide Tubular Structure: *Hassam Muazzam*¹; ¹Industries, Commerce & Investment

P1-117: Energy Storable Carbon Fiber Composite Supercapacitors Based on Three-dimensional CNT/Graphene Hydrogel and Aramid Nanofiber-reinforced Epoxy Electrolyte: *Wonoh Lee*¹; ¹Chonnam National University

P1-118: Evaluation of Mechanical Properties for Electroless Ni-P-PTFE-WO₃ Composite Coatings: *Hyoung Chan Kim*¹; *Sang Joon Lee*¹; *Hyoung-Seok Moon*¹; *Byung Jun Kim*¹; *Gwang Joo Jang*¹; ¹Korea Institute of Industrial Technology

P1-119: Homojunction of Oxygen and Titanium Vacancies and Its Interfacial n-p Effect: *Yitian Wang*¹; *Siming Wu*¹; *Xiaoyu Yang*¹; ¹Wuhan University of Technology

P1-120: Low Temperature SCR Catalyst for NO_x Abatement by Well-dispersed Nanoparticles Supported on Porous Hexagonal Boron Nitride: *Myeung-jin Lee*¹; *Do-Hyun Kim*²; *Taewook Kim*¹; *Heesoo Lee*³; *Hong-Dae Kim*¹; ¹Korea Institute of Industrial Technology; ²Korea University; ³Pusan National University

P1-121: Microwave Synthesis of PbSe Quantum Dots and their Application for Detecting Ionizing Radiation: *Nova Wu*¹; *Tyler McCrea*¹; *Haori Yang*¹; *Gregory Herman*¹; *Han Mei*¹; *Chih-Hung Chang*¹; *Stebby John*¹; ¹Oregon State University

P1-122: Mussel-directed Synthesis of Nanomaterials: *Jingjing Xie*¹; ¹Wuhan University of Technology

P1-123: Ni Nano-wire and Nano-thin Films on Highly Ordered Pyrolytic Graphite (HOPG) by Atomic Layer Deposition (ALD): *Hyoung-Seok Moon*¹; *Hyoung Chan Kim*¹; *Byung Jun Kim*¹; ¹KITECH/Energy Plant R&D Group

P1-124: Novel Solid Lubricants for Use in Multifarious Environments at High Load and Sliding Speeds: *Aditya Ayyagari*¹; *Kalyan Mutyala*¹; *Anirudha Sumant*¹; ¹Argonne National Laboratory

11th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing — Poster Session

Program Organizers: *Surojit Gupta*, University of North Dakota; *Yiquan Wu*, Alfred University; *Hisayuki Suematsu*, Nagaoka University of Technology; *John Wolodko*, University of Alberta; *Christopher Taylor*, DNV GL; *Junichi Tatami*, Yokohama National University; *Enrico Bernardo*, University of Padova; *Zhengyi Fu*, Wuhan University of Technology; *Rajiv Asthana*, University of Wisconsin; *Allen Applebitt*, Oklahoma State University; *Richard Sisson*, Worcester Polytechnic Institute; *Tatsuki Ohji*, National Institute of Advanced Industrial Science and Technology; *Mritunjay Singh*, Ohio Aerospace Institute

Tuesday PM
October 1, 2019
12:00 PM-1:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P2-23: A New Experimental Approach to Improve the Recovery of Low-grade Refractory Copper Oxide Ore: The Combination of Selective Flotation with High-gradient Magnetic Separation: *Daixiong Chen*¹; *Jun Xiao*¹; ¹Hunan Research Institute for Non-ferrous Metals

P2-25: Analysis of Energy and Mass Conservation in the Process of Hazardous Waste Melting: *Hui Sun*¹; ¹Shenwu Technology Group Corp Co.,Ltd.

P2-26: Broadband Microwave Absorber Based on Bio-sourced Composite: *Ratiba Benzerga*¹; *Chloé Méjean*¹; *Ala Shariha*¹; ¹University of Rennes, IETR

P2-27: Fabrication and Characterization of Inkjet-printed Cs₂SnI₆ Thin Film for Optoelectronic Application: *Shujie Li*¹; *Alex Kosekb*¹; *Shi-Joon Sung*²; *Chih-hung Chang*¹; ¹Oregon State University; ²DGIST

P2-28: Laser Welding Application for Secondary Cell Module for Electrical Vehicle: *Heeshin Kang*¹; *Jiwhan Noh*¹; *Jiyeon Choi*¹; *Sanghoon Ahn*¹; ¹Korea Institute of Machinery & Materials

P2-29: The Review on Advanced Synthesized Diamonds Consolidation: *Sandra Veljkovic*¹; *Vojislav Mitic*²; *Goran Lazovic*³; *Markus Mohr*⁴; *Vesna Paunovic*¹; *Hans Fecht*⁵; ¹University of Nis, Faculty of Electronic Engineering; ²University Nis, Fac. Electronic Engineering, ITS. S.A.S.A.; ³University of Belgrade, Faculty of Mechanical Engineering; ⁴Institute of Micro and Nanomaterials, Ulm University; ⁵Institute of Functional Nanosystems FNS, Ulm University

P2-30: Valorization of Zinc Slag by-product via Geopolymerization: Potential Use for Dry Cask Applications: *Raul Florez*¹; *Deiber Riasco B.*²; *Carlos Castano*¹; *Henry Colorado*²; ¹Missouri University of Science & Technology; ²Universidad de Antioquia

P2-32: Development of Ultra-high Hydrophobic Coating on Hardwood Material: *Shahid Hussain Abro*¹; ¹NED University of Engineering

P2-33: Performance of Concrete Incorporating with Marble Waste: *Gurpreet Singh*¹; *onkar Sidhu*¹; ¹Punjabi University Patiala

P2-34: Insulation System in Green Buildings with Earthen Pots to Reduce Carbon Emissions for Better Environment: *Amitoj Saini*¹; *Navjot Singh*¹; *Arshdeep Kang*¹; *Anupinder Kaur*¹; *Harmanjeet Sohi*¹; ¹Punjabi University

P2-35: Total-corrosion Modelling of the Cymbopogon Citratus Leaf-extract Admixture Performance on Steel-reinforced Concrete for the Saline/Marine Service-environment: *Joshua Okeniyi*¹; *Esther Akinlabi*²; *Elizabeth Okeniyi*¹; ¹Covenant University; ²University of Johannesburg

Actinide and Lanthanide Materials III — Poster Session

Program Organizers: Clarissa Yablinsky, Los Alamos National Laboratory; Ryan Stillwell, Lawrence Livermore National Laboratory; Kester Clarke, Colorado School of Mines; Clinique Brundidge, Naval Nuclear Laboratory; Adam Farrow, Los Alamos National Laboratory; Curt Lavender, Battelle - Pacific Northwest National Laboratory; Douglas Burkes, Pacific Northwest National Laboratory

Tuesday PM
October 1, 2019
12:00 PM-1:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

Session Chair: Clarissa Yablinsky, Los Alamos National Laboratory

P2-1: A Young's Modulus Comparison Study in Aluminum, Uranium, and Plutonium: *Clarissa Yablinsky*¹; Meghan Gibbs¹; Taylor Jacobs¹; Miranda Williams¹; Carlos Archuleta¹; Tomas Martinez¹; Todd Martinez¹; Cody Miller¹; Daniel Coughlin¹; Rodney McCabe¹; Tarik Saleh¹; ¹Los Alamos National Laboratory

P2-2: Characterization of Heat Source Containment Capsules: *Angelique Wall*¹; David Wayne¹; Joseph Romero¹; Terry Hoelsinger¹; ¹Los Alamos National Laboratory

P2-3: Fission Product Behavior in Irradiated U-Mo Alloys: *Dennis Keiser*¹; Jan-Fong Jue¹; Jian Gan¹; Brandon Miller¹; Adam Robinson¹; Mukesh Bachhav¹; ¹Idaho National Laboratory

P2-4: Removal of Impurity in Lanthanum Metal by Zone Refining: *Ke Xu*¹; Siming Pang¹; Shihong Yan¹; Hongbo Yang¹; Zhiqiang Wang¹; Dehong Chen¹; Daogao Wu¹; Lei Zhang¹; ¹Grirem Advanced Material Co.LM.

P2-5: The Effect of Argon Ion Sputtering on Uranium Hydride Initiation Time: *Wigbert Siekhaus*¹; Art Nelson¹; ¹Lawrence Livermore National Laboratory

Additive Manufacturing of Glass, Ceramics and Composites — Poster Session

Program Organizers: Tobias Schaedler, HRL Laboratories LLC; Matthew Dickerson, Air Force Research Laboratory; Rebecca Dylla-Spears, Lawrence Livermore National Laboratory; Chang-Jun Bae, Korea Institute of Materials Science (KIMS)

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Room: Exhibit Hall CD
Location: Oregon Convention Center

Session Chairs: Chang-Jun Bae, Korea Institute of Materials Science (KIMS); Rebecca Dylla-Spears, Lawrence Livermore National Laboratory; Matthew Dickerson, Air Force Research Laboratory; Tobias Schaedler, HRL Laboratories, LLC

P3-1: Achieving the Upper Bound of Piezoelectric Constants of Additive Manufactured Nanocomposites: *Desheng Yao*¹; Huachen Cui¹; Ryan Hensleigh¹; Xiaoyu Zheng¹; ¹Virginia Tech

P3-2: Additive Manufacturing of Complex Micro-architected Graphene Aerogels: *Ryan Hensleigh*¹; Huachen Cui¹; James Oakdale²; Jianchao Ye²; Patrick Campbell²; Eric Duoss²; Christopher Spadaccini²; Xiaoyu Zheng¹; Marcus Worsley²; ¹Virginia Tech; ²Lawrence Livermore National Laboratory

P3-3: Additive Manufacturing Utilizing a Novel In-line Mixing System for Multi-scale Design of Ceramic Composites: *Joshua Pelz*¹; Nicholas Ku²; Lionel Vargas Gonzalez²; Marc Meyers¹; ¹University of California, San Diego; ²US Army Research Laboratory

P3-4: Materials and Performance Studies of Light Sensitive Devices Obtained from Solution-based Inks: *Shah Mohammad Rahmot Ullah*¹; Al-Amin Ahmed Simon¹; Maria Mitkova¹; ¹Boise State University

P3-5: Multiscale Mechanical Analysis of Lithiation Behavior of Silicon Oxide as High Capacity Anode Materials for Lithium Ion Batteries: *Janghyuk Moon*¹; Min-Sik Park²; ¹Chung-Ang University; ²Kyung Hee University

P3-6: Research on the Post-treatment Process of 3D Printing Resin Sand Shell: *Rui Guo*¹; ¹Hubei University of Automotive Technology

P3-7: Study on Physicochemical Properties of Composite Refractories for Blast Furnace: *Fan Xiaoyue*¹; Zhang Jianliang¹; Jiao Kexin¹; Zhao Yongang²; He Rusheng³; ¹University of Science and Technology, Beijing; ²Henan Winna Industrial Group Co., Ltd.; ³Beijing REALJD Group Co., Ltd.

Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Additive Manufacturing: Poster Session I

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Specialty Materials; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

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Room: Exhibit Hall CD
Location: Oregon Convention Center

P3-8: A Computational Model Based Investigation to Derive the Mechanism of Substructure Formation in Additively Manufactured (AM) 316L Stainless Steel: *Chamara Herath*¹; Andrew Birnbaum²; John Michopoulos²; Amit Bagchi²; Ajit Achuthan¹; ¹Clarkson University; ²U.S. Naval Research Laboratory

P3-9: Additive Manufacturability of Various Nickel-aluminum Bronze Wire Using CMT-based Wire-arc Additive Manufacturing Process: *Jae-Deuk Kim*¹; Joo Yong Cheon¹; OkSu Kim¹; Changwook Ji¹; ¹Korea Institute of Industrial Technology

P3-10: Additive Manufacturing of Porous Copper Wicking Structures for Heat Pipes and Vapor Chambers: *Adnen Mezghani*¹; Abdalla Nassar²; Corey Dickman³; Eduardo Valdes⁴; Raul Alvarado⁴; ¹Additive Manufacturing and Design Program, The Pennsylvania State University; ²Applied Research Laboratory, The Pennsylvania State University; ³Applied Research Laboratory, The Pennsylvania State University; ⁴SET Group

P3-11: Design of Additively Manufactured Methanol Conversion Reactor for High Throughput Production: *Dongsheng Li*¹; Tom Maloney²; Nasir Mannan²; ¹Advanced Manufacturing LLC; ²Connecticut Center of Advanced Technology

P3-12: Direct Writing Technology of Semi-solid Aluminium Alloys: *Xiaogang Hu*¹; ¹Southern University of Science and Technology

P3-13: Effect of Ti Treatment on Inclusions, Microstructure and Properties of Shipbuilding Steel: *Xuwei Zhang*¹; ¹Central Iron and Steel Research Institute

P3-16: Indentation Size Effect in Additively Manufactured 316L Stainless Steel: *Heonjune Ryou*¹; Kathryn Wahl²; Edward Gorzkowski²; John Michopoulos²; Andrew Birnbaum²; ¹ASEE Postdoc cited at US Naval Research Laboratory; ²US Naval Research Laboratory

P3-17: Intrinsic Heat Treatment in a Model Al-Sc Alloy during Laser Metal Deposition - Driving Factors, Kinetics and Effect of Alloying Elements: *Priyanshu Bajaj*¹; Markus Wilms²; Ankit Gupta¹; Philipp Kuernsteiner¹; Tilmann Hicel¹; Andreas Weisheit²; Eric Jaegle¹; Dierk Raabe¹; ¹Max-Planck-Institut für Eisenforschung GmbH; ²Fraunhofer-Institut für Lasertechnik ILT



Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development — Additive Manufacturing: Poster Session II

Program Organizers: Prashanth Konda Gokuldoss, Tallinn University of Technology; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Specialty Materials; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

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4:45 PM-5:45 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P3-18: Melt Pool Dynamics in Continuous Wave Laser Heating of Bulk and Powder Metal Targets: *Deepak Shah*¹; Alexey Volkov¹; ¹University of Alabama

P3-20: Off-line Quantification of in-built Cracking Susceptibility during AM Processing: *Shubhra Jain*¹; Timothy Prost²; Ralph Napolitano¹; ¹Iowa State University; ²Ames Laboratory, DOE

P3-21: Optimizing Laser Parameters for Selectively Laser Melted Maraging Steel Using Deposited Energy Density: *Ryoya Nishida*¹; Asuka Suzuki¹; Naoki Takata¹; Makoto Kobashi¹; Masaki Kato²; ¹Nagoya University; ²Aichi Center for Industry and Science Technology

P3-22: Single- and Double-Track Simulations of Melt Flow and Pore Formation in Powder-bed Fusion Additive Manufacturing using Smoothed Particle Hydrodynamics and Ray Tracing: *Deepak Shah*¹; Alexey Volkov¹; ¹University of Alabama

P3-23: The Role of Extraneous Oxygen in the Formation of Oxide Inclusions in Laser Powder Bed Fusion: *Pu Deng*¹; Bart Prorok¹; Xiaoyuan Lou¹; Vijaya Rangari²; ¹Auburn University; ²Tuskegee University

P3-114: Laser Powder Bed Fusion of Iron-based Bulk Metallic Glass Alloys: *Thinh Huynh*¹; Holden Hyer¹; Sharon Park¹; Le Zhou¹; Yongho Sohn¹; ¹University of Central Florida

Additive Manufacturing of Metals: Post Processing — Poster Session

Program Organizers: Ola Harrysson, North Carolina State University; Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Metals; Sudarsanam Babu, University of Tennessee, Knoxville

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Room: Exhibit Hall CD
Location: Oregon Convention Center

P3-24: Comparative Study between the Processed and Unprocessed TIG Welded Joints: *Sipokazi Mabuwa*¹; Velaphi Msomi¹; ¹Cape Peninsula University of Technology

P3-25: Hot Isostatic Pressing of High Volume Fraction Gamma Prime Nickel-base Superalloys: *Brian Welt*¹; Kevin Chaput²; Hamish Fraser¹; ¹Ohio State University; ²Air Force Research Laboratory

Additive Manufacturing: Effective Production, Characterization, and Recycling of Powder Materials — Poster Session

Program Organizers: James Paramore, U.S. Army Research Laboratory; Ulf Ackelid, Freemelt AB; Sudarsanam Babu, University of Tennessee, Knoxville; Brady Butler, U.S. Army Research Laboratory; Zhigang Fang, University of Utah; Ola Harrysson, North Carolina State University; Don Li, Arconic Titanium & Engineered Products; Andrzej Wojcieszynski, ATI Specialty Materials

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Room: Exhibit Hall CD
Location: Oregon Convention Center

P3-26: Identifying Correlations between Metal Powder Properties and Binder Jet Print Settings to Optimize Process: *Natalie Wieber*¹; Amy Elliott¹; ¹Oak Ridge National Laboratory

Additive Manufacturing: In-situ Process Monitoring and Control — Poster Session

Program Organizers: Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Powder Metals; Sudarsanam Babu, University of Tennessee, Knoxville; Ola Harrysson, North Carolina State University

Tuesday PM
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Room: Exhibit Hall CD
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P3-27: Characterizing In-situ Anisotropic Micromechanical Response in Additively Manufactured 17-4 Stainless Steel Using High-Energy X-ray Diffraction: *Darren Pagan*¹; Thien Phan²; ¹Cornell High Energy Synchrotron Source; ²National Institute of Standards and Technology

P3-28: In-situ Mechanical Neutron Diffraction Loading Characteristics of GRCop-84 Fabricated by Selective Laser Melting: *Robert Minneck*¹; Claudia Rawn¹; ¹University of Tennessee

P3-29: Influence of Sources of Heating and Protective Gases on the Properties of the Material Obtained by the Direct Deposition: *Mikhail Gnatenko*¹; Valeriy Naumyk²; Maria Matkovska²; ¹JSC «Motor Sich»; ²Zaporozhye National Technical University

Additive Manufacturing: Microstructure and Material Properties of Titanium-based Alloys — Poster Session

Program Organizers: Ulf Ackelid, Freemelt AB; Andrzej Wojcieszynski, ATI Powder Metals; Ola Harrysson, North Carolina State University; Sudarsanam Babu, University of Tennessee, Knoxville

Tuesday PM
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Room: Exhibit Hall CD
Location: Oregon Convention Center

P3-30: Study on Additive Manufacturing based in GMAW Process for Ti-6Al-4V Alloy: *Tae Hyun Lee*¹; Je Hoon Oh²; Dong-Hyuck Kam¹; Cheolhee Kim¹; ¹Korea Institute of Industrial Technology; ²Hanyang University

Additive Manufacturing: Solid-state and Other Nonbeam-based Technologies for the Manufacturing of Metallic Parts — Poster Session

Program Organizers: Olaf Andersen, Fraunhofer Society; J. Brian Jordon, University of Alabama; Orlando Rios, Oak Ridge National Laboratory; Paul Allison, University of Alabama; Mark Norfolk, Fabrisonic LLC; Luke Brewer, University of Alabama

Tuesday PM
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Room: Exhibit Hall CD
Location: Oregon Convention Center

P3-31: Corrosion Repair Using Additive Manufactured Stainless Steel 304L:
*Brett Tucker*¹; Paul Allison¹; Luke Brewer¹; ¹The University of Alabama

P3-33: Laser Assisted Cold Spray Deposition of Austenitic Stainless Steel:
*Venkata Bhattachiprotu*¹; Luke Brewer¹; ¹University of Alabama

P3-34: Significant Benefits of Solid State 3D Screen Printing for Manufacturing Micro-channel Heat Exchangers: *James Zess*¹; ¹Zess Industries

P3-35: Wire Arc Additive Repair (WAAR) for the Restoration of Worn-out Helicopter Skids: *Hanadi Salem*¹; Amr Moataz¹; Sameha Sadek¹; Mohamed Bakr¹; ¹American University in Cairo

Advanced Coatings for Wear and Corrosion Protection — Poster Session

Program Organizers: Evelina Vogli, LM Group Holdings Inc.; Fei Tang, DNV GL; Arif Mubarak, PPG; Mary Lyn Lim, PPG Industries

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Room: Exhibit Hall CD
Location: Oregon Convention Center

Session Chair: Evelina Vogli, LM Group Holdings Inc.

P3-100: Calculation Model of Hydrogen Permeation in Copper Cooling Stave and Exploratory Research on Preparation of Hydrogen Permeation Barrier: *Fengguang Li*¹

P3-101: Research Status of Preparation of Surface Coating on Pure Copper:
*Yang Liu*¹; *Fengguang Li*¹; ¹Hubei University of Automotive Technology

P3-102: Role of Graphene Nanoplatelets on Splat Morphology and Microstructure of Plasma Sprayed Alumina Coatings: *Xiaolong Lu*¹; Sadhana Bhusal¹; Dong Zhao²; Cheng Zhang¹; Yao Chen²; Arvind Agarwal¹; ¹Florida International University; ²Soochow University

P3-103: Surface Coatings Improve the Characteristics of Materials Obtained under SHS Conditions: *Borys Sereda*¹; Dmytro Sereda¹; Irina Sereda¹; ¹Dneprovsky State Technical University

P3-104: Evaluation of Microstructure of Martensitic Stainless Steel CA6NM Welded by Pulsed Plasma Process: *Rodolpho Vaz*¹; Anderson Pukasiewicz²; Ramón Paredes³; André Chicoski¹; Luiz Procopiak⁴; Romildo Tristante⁴; ¹Lactec; ²UTFPR; ³UFPR; ⁴Copel GeT

P3-105: Advanced Tribological Coatings Titanium Based Coatings Obtaining under SHS Conditions: *Borys Sereda*¹; Dmytro Sereda¹; Irina Palehova¹; Alexander Gaydaenko¹; ¹Dneprovsky State Technical University

P3-106: Mechanical and Corrosion Properties of Additive Manufactured Ti-Al-Cu-Si/Ti-6Al-4V Composite Coating: *Olawale Fatoba*¹; Lester Naidoo¹; Esther Akinlabi¹; Stephen Akinlabi¹; ¹University of Johannesburg

Advanced High Strength Steels / From Design to End Users — Poster Session

Program Organizers: Alla Sergueeva, NanoSteel Company Inc.; Daniel Branagan, The NanoSteel Company

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P3-82: Development of Copper Strengthened 0.2%C Low Aligned Steel:
*Pavel Podany*¹; Jaromir Dlouhy¹; Tomas Studecky¹; ¹COMTES FHT

P3-83: Nucleation of Graphite Particles Formed in Medium Carbon Steel after Graphitising Anneal: *Aqil Inam*¹; David Edmonds²; Rik Drummond-Brydson²; ¹University of the Punjab; ²University of Leeds

P3-84: Optimizations of Submerged Entry Nozzle in a Steel Slab Continuous Casting Mold: *Yushi Tian*¹; Shengtao Qiu²; Lijun Xu²; Rong Zhu¹; ¹University of Science and Technology Beijing; ²National Engineering Research Center of Continuous Casting Technology

Advanced Manufacturing, Processing, Characterization and Modeling of Functional Materials — Poster Session

Program Organizers: Mohammad Elahinia, University of Toledo; Haluk Karaca, University of Kentucky; Reza Mirzaeifar, Virginia Tech; Reginald Hamilton, Pennsylvania State University; Reza Mehrabi, University of Toledo; Hamdy Ibrahim, University of Tennessee at Chattanooga; Mohammad Mahtabi, University of Tennessee at Chattanooga; Narges Shayesteh Moghaddam, University of Texas at Arlington; Markus Chmielus, University of Pittsburgh

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P2-36: Formulation and Characterization of Ceramic Ink for Digital Ink-jet Printing: *Kyu Sung Han*¹; Jin Ho Kim¹; Kwang Taek Hwang¹; ¹Kicet

P2-37: Self-powered Hydrophone with Broadband Frequency and Rationally Designed Directivity Pattern via 3D Printing Using Piezoelectric Metamaterials: *Huachen Cui*¹; Ryan Hensleigh¹; Desheng Yao¹; Xiaoyu Zheng¹; ¹Virginia Polytechnic Institute

P2-38: The Solid Oxide Fuel Cell NiO Based and Microstructure Surface Fractal Characterization: *Vojislav Mitic*¹; Goran Lazovic²; Ming Wei Liao³; Guang Hsun Tan³; Shabana Shaikh⁴; ¹University Nis, Fac. Electronic Engineering, ITS. S.A.S.A.; ²Faculty of Mechanical Engineering University of Belgrade; ³National Tsing Hua University; ⁴Puna University

P2-39: Effects of Cooling Rate and Ti Addition on Microstructure, Mechanical Properties and Corrosion Characteristics of Laser Deposited Ti-6Al-4V Alloy: *Olawale Fatoba*¹; *Esther Akinlabi*¹; Stephen Akinlabi¹; Omolayo Ikumapayi¹; ¹University of Johannesburg

P2-40: Grain Boundary Character Distributions (GBCDs) of Annealed YIGs: *Minji Kim*¹; Minsun Jang¹; Youngkyun Son¹; Kisuk Lee¹; Sukbin Lee¹; ¹Ulsan National Institute of Science and Technology

P2-43: Numerical Modelling of Additive Manufactured Ti-Al-Cu-Si/Ti-6Al-4V Composite by Direct Laser Metal Deposition (DLMD) Technique: *Esther Akinlabi*¹; *Olawale Fatoba*¹; Stephen Akinlabi¹; Fredrick Mwema¹; ¹University of Johannesburg



P2-44: Self-propagating High Temperature Synthesized Chevrel Phase Nanoparticles/Nanofibers via Electrospinning: *Milind Pawar*¹; ¹Ohio State University

P2-45: Machine Learning for the 3D Printing of Polymer Composite Inks: *Isidro Pantoja G*¹; *Irmak Sargin*¹; *Sepehr Nesaei*¹; *Clarence King*¹; *Arda Gozen*¹; *Scott Beckman*¹; ¹Washington State University

Advances in Surface Engineering — Poster Session

Program Organizers: Brian Skinn, Faraday Technology, Inc.; Timothy Hall, Faraday Technology, Inc.; Sandip Harimkar, Oklahoma State University; Michael Roach, University of Mississippi Medical Center; Rajeev Gupta, The University of Akron

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Session Chair: Brian Skinn, Faraday Technology, Inc.

P2-46: Corrosion Behaviour of API 5L X42 and API 5L X60 Mild Steels in Different Combinations of Salt Solutions: *Wasiu Ajibola Ayoola*¹; *Muideen Bodude*¹; *Stephen Durowaye*¹; *Tajudeen Ayoola*¹; *Ezekiel Anthony*¹; ¹University of Lagos

P2-47: Study on Structure and Properties of High Speed Steel Powder Coatings Sprayed on Surface of Steels for Cutlery 8Cr13MoV: *Jihui Liu*¹; *Zhijun He*¹; *Taixu Xu*¹; *Xiao Han*¹; *Huan Zhang*¹; ¹University of Science and Technology Liaoning

P2-48: Effect of Heat Input on Nano-tribological and Corrosion Properties of Fe-based Amorphous/ Nanocrystalline Coating: *Anil Kumar*¹; *Sapan Nayak*¹; *Atanu Banerjee*²; *Tapas Laha*¹; ¹Indian Institute of Technology, Kharagpur; ²Research and Development Division, Tata Steel

P2-49: Mechanical and Electrochemical Behavior of an Economical Fe-based Amorphous / Nanocrystalline Composite Coating Synthesized by High Velocity Oxy-fuel Thermal Spraying: *Sapan K. Nayak*¹; *Anil Kumar*¹; *Atanu Banerjee*²; *Tapas Laha*¹; ¹Indian Institute of Technology Kharagpur; ²Research and Development Division, Tata Steel

P2-50: Electrochemical Characterization of Plasma-treated Titanium Alloys: *Kevin Robles*¹; *Sara Margala*²; *Nina Abramzon*¹; *Vilupanur Ravi*²; ¹California State Polytechnic University, Pomona; ²Cal Poly Pomona

Advances in Zinc-coated Sheet Steel Processing and Properties — Poster Session

Program Organizers: Frank Goodwin, ILZRO; Joseph McDermid, McMaster University

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P3-85: The Effect of Zn-Mg Interlayer on the Microstructure and Corrosion Resistance of PVD-processed Coatings: *KyoungPil Ko*¹; *Dong Yoeul Lee*¹; *Kyung Hoon Nam*¹; *Young Jin Kwak*¹; *Yonghwa Jung*¹; *Seok Jun Hong*¹; *Woo Sung Jung*¹; *Mun Jong Eom*¹; *Sang Hyeon Lee*¹; ¹Posco Technical Research Laboratories

P3-86: Effect of the Microstructure Development on Cracking Phenomena in Hot-Dip Zn-Al-Mg Alloy Coatings on IF Steel: *In Gyeong Kim*¹; *Yong Bum Park*¹; ¹Sunchon National University

P3-87: Obtaining Zinc Coatings on a Sheet Steel in SHS Conditions: *Borys Sereda*¹; *Dmytro Sereda*; *Aleksandr Korobochka*¹; *Irina Krugljak*¹; ¹Dneprovsky State Technical University

P3-88: Control of Zinc Coatings Obtained under SHS Conditions: *Borys Sereda*¹; *Dmytro Sereda*¹; *Aleksandr Korobochka*¹; *Irina Krugljak*¹; ¹Dneprovsky State Technical University

P3-89: Study on the Environment-friendly Coating Technology for Hot-dip Galvanized Steel Sheet with High Humidity Resistant: *Xueqiang Dong*¹; *Yilin Zhou*²; *Yu Song*³; *Taixiong Guo*³; ¹PanGang Group Research Institute Co.,Ltd.; ²Pangang Group Panzhihua Steel & Vanadium Co. Ltd.; ³PanGang Group Research Institute Co.,Ltd.

Characterization of Materials and Properties through Metallography, Mechanical Testing and Analysis - From Fundamentals to the Cutting Edge — Poster Session

Program Organizer: Michael Keeble, Buehler

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P2-6: Development of a Technique to Evaluate the Bond Strengths of Cold Sprayed Single Particle Impacts: *Matthew Gleason*¹; ¹Worcester Polytechnic Institute

P2-7: Metallographic Study of Chronic Surface Defects in Automotive Grade Cold-rolled Steel Sheet: *Soumendu Monia*¹; *Hrishikesh Jugade*¹; *Goutam Mukhopadhyay*¹; ¹Tata Steel

Corrosion of Additively Manufactured Metals — Poster Session

Program Organizers: Eric Schindelholz; Rajeev Gupta, The University of Akron; Ajit Mishra, Haynes International; Amit Pandey, Ansys/Granta Design

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Session Chair: Eric Schindelholz, Sandia National Laboratories

P3-37: Microstructure and Corrosion Behavior of Alloy 625 Produced by Laser Powder Bed Fusion: *Christopher Faraj*¹; *Samad Firdosy*²; *Vilupanur Ravi*¹; ¹California State Polytechnic University, Pomona; ²Jet Propulsion Laboratory, California Institute of Technology

Data Science for Material Property Interpretation — Poster Session

Program Organizers: Alex Belianinov, Oak Ridge National Laboratory; Ichiro Takeuchi, University of Maryland; Jeff Simmons, Wright Patterson Air Force Research Laboratory; Jason Hatrick-Simpers, National Institute of Standards and Technology

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P2-8: Evaluation for the Quality of Flake Graphite Cast Iron and Spheroidal Graphite Cast Iron by Tapping Test with Using Artificial Intelligence: *Mitsuki Shinohara*¹; Nozomu Uchida¹; Yuki Iwami²; Yuichi Hiramoto²; Masaya Kato²; Toshitake Kanno²; ¹Nagaoka University of Technology; ²Kimura Foundry Co., Ltd.

Formability and Fracture of Metal Sheets — Poster Session

Program Organizers: Piyush Upadhyay, Pacific Northwest National Laboratory; John Carsley, Novelis, Inc.; Daniel Coughlin, Los Alamos National Laboratory; Kester Clarke, Colorado School of Mines

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Session Chairs: Daniel Coughlin, Los Alamos National Laboratory; Piyush Upadhyay, Pacific Northwest National Laboratory; Kester Clarke, Colorado School of Mines

P3-90: Prediction Method of Voids Distribution in the Punched Surface of the Spheroidizing Annealed Medium Carbon Steel Sheet by the Scrap: *Ken Saito*¹; Chikara Inoue¹; Kazuhiko Yamazaki²; Sota Goto²; Shinsuke Suzuki¹; ¹Waseda University; ²JFE Steel Corporation

Gas/Metal Reactions, Diffusion, and Phase Transformation during Heat Treatment of Steel — Poster Session

Program Organizer: Daniel Baker, General Motors

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P3-91: Austenite Grain Evolution Mechanism of High Carbon Rail Based on Thermal Technology: *Jun Yuan*¹; ¹Pangang Group Research Institute Co., Ltd.

P3-92: Homogenization on Manganese Microsegregation in Continuous Cast Microalloyed Steel Slabs: *Rishav Raj*¹; J.B. Wiskel¹; D. Ivey¹; L. Li¹; H. Henein¹; ¹University of Alberta

P3-93: Numerical Simulation Research on Quality Control of the Continuous Casting Billet at Different Casting Speeds: *Haitao Ma*¹; Jiongming Zhang¹; Rong Cheng¹; Zhaozhao Yan¹; ¹University of Science and Technology Beijing

Grain Boundaries, Interfaces, and Surfaces in Functional Materials: Fundamental Structure-Property-Performance Relationships — Poster Session

Program Organizers: Ming Tang, Rice University; Shen Dillon, University of Illinois, Urbana-Champaign; John Blendell, Purdue University; Wayne Kaplan, Technion - Israel Institute of Technology

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P2-9: A Green Two-step Route to Prepare Superhydrophobic-oleophobic Semitransparent Coatings: *Ying Zhang*

Hybrid Organic-Inorganic Materials for Alternative Energy — Poster Session

Program Organizers: Andrei Jitianu, Lehman College, City University of New York; Lisa Klein, Rutgers University; Lia Stanciu, Purdue University; Mihaela Jitianu, William Paterson University

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P3-59: Liquid Phase Synthesized BaTiO₃-CoFe₂O₄ Multiferroics Nanocomposites: *Irna Shahbudin*¹; Go Kawamura¹; Wai Tan¹; Hiroyuki Muto¹; Atsunori Matsuda¹; ¹Toyohashi University of Technology

P3-60: Low-temperature Synthesis and Ionic Conductivity Studies of Ceria-carbonate Nanocomposite Electrolytes for Low Temperature SOFCs: *Ana Lucia Villa*¹; José Alonso Guillen¹; Antonio Fuentes²; *Padmasree Padmasda*²; ¹Instituto Tecnológico de Saltillo; ²Cinvestav Saltillo

P3-61: NIR Annealing Treatment for Perovskite Films to Improve Solar Cells Performance: *Bosky Sharma*¹; Dinesh Kabra¹; Parag Bhargava¹; ¹IIT Bombay

Joining of Advanced and Specialty Materials XXI — Poster Session

Program Organizers: Mathieu Brochu, McGill University; Anming Hu, University of Tennessee; Hiroaki Mori, Osaka University; Yuri Hovanski, Brigham Young University; Darren Barborak, WeldQC Inc; Akio Hirose, Osaka University; Peng He, Harbin Institute of Technology; Zhiyong Gu, University of Massachusetts Lowell; Zhenzhen Yu, Colorado School of Mines

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P2-51: Additive Manufacturing of Bimetallic Structure using Laser Engineered Net Shaping (LENS™): *Yanning Zhang*¹; Bonny Onuikwe¹; Amit Bandyopadhyay¹; ¹Washington State University

P2-52: Microstructure and Mechanical/Electrochemical Behavior of Friction Stir Butt Welded Joint of Dissimilar Aluminium and Steel Alloys: *Sam Yaw Anaman*¹; Hoon-Hwe Cho¹; Hrishikesh Das²; Sung-Tae Hong²; ¹Hanbat National University; ²University of Ulsan

P2-53: Interfacial Microstructure of Ti - STS Dissimilar Joints Brazed with Zr-Ti-Cu-Ni Metallic Glass Filler and Intermediate Layers: *Jin Soo Park*¹; *Jin Kyu Lee*¹; ¹Kongju National University

P2-54: Microstructure and Mechanical Properties of Friction-stir-welded Beryllium-copper Alloy Joints: *Kwangjin Lee*¹; ¹Korea Institute of Industrial Technology

P2-55: Numerical Simulation of Temperature Distribution and Material Flow during Friction Stir Welding of Magnesium Alloy: *Evgenii Rylkov*¹; Anton Naumov¹; Fedor Isupov¹; Oleg Panchenko¹; ¹Peter The Great St.Petersburg Polytechnic Uni

Light Metal Technology — Poster Session

Program Organizers: Xiaoming Wang, Purdue University; Alan Luo, Ohio State University; Kumar Sadayappan, Canmet MATERIALS

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P2-57: Effect of Solidification Range on Hot Tearing Susceptibility of Al-Mg Alloys: *Young-Ok Yoon*¹; Seong-Ho Ha¹; Bong-Hwan Kim¹; Hyun-Kyu Lim¹; Shae K. Kim¹; ¹Korea Institute of Industrial Tech

P2-58: Fabrication of Ultrafine Grained Aluminum Sheets by Repeated Roll-Bonding Process: *ChaYong Lim*¹; Seunghee LEE²; ¹Korea Institute of Materials Science; ²Mokpo National University

P2-59: Influence of Mo to Fe Ratio on Heat-treatment Effects in Ti-Mo-Fe Alloys: *Masahiko Ikeda*¹; Masato Ueda¹; ¹Kansai University

P2-60: Research on Short-process Fabrication and Thixoforming of Semisolid Billet of Wrought Aluminum Alloys: *Jufu Jiang*¹; ¹Harbin Institute of Technology

P2-61: Semi-solid Manufacturing Process of Micro Gears: *Long An*¹; YongFei Wang¹; JiaJi Liu¹; ¹Xi'an Jiaotong University

P2-62: Stress Corrosion of the Mg-Zn-Zr Alloy System Using C-ring Tests: *Petra Maier*¹; Nico Ostermeier¹; Jens Wicke¹; Norbert Hort²; ¹Stralsund University of Applied Sciences; ²Helmholtz Zentrum Geesthacht

P2-63: Ultrafine Grained AZ61Mg/Ti Composite with High Mechanical Strength: *Lianxi Hu*¹; Yuan Yuan¹; ¹Harbin Institute of Technology

Materials for Nuclear Applications — Poster Session

Program Organizers: Philip Edmondson, Oak Ridge National Laboratory; Yutai Katoh, Oak Ridge National Laboratory; Jake Amoroso, Savannah River National Laboratory; Levi Gardner, University of Utah; Amy Gandy, University of Sheffield; Karl Whittle, University of Liverpool; Monica Ferraris, Politecnico di Torino

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Session Chairs: Philip Edmondson, Oak Ridge National Laboratory; Karl Whittle, University of Liverpool

P3-62: Characterization and Oxidation of Graphite and Silicon Carbide in TRISO Nuclear Fuel: *Adam Bratten*¹; Jiaqi Duan¹; Hans Pommerenke¹; Haiming Wen¹; ¹Missouri University of Science & Technology

P3-63: Corrosion Behavior of Metallic Alloys in a Molten Chloride Eutectic Salt for Nuclear Applications: *Dominic Dinh*¹; Vilupanur Ravi¹; ¹Cal Poly Pomona

P3-64: Corrosion Behavior of Nanostructured Stainless Steels and High Entropy Alloys: *Hans Pommerenke*¹; Andrew Hoffman¹; Nathan Curtis¹; Haiming Wen¹; ¹Missouri University of Science and Technology

P3-65: Effects of Deposition Conditions on the Production of ZrO2 Coatings Produced by PE-CVD as Environmental Barrier Coatings for the Molten Salt Reactor: *Lester Espinoza*¹; Eddie López Honorato¹; ¹Centro de Investigación y de Estudios Avanzados del IPN

P3-67: Investigation of Recrystallization and Grain Growth in Uranium 10 wt% Molybdenum: *Jacqueline Reeve*¹; Vineet Joshi²; David Field¹; ¹Washington State University; ²Pacific Northwest National Laboratory

P3-68: Oxidation of TRISO particles and Matrix Graphite in Mixed Gas Atmospheres: *Elizabeth Sooby Wood*¹; Brian Brigham¹; Katherine Montoya¹; Marielle Gaspar¹; Amanda Fernandez¹; Zachary Acosta¹; Tyler Gerczak²; ¹The University of Texas at San Antonio; ²Oak Ridge National Laboratory

Materials Issues in Nuclear Waste Management — Poster Session

Program Organizers: Jake Amoroso, Savannah River National Laboratory; Kyle Brinkman, Clemson University; Kevin Fox, Savannah River National Laboratory; Cory Trivelpiece, Savannah River National Laboratory; Jarrod Crum, Pacific Northwest National Laboratory

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P3-69: Corrosion Test Method Evaluation for Iodine Waste Forms: *Amanda Lawter*¹; R. Asmussen¹; Jeff Bonnett¹; Joelle Reiser¹; Nancy Avalos¹; Brian Riley¹; ¹Pacific Northwest National Laboratory

P3-70: Glass Pool Flow in a Joule-Heated, Laboratory-Scale Melter: *Derek Cutforth*¹; Derek Dixon¹; Jesse Lang¹; Will Eaton¹; Mike Schweiger¹; ¹Battelle Pacific N.W. National Laboratory

P3-71: Multi-scale Structural Response of Pyrochlore Oxides to Swift Heavy Ion Irradiation: *Eric O'Quinn*¹; Igor Gussev¹; William Cureton¹; Devon Drey¹; Joerg Neufeind²; Maik Lang¹; ¹University of Tennessee; ²Oak Ridge National Laboratory

Mechanochemical Synthesis and Reactions in Materials Science IV — Poster Session

Program Organizers: Antonio Fuentes, Cinvestav Unidad Saltillo; Laszlo Takacs, University of Maryland Baltimore County; Challapalli Suryanarayana, University of Central Florida; Jacques Huot, Université du Québec a Trois-Rivieres

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P2-64: Ionic Conductors Synthesized by Mechanochemistry: Exploring the ZrO2-Y2O3-Gd2O3 System.: Karime A. González-García¹; José Alonso Díaz-Guillén¹; Sagrario Martínez Montemayor²; Oswaldo Burciaga-Díaz¹; María Elena Bazaldua-Medellín³; Juan Carlos Díaz-Guillén⁴; Antonio F. Fuentes³; ¹Instituto Tecnológico de Saltillo; ²CIQA; ³CINVESTAV IPN Unidad Saltillo; ⁴CONACYT-COMIMSA

Multifunctional Ceramic- and Metal-matrix Composites: Processing, Microstructure, Properties and Performance — Poster Session

Program Organizers: Martin Pech-Canul, Cinvestav IPN Saltillo; Xiaoming Wang, Purdue University; Golam Newaz, Wayne State University

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Session Chair: Martin Pech-Canul, Cinvestav IPN Saltillo

P2-66: Test and Evaluation of SiC/SiC Composites for High Temperature Components of the H-class Gas Turbine: In-Sub Han¹; Seyoung Kim¹; Soohyun Kim¹; Young-Hoon Seong¹; Jaehyung Choi¹; *Hyunjoon Bang*¹; ¹Korea Institute of Energy Research

P2-67: Hybrid Ceramic Matrix Composites: *Martin Pech-Canul*¹; Socorro Valdez²; Evangelina Trujillo-Vazquez³; Juan Guía-Tello⁴; Máximo Pech-Canul⁵; Josué Aguilar-Martínez⁶; Luis González-López⁷; ¹Cinvestav IPN Saltillo; ²UNAM; ³Benemérita Universidad Autónoma de Puebla; ⁴Centro de Investigación en Materiales Avanzados (CIMAV); ⁵Cinvestav IPN Mérida; ⁶Universidad Autónoma de Nuevo León

Powder Metallurgy of Light, Reactive and Other Non-ferrous Metals — Poster Session

Program Organizers: Ma Qian, Royal Melbourne Institute of Technology; Zak Fang, University of Utah; David Yan, San Jose State University; James Paramore, U.S. Army Research Laboratory

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P2-68: Creep Compaction of Nanocrystalline Copper Powder: *Nathan Palmerio*¹; Kexiang Zhao¹; Lynnora Grant¹; Zachary Cordero¹; ¹Rice University

P2-69: Modeling the Critical Dynamic Recrystallization of a PM Ti-22Al-25Nb Alloy during Hot Compression Deformation: *Yu Sun*¹; Lianxi Hu¹; Yuan Yuan¹; ¹Harbin Institute of Technology

Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work – Rustum Roy Symposium — Poster Session

Program Organizers: Morsi Mahmoud, King Fahd University of Petroleum and Minerals - KFUPM; Dinesh Agrawal, Pennsylvania State University; Guido Link, Karlsruhe Institute of Technology; Motoyasu Sato, Chubu University; Rishi Raj, University of Colorado; Victoria Blair, Army Research Laboratory

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P2-70: Characterization of Graphite-Si-SiC Ceramics Processed by Microwave Assisted Reactive Melt Infiltration: *Elisa Padovano*¹; Mauro Giorcelli¹; Giovanni Bianchi²; Sara Biamino¹; Massimo Rovere¹; Alberto Tagliaferro¹; Alberto Ortona²; ¹Politecnico di Torino; ²SUPSI

Retained Austenite for High and Ultrahigh Strength Steels — Poster Session

Program Organizer: Mahesh Somani, University of Oulu

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P3-94: The Relationships between Tensile Behavior and Hole Expansion Property of TRIP-aided Steels: *Jae Hoon Lee*¹; Sang Ho Han¹; ¹POSCO Technical Research Laboratories

Sintering and Related Powder Processing Science and Technologies — Poster Session

Program Organizers: Wolfgang Rheinheimer, Purdue University; Zachary Cordero, Rice University; Ricardo Castro, University of California, Davis; Eugene Olevsky, San Diego State University

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P2-71: Field-induced Mass Transport Phenomena in Flash Sintered High Temperature Ceramics Explored by TEM and In situ SEM: *Xin Li Phuah*¹; Han Wang¹; Jaehun Cho¹; Jin Li¹; Sichuang Xue¹; K.S.N. Vikrant¹; Harry Charalambous²; Thomas Tsakalakos²; Amiya Mukherjee³; C. Stephen Hellberg⁴; Noam Bernstein⁴; R. Edwin Garcia¹; Xinghang Zhang¹; Haiyan Wang¹; ¹Purdue University; ²Rutgers University; ³University of California, Davis; ⁴Naval Research Laboratory

P2-72: Formation Mechanism of Porosity in P-type Bi_{0.5}Sb_{1.5}Te₃ Materials and its Influence on Thermoelectric Transport Properties: *Cheeneepalli Nagarjuna*¹; Pathan Sharief¹; Hyeon-Jeong You¹; Peyala Dharmiah¹; Suk-Min Yoon¹; Soon-Jik Hong¹; ¹Kongju National University

P2-73: Investigation of Mechanical Properties of CoCrFeMnNi High Entropy Alloys Fabricated by Rapid Solidification Process: *Hyeon Jeong You*¹; Kwang-Yong Jeong¹; Cheeneepalli Nagarjuna¹; Raechool Kang¹; Soon-Jik Hong¹; ¹Kongju National University

P2-74: Study on the Effect of Cu Dispersion on the Thermoelectric Properties of Bi-Sb-Te Alloy: *Seok Min Yoon*¹; Chul hee Lee¹; Cheeneepalli Nagarjuna¹; Pathan sharief¹; Soon jik Hong¹; ¹Kongju National University

P2-75: Synthesis and Chemical Lixiviation of Nanostructured Calcium-doped Magnesium Aluminate Spinel: *Gilberto José Pereira*¹; Rayanne Andrade¹; ¹Centro Universitario Da Fei

P2-107: Influence of Spark Plasma Sintering Processing Parameters and Field Effects on the Microstructure and Mechanical Properties of Advanced Materials: *Tyler Dolmetsch*¹; Arvind Agarwal¹; Benjamin Boesl¹; Cheng Zhang¹; ¹Florida International University

Substrate Protection for Corrosion Prevention — Poster Session

Program Organizers: Mary Lyn Lim, PPG Industries; Qixin Zhou, The University of Akron; Niamh Hosking, Ford Motor Company; Matthew Asmussen, Pacific Northwestern National Laboratory; Elissa Trueman, NSWC Carderock Division; Cortney Crane, Exponent Failure Analysis Associates; Stephen Raiman, Oak Ridge National Laboratory; Raul Rebak, GE Global Research

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P3-107: Materials Performance and Corrosion Susceptibility Study of C-52 Steel Grades in Concentrated Media: *Ojo Sunday Fayomi*¹; ¹Covenant University

Surface Protection for Enhanced Materials Performance: Science, Technology, and Application — Poster Session

Program Organizers: Kang Lee, NASA Glenn Research Center; Jun Song, McGill University; Yutaka Kagawa, University of Tokyo; Rodney Trice, Purdue University; Daniel Mumm, University of California, Irvine; Mitchell Dorfman, Oerlikon Metco (US) Inc.; Christian Moreau, Concordia University; Emmanuel Boakye, UES Inc.; Edward Gorzkowski, Naval Research Laboratory; Scooter Johnson, Naval Research Laboratory; Stephen Yue, McGill University; Richard Chromik, McGill University

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Room: Exhibit Hall CD
Location: Oregon Convention Center

P2-76: Optimization of Microstructure and Mechanical Properties of MoSiN Coatings by Reactive Magnetron Sputtering Process Control: *Ki Buem Kim*¹; Ki Seong Lim¹; Young Seok Kim¹; Jin Kyu Lee²; Taek Jib Choi¹; Hyo Soo Lee³; ¹Sejong University; ²Kongju National University; ³Korea Institute of Industrial Technology

Synthesis, Characterization, Modeling and Applications of Functional Porous Materials — Poster Session

Program Organizers: Lan Li, Boise State University; Winnie Wong-Ng, National Institute of Standards and Technology (NIST); Kevin Huang, University of South Carolina

Tuesday PM
October 1, 2019
12:00 PM-1:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P2-77: A Novel Styrene-assisted Monomer Route for Polymer Derived Macroporous SiBCN Ceramic Monolith: *Xuan Cheng*¹; Lujiao Yang¹; Ying Zhang¹; ¹Xiamen University

P2-78: An Atomic Force Microscopic Investigation on Single Secondary Particle of Silica Aerogel Monolith: *Xiaoyong He*¹; Xuan Cheng¹; Ying Zhang¹; ¹Xiamen University

P2-79: Corrosion Studies of Open Cell Aluminum Foams in Simulated Marine Environments: *Ho Lun Chan*¹; Kevin Guo¹; Adam Teoh¹; Rogine Gomez¹; Vilupanur Ravi¹; ¹Cal Poly Pomona

P2-80: Epoxy Foam Based Composites for Anechoic Chamber Application: From Elaboration to a Dielectric Characterization: *Chloé Méjean*¹; Ratiba Benzerga¹; *Hanadi Breiss*¹; Aicha El Assal¹; Ala Sharaiha¹; ¹University Rennes, IETR

P2-81: Foam Composites for Planar Absorber Application: *Aicha El Assal*¹; Ratiba Benzerga¹; Ala Sharaiha¹; Ali Harmouch¹; Akil Jrad¹; ¹University Rennes, IETR

P2-82: Inorganic Foam Composites for Absorption in X Band Frequency Range: *Ratiba Benzerga*¹; Vincent Laur²; Ronan Lebullenger³; Laurent Le Gendre¹; Ala Sharaiha¹; ¹University of Rennes, IETR; ²LabSTICC; ³ISCR

P2-84: Rapid, Additive Synthesis of Functional Metal-organic Framework Thin Films: *Yujing Zhang*¹; Chih-Hung Chang¹; ¹Oregon State University

P2-85: Time-domain Thermoreflectance Investigation of the Thermal Conductivity for Amorphous Nano-porous Organo-Silicate Thin Films: *Hari Harikrishna*¹; Scott Huxtable¹; Ira Ben Shir²; Shifi Kababya²; Asher Schmidt²; David Gidley³; William Lanford⁴; Sean King⁵; ¹Virginia Tech; ²Technion - Israel Institute of Technology; ³University of Michigan; ⁴University of Albany; ⁵Intel

Thermomechanical Processing in Shaping and Forming of Steels — Poster Session

Program Organizers: Evgueni Poliak, Arcelormittal; Amy Clarke, Colorado School of Mines; Kester Clarke, Colorado School of Mines; Pello Uranga, CEIT and TECNUN (University of Navarra)

Tuesday PM
October 1, 2019
4:45 PM-5:45 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P3-95: Effect of Cold Rolling on Characteristics of Inclusions in 304 Stainless Steel: *Xueliang Zhang*¹; Shufeng Yang¹; Jingshe Li¹; Jun Zhai²; *Mengjing Zhao*¹; ¹University of Science and Technology Beijing; ²Shanxi Taigang Stainless Steel Co., Ltd.

Ultra High Performance Metallic Systems for Aerospace, Defense, and Automotive Applications — Poster Session

Program Organizers: Ali Yousefiani, Boeing Research And Technology; Troy Topping, California State University, Sacramento; Robert Dillon, NASA Jet Propulsion Laboratory; Linruo Zhao, National Research Council of Canada

Tuesday PM
October 1, 2019
12:00 PM-1:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P2-86: Combinatorial Studies on Refractory High-entropy Alloys via Directed Vapor Deposition: *Christopher Kassner*¹; Hengbei Zhao¹; Haydn Wadley¹; ¹University of Virginia

P2-87: Improvement of Technological Processes Obtaining a Heat-resistant Nickel Alloys for Turbine Blades Using Foundry Return: *Vladimir Klochikhin*¹; *Valeriy Naumyk*²; ¹JSC «Motor Sich»; ²Zaporozhye National Technical University

P2-88: Improvements in Mechanical Properties of Aerospace Grade Al-Li Alloys Through the Application of High-Pressure Torsion: *Taylor Herndon*¹; ¹Oregon State University

Late News Poster Session — Additive Manufacturing

Tuesday PM Room: Exhibit Hall CD
 October 1, 2019 Location: Oregon Convention Center
 4:45 PM-5:45 PM

P3-38: 3D Characterization of Defects in Deep-powder-bed Manufactured Ti-6Al-4V and Influence on Tensile Properties: Joe Elambasseril¹; Shenglu Lu²; Yapeng Ning²; Nan Liu²; Jian Wang²; Milan Brandt¹; Huiping Tang²; *Ma Qian*¹; ¹RMIT University; ²State Key Laboratory of Porous Metal Materials, Northwest Institute for Nonferrous Metal Research

P3-39: 3D Printed Electronic Sensors and Authentication: *Pedro Cortes*¹; Michael Walker¹; Guraarashjot Multani¹; Carolyn Carradero¹; Dillon Kennedy¹; Brian Zellers¹; Eric MacDonald¹; ¹Youngstown State University

P3-40: 3D Printing of Refractory Alloys for Extreme Environments: *John Porter*¹; Youping Gao¹; ¹Castheon, Inc.

P3-41: Accelerating Alloy Development with Directed Energy Deposition: *Melanie Lang*¹; ¹Formalloy

P3-42: Advantages of Open-source Additive Manufacturing: *Ulf Ackelid*¹; Ulric Ljungblad¹; Patrik Ohldin¹; Robin Stephansen¹; Martin Wildheim¹; Fredrik Ostman¹; ¹Freemelt AB

P3-43: Compression Behavior of Additively-manufactured Polymeric and Metallic Cellular Solids Composed of Tachi-Miura Polyhedron Cells: *Takahiro Kunimine*¹; Hiromi Yasuda²; Jinkyu Yang³; ¹Kanazawa University; ²University of Pennsylvania; ³University of Washington

P3-44: Directed Energy Deposition for Complex, Gradient Material Components: *Melanie Lang*¹; ¹Formalloy

P3-45: Effect of Heat Treatments on Microstructural Transformations and Properties of Wire-arc Additively Manufactured Nickel Aluminum Bronze: *Dharmendra Chalasani*¹; Kanwal Chadha¹; G.D. Janaki Ram¹; Mohsen Mohammadi¹; ¹Marine Additive Manufacturing Centre of Excellence

P3-47: Evaluation of Printability of Ecoefficient Cement Compositions Using Different Rheological Methods: Heitor Bernardo¹; Estevão Laurito¹; Alexandre Santos²; Valdecir Quarcioni²; *Roberto Romano*¹; Rafael Pileggi¹; ¹Escola Politécnica / Universidade de São Paulo; ²Instituto de Pesquisas Tecnológicas

P3-48: Geometric Model and Density Variation in Binder Jetting 3D-printed Concrete: *Asif Ur Rehman*¹; Vincenzo Sglavo¹; ¹The University of Trento, Italy

P3-49: Influence of Part Positioning in Relation to the Build Plate on the Microstructure and Mechanical Properties of Electron Beam Melted Inconel 718 Parts: *Tizian Arold*¹; Daniel Kotzem²; ¹Universität Kassel Material science department; ²TU Dortmund University

P3-50: Investigation of Material Deformation Behavior under Dynamic Compressive Loading of Selective Laser Melted 316L Stainless Steel Samples: *Md Salah Uddin*¹; Kristofer Kuelper¹; Brahmananda Pramanik¹; ¹Montana Technological University

P3-51: Investigation of Traditional vs. Designer Feedstock Powders for Additive Manufacturing: *Jack Grubbs*¹; Kyle Tsakopoulos¹; Danielle Cote¹; ¹Worcester Polytechnic Institute

P3-52: Optimisation of Mixture Properties for 3D Printing of Geopolymer Concrete: *Asif Ur Rehman*¹; Vincenzo Sglavo¹; ¹The University of Trento, Italy

P3-53: Serial Sectioning 3D Characterization of Defects in Additive Manufacturing Powders and Components: *Veeraraghavan Sundar*¹; Rachel Reed¹; ¹UES Inc

P3-54: Smart Snow and Ice Prevention System Engineering and Manufacturing: *Robert Burns*¹; Ryan Miller¹; Zhen Liu¹; ¹Frostburg State University

P3-56: Three-dimensional Quantitative Characterization on Binder-jet Printed Powder Systems: *Chuyuan Zheng*¹; Amir Mostafaei²; Pierangeli Rodriguez¹; Markus Chmielus¹; Ian Nettleship¹; ¹University of Pittsburgh; ²Carnegie Mellon University

P3-57: Unique Microstructure and Phase Transformation Behavior of High Carbon Tool Steel Layers Produced by Direct Energy Deposition Method: *Jongbae Jeon*¹; Wookjin Lee¹; Sunmi Shin¹; Byungjun Kim¹; ¹Korea Institute of Industrial Technology

Late News Poster Session — Energy

Tuesday PM Room: Exhibit Hall CD
 October 1, 2019 Location: Oregon Convention Center
 4:45 PM-5:45 PM

P3-72: Corrosion Performance of Alloyed Nuclear Waste Form: *Vineeth Kumar Gattu*¹; William Ebert¹; J Ernesto Indacochea²; ¹Argonne National Laboratory; ²University of Illinois at Chicago

P3-73: Exploring Crucial Factors Affecting Cyclability of Silicon Diposphide: Role of Chemical Bonding and Interfaces with Carbon: *Byung Hoon Park*¹; Geon Woo Lee¹; Yeon Jun Choi¹; Kwang Bum Kim¹; ¹Yonsei University

P3-74: Germanium Selenide as an Attractive Anode Material for Potassium Ion Batteries: *Geon-Woo Lee*¹; Byung Hun Park¹; Young Hwan Kim¹; Kwang-Bum Kim¹; ¹Yonsei University

P3-75: In-package Material Corrosion: Major Source of Hydrogen in Breached Waste Container: *Eric Lee*¹; James Jerden²; Vineeth Gattu²; William Ebert²; Ernesto Indacochea¹; ¹University of Illinois, Chicago; ²Argonne National Laboratory

P3-76: Measurement of Heat Transfer Coefficient in Interaction Zone of Multiple Liquid Jet Impingements: *Chaitanya Ghodake*¹; ¹Bharat Forge

P3-77: Single Crystalline VO₂ Nanobelts Prepared in Nanocellulose Templates for Li-ion Battery Applications: *Taekjib Choi*¹; ¹Sejong University

P3-78: Structure-property Correlation of Isothermal Friction Stir Welding of 304L SS: *Madhumanti Bhattacharyya*¹; Arnab Kundu¹; Krishnan Raja¹; Indrajit Charit¹; Saumyadeep Jana²; Jens Darsell²; ¹University of Idaho; ²Pacific Northwest National Laboratory

P3-79: Surface-engineered High-entropy Alloy for Catalyzing Oxygen Evolution Reaction: *Peiyuan Ma*¹; ¹Wuhan University of Technology

P3-80: Synthesis of SnO₂/Nanoperforated Graphene Microball to Analyze the Effects of Nanoperforation under SnO₂ on Lithium/Sodium-ion Storage Performance: *Yeon Jun Choi*¹; Kwang-Bum Kim¹; ¹Yonsei University

P3-81: Uniformly Decorated Graphene Tube @ Graphene Microsphere for High Rate Supercapacitors: *Young Hwan Kim*¹; Yeon Jun Choi¹; Kwang-Bum Kim¹; ¹Yonsei University



Late News Poster Session — Fundamentals and Characterization

Tuesday PM
October 1, 2019
12:00 PM-1:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P2-10: A Three-dimensional Study of the Grain Boundary Networks in Conventional and Grain Boundary Engineered 316L Stainless Steels: *Shuang Xia*¹; Qin Bai¹; Bangxin Zhou¹; ¹Shanghai University

P2-11: Beware if you are Using Cobalt! Effect of Fluorescence and Microabsorption on XRD Patterns: *Anuj Rathi*¹; William Boyer¹; ¹Proto Manufacturing Inc.

P2-12: Characterization of Cadmium Whisker Growth Environment and Microstructure: *Rachel White*¹; Zahra Ghanbari¹; Donald Susan¹; Sara Dickens¹; ¹Sandia National Laboratory

P2-13: Characterization of the Microstructure Anisotropy during Co-firing in Solid Oxide Fuel Cell Electrodes/Electrolyte: *Shotaro Hara*¹; Sakura Kaneki¹; Zilin Yan²; Naoki Shikazono²; ¹Chiba Institute of Technology; ²Institute of Industrial Sciences, The University of Tokyo

P2-14: Combining ²⁷Al Solid-state NMR and First-principles Simulations to Explore Crystal Structure in Disorder Aluminum Oxynitride: *Bingtian Tu*¹; ¹Wuhan University of Technology

P2-15: Crystal Growth and Characterization of Anisotropic Thermoelectric Compounds: *David Smiadak*¹; Alex Zevalkink¹; Nicolas Rodriguez²; Geoffroy Hautier³; Richard Staples¹; Gabi Schiering²; ¹Michigan State University; ²Leibniz Institute for Solid State and Materials Research; ³University of Louvain

P2-16: Factors Controlling Tensile Strength and Elongation of Aluminum Alloy during Partial Solidification: *Yoshihiro Nagata*¹; Ryosuke Takai²; Rei Hirohara³; Naoki Endo⁴; Makoto Yoshida¹; ¹Waseda University; ²IHI Corp.; ³Honda Engineering Co., Ltd.; ⁴Kubota Corp.

P2-17: From Fundamental Research to Engineered Components: Application to 3D Materials Science: *Jonathan Madison*¹; Thomas Ivanoff¹; Alex Hlckman¹; ¹Sandia National Laboratories

P2-18: Microstructural Evolution of Austenitic Stainless Steel During Nitridation: *Alice Young*¹; Milo Kral¹; Catherine Bishop¹; ¹University of Canterbury

P2-19: Predicting Compressive Strength of Consolidated Solids Using Computer Vision and Deep Learning: *Yong Han*¹; Brian Gallagher¹; Donald Loveland¹; Matthew Rever¹; T. Nathan Mundhenk¹; Emily Robertson¹; ¹Lawrence Livermore National Laboratory

P2-20: Processing-structure-property Relations in 70/30 Brass with Spatially Varying Grain Size Distributions: Nicholas Breeuwer¹; Daniel Lewis²; Milo Kral¹; *Catherine Bishop*¹; ¹University of Canterbury; ²Rensselaer Polytechnic Institute

P2-21: Spatial Distribution of Spherical Al₃Ti Particles in Al-Al₃Ti Composite by Equal-channel Angular Pressing and Multi-Directional Forging: *Sarath Babu Duraisamy*¹; Hisashi Sato¹; Yoshimi Watanabe¹; ¹Nagoya Institute of Technology

P2-22: Use of Resonant Ultrasound Spectroscopy to Explore the Temperature Dependent Elasticity of Thermoelectric SnSe: *Ashoka Karunarathne*¹; Gautam Priyadarshan¹; Joseph Gladden¹; ¹University of Mississippi

Late News Poster Session — Iron and Steel (Ferrous Alloys)

Tuesday PM
October 1, 2019
4:45 PM-5:45 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P3-96: A New Numerical Technique for Correction of the Stress-strain Curve and the Stress-strain Distribution on Neck Section in Tensile Specimen: *Farzad Fariba*¹; ¹Azad University

P3-97: Atomistic Approach in Transformation in Steels: *Kanwal Chadha*¹; Mohammad Jahazi¹; John Spray²; ¹Ecole De Technology Superieur; ²UNB

P3-98: Electron Beam Re-melting to Improve Surface Properties of Hot Work Tool Steel: *Digvijay Sheed*¹; ¹Bharat Forge Ltd.

P3-99: The Effects of Annealing Treatment on the Anisotropy Behavior for Cold Worked High-manganese Steels: *Byung Jun Kim*¹; Minha Park¹; Jong Bae Jeon¹; Hyoung-Seok Moon¹; Hyoung-Chan Kim¹; ¹Korea Institute of Industrial Technology

Late News Poster Session — Materials-Environmental Interactions

Tuesday PM
October 1, 2019
4:45 PM-5:45 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P3-109: Application of Incoloy 800H Alloy in the Thermal Solar Energy System: Corrosion Test in MgCl₂-KCl Heat Transfer Fluid: *Yuxiang Peng*¹; Ramana Reddy¹; ¹University of Alabama

P3-110: First-principles Investigation of Hydrogen Trapping in Chemistry Dependent Vacancies of Fe Cr Ni Alloys: *Patrick Thomas*¹; Benjamin Sikora¹; ¹Honeywell Fm&T

P3-111: Frictional Behaviour of 2-D Materials -- MoS₂ and Graphene -- in Different Environments: *Ahmet Alpas*¹; Zaixiu Yang¹; Fatih Sen²; Sukanta Bhowmick¹; ¹University of Windsor; ²Argonne National Laboratory

P3-112: High Performing Sustainable Pylons: *Karnika De Silva*¹; ¹University of Auckland-Nz

P3-113: Investigation on Slab Deterioration due to Carbonation in a Concrete Building: *Eleni Araya*¹; ¹University of Johannesburg

Late News Poster Session — Processing and Manufacturing

Tuesday PM
October 1, 2019
12:00 PM-1:00 PM

Room: Exhibit Hall CD
Location: Oregon Convention Center

P2-91: Bioprocess Inspired Synthesis of Functional Materials: *Hao Xie*¹; Hang Ping¹; Panpan He¹; Zhengyi Fu¹; ¹Wuhan University of Technology

P2-92: Copper Particle Size Effect on the Microstructure and Mechanical Properties of Copper-based Transient Liquid Phase Sintering: *Khairi Faiz Muhammad*¹; Yoshida Makoto¹; ¹Waseda University

P2-93: Drilling study of Multi-directional Carbon Fiber Reinforced Polymers: *Kamlesh Phapale*¹; ¹Bharat Forge Ltd

P2-94: Effect of Friction Stir Processing on Friction Stir Welded 5083 Aluminium Alloy Joints: *Velaphi Msomi*¹; Siphokazi Mabuwa¹; ¹Cape Peninsula University of Technology

P2-95: Effect of Mass Deposition on Fatigue Properties of Newly Developed Ultra-narrow Gap Multipass PC-GMA Weld for Thick Section: *Ramkishor Anant*¹; P.K. Ghosh¹; ¹Indian Institute of Technology Roorkee

P2-96: Estimate of Cutting Tools Wear in Turning: *Lucas Equeter*¹; François Ducobu¹; Edouard Rivière-Lorphèvre¹; Pierre Dehombreux¹; ¹University of Mons

P2-97: Fiber Laser Welding of Commercially Pure Titanium to Ti-6Al-4V Alloy: *Alireza Abdollahi*¹; *Abu Syed Kabir*¹; ¹Carleton University

P2-98: Genetic Algorithm Optimization of Process Parameters in Resistance Spot Welding of Automotive Steel Sheets: *Blériot Vincent Feujofack Kemda*¹; Noureddine Barka¹; Mohammad Jahazi²; Denis Osmani³; ¹Université du Québec à Rimouski; ²École de Technologie Supérieure; ³AMH Canada Ltée

P2-99: Laser Writing of Embedded Integrated Circuits: *Kimberly Gliebe*¹; ¹University of Dayton; Air Force Research Laboratories

P2-100: NIST Data Infrastructure for Collection and Dissemination of Thermophysical Property Data for Metal Systems: *Boris Wilthan*¹; ¹NIST

P2-101: Parameters Optimization for Double-sided Laser Beam Welding of Aluminum Alloy 5052-H32 Thin Sheet: *Herinandrianina Ramiarison*¹; Noureddine Barka¹; *Vincent Blériot Feujofack*¹; Sofiene Amira²; ¹University of Québec in Rimouski; ²Centre Québécois de Recherche et de Développement de l'Aluminium

P2-102: Press Blanking Process for Enhancing Edge Stretchability of GPa-grade Steels: *Chanhee Won*¹; *Hyouon Young Lee*²; *Jonghun Yoon*¹; ¹Hanyang University; ²POSCO

P2-103: Recent Advances in Solid Phase Processing of Ultra-conductive Aluminum Alloys using Hot Extrusion Alloying: *Aditya Nittala*¹; Lloyd Furuta¹; Frank Kraft¹; Alex Poznak²; Keerti Kappagantula³; ¹Ohio University; ²Hydro Extrusion North America; ³Pacific Northwest National Laboratory

P2-104: Study of the Kinetics of IMCs Precipitation during Solidification of an Al-Zn-Si-Mg Alloy, Using a Copper Wedge Mould Approach: *Abdul Khaliq*¹; Daniel Parker²; Nega Setargew²; *Ma Qian*¹; ¹RMIT University; ²BlueScope Innovation; Australia/ARC Research Hub for Australian Steel Manufacturing, University of Wollongong

P2-105: Structural Formations in WFeNi(Ti) and MoFeNi(Ti) Layers under Intense Plastic Deformation Induced by Ball Collisions: *Sergey Romankov*¹; ¹Chonbuk National University

P2-106: Substitutional Solid Solutions of Rare Earth Doped-ceria Elaborated by Chemical Co-precipitation: *Karla Maria Rangel-Arreola*¹; Ena Athenea Aguilar-Reyes¹; Carlos Alberto León-Patiño¹; ¹Universidad Michoacana de San Nicolás de Hidalgo



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The MS&T 19 Networking Game

Organized by the ACerS Young Professionals Network (YPN)

Practice your networking skills! Network with individuals from the following professions and locations and fill in the categories below to have a chance to win. Plan to meet at the ACerS Lounge on *Wednesday, October 2 at 11:00 a.m.* to compete amongst your colleagues for a prize. Categories will be randomly selected - if you have that section filled out then you will be eligible to win. More networking means more chances... go forth and network!

	Name of Individual	Name of Institution or Company	Location	Topical Area
Talk to a Professor from a University located in:				
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Central Time (U.S.)				
Mountain Standard Time (U.S.)				
Pacific Standard Time (U.S.)				
Outside of the U.S.				
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Central Time (U.S.)				
Mountain Standard Time (U.S.)				
Pacific Standard Time (U.S.)				
Outside of the U.S.				
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Eastern Standard Time (U.S.)				
Central Time (U.S.)				
Mountain Standard Time (U.S.)				
Pacific Standard Time (U.S.)				
Outside of the U.S.				
Talk to an employee from a Company or Vendor located in:				
Eastern Standard Time (U.S.)				
Central Time (U.S.)				
Mountain Standard Time (U.S.)				
Pacific Standard Time (U.S.)				
Outside of the U.S.				

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HOW TO GET THE MOST FROM YOUR VISIT

You probably have your own special system for seeing a show. Whether you look for specific exhibitors first or start by looking for particular products or services, this directory will guide you. You will be able to find exactly what you need quickly and easily.

Alphabetical Listing of Exhibitors	pg 191
Exhibit Floor Plan	pg 192 – 193
Alphabetical Listing of Exhibitors with Company Descriptions	pg 195
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SHOW HOURS

Tuesday, October 1, 2019 | 10:00 a.m. – 6:00 p.m.

Refreshment Break	10:30 a.m.
Lunch on Show Floor	Noon – 2:00 p.m.
General Poster Session	1:00 p.m. – 6:00 p.m.
Exhibitor Networking Reception	4:00 p.m. – 6:00 p.m.

Wednesday, October 2, 2019 | 9:30 a.m. – 2:00 p.m.

Lunch on Show Floor	Noon – 2:00 p.m.
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CONVENIENT INQUIRY SYSTEM

Your conference badge allows you to enter the exhibition during show hours. When visiting exhibits, please present your name badge to the exhibitor’s representative to request additional information about products and services.

MESSAGE BOARD

A bulletin board for messages will be located in the registration area.

PHOTOGRAPHY/VIDEO EQUIPMENT

Please keep in mind that the exhibits are the property of the exhibiting companies. Photography and/or the recording of the exhibit hall or contents of any exhibitor booth are strictly prohibited at all times. Photography inside any exhibit space is limited to only the company that has contracted for the exhibit space or to an MS&T representative (or their contracted agent) with the consent of the exhibitor.

Because there may have been some late changes in booth assignments, some exhibitors may have a different booth number than was shown on their invitations and advertising. Please check the MS&T19 app or onsite signage for the most-up-to-date listings.

Reasonable precautions have been taken to avoid errors in and omissions from this directory.

EXHIBITOR LIST (As of 8/6/19)

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Anton Paar USA Inc.	335	Objects Research Systems	430
Applied Test Systems	510	Ophir	527
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Beckman Coulter	526	PACE Technologies	604
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FLOOR PLAN (As of 7/24/19)

STUDENT AWARDS CEREMONY

MS&T SHOW OFFICE **EXHIBITOR LOUNGE**

FOOTBALL FEATURE

DOMES DAY

Micro Trac 627	Rigaku 625	623	621	PREMIER 619
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Show Management

Exhibitor Booths

Non-Rented Booths

MUG DROP / DISC GOLF

20' MTS Systems Corporation
535

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MATERIALS CAMP

FOOD

GENERAL POSTER SESSION

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20' Nanovea 313	Reser ved 311	309	307	Reser ved 305	20' HORIBA 301

Proto Manuf 314	Reser ved 312	Reser ved 310	308	Reser ved 306	Reser ved 304	Reser ved 302	RJ Lee 300
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COMPANY DESCRIPTIONS (As of 8/30/19)

Across International LLC
Booth 525
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Fritsch Milling & Sizing

Booth 512 Fritsch manufactures instruments for both milling/grinding and particle size/shape characterization. The products are often used in conjunction with R&D, analytical prep, process, or quality testing. <http://www.fritsch-us.com>

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Booth 418
<http://www.gasbarre.com>

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COMPANY DESCRIPTIONS (As of 8/30/19)

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Booth 532 Malvern Panalytical is a leader in materials characterization, creating expert solutions for the challenges associated with maximizing productivity, developing better quality products and getting them to market faster. We provide superior, customer-focused solutions and services which deliver tangible economic impact through chemical, physical and structural analysis of materials. <http://www.panalytical.com>

Metal Samples Co.

Booth 406 Mechanical test specimens to evaluate various properties of materials. Tensile, fracture mechanics, & other type specimens machined to ASTM, NACE, or customer-defined specifications. Large inventory of certified material or use customer-supplied material. Precision machining and laser services. <http://www.metalsamples.com>

Metcut Research

Booth 524 Since 1948, Metcut Research Inc. has provided worldwide materials evaluation services to the aerospace, power generation, oil & gas, ground transportation, and bio-materials industries. Services include test specimen manufacturing, mechanical and physical properties testing, structural behavior evaluation, materials analysis, and failure investigations. Our independent employee-owned corporation has locations in Cincinnati, Ohio (Metcut and CTL) and Nantes, France (Metcut Recherches S.A.S). <http://www.metcut.com>

Mettler-Toledo, LLC

Booth 531 METTLER TOLEDO is a leading global manufacturer of precision instruments. The Company is the world's largest manufacturer and marketer of weighing instruments for use in laboratory, industrial and food retailing applications. The Company also holds top-three market positions in several related analytical instruments markets and is a leading provider of automated chemistry systems used in drug and chemical compound discovery and development. Additional information can be found at www.mt.com/lab.



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COMPANY DESCRIPTIONS (As of 8/30/19)

MicroTrac

Booth 627

MSE Supplies LLC

Booth 422 MSE Supplies is a U.S.-based leading supplier of high quality materials, equipment, and material characterization services for both research and production. We have a standard suite of product offerings as well as the ability to provide customized solutions to address the totality of our customers' needs. We supply solutions to accelerate your innovations. <http://www.msesupplies.com>

MTI Corporation

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Nanovea

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National Energy Technology Laboratory

Booth 333 NETL is a U.S. DOE National Laboratory that produces technological solutions to America's energy challenges. NETL's mission is to discover, integrate, and mature technology solutions to enhance the Nation's energy foundation while protecting the environment for future generations. NETL's Materials Engineering and Manufacturing capability comprises a suite of

unique computational and experimental capabilities for evaluating materials performance at condition and manufacturing materials at scale.

NETZSCH Instruments N.A. LLC

Booth 600 NETZSCH Instruments provides a complete instrument line and commercial laboratory testing for thermal analysis, calorimetry and thermophysical properties measurement, including advanced materials research and quality control. <https://www.netzsch-thermal-analysis.com/us/>
<http://www.netzsch.com>

Novelis

Booth 433 As a global leader in innovative products and services and the world's largest recycler of aluminum, Novelis partners with customers in the automotive, beverage can and specialty industries to deliver solutions that maximize the benefits of sustainable lightweight aluminum throughout N.A., S.A., Europe, and Asia. The company is headquartered in Atlanta, Georgia, operates 23 facilities in 9 countries, has approximately 11,000 employees and recorded \$12.3B in revenue for its 2019FY. <http://novelis.com/>

NSL Analytical Services

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Objects Research Systems

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Ophir

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Oxford Instruments

Booth 425 Oxford Instruments NanoAnalysis provides leading-edge tools that enable materials characterization and sample manipulation at the nanometer scale. Used on electron microscopes (SEM and TEM) and ion-beam systems (FIB), our tools are used for R&D across a wide range of academic and industrial applications including semiconductors, renewable energy, mining, metallurgy, and forensics.

<http://www.oxford-instruments.com>

PACE Technologies

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Park Systems

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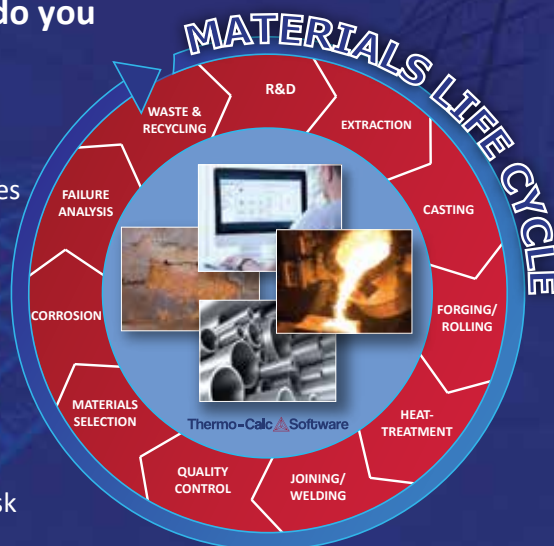
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COMPANY DESCRIPTIONS (As of 8/30/19)

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<http://www.premierlabsupply.com>

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PVA TePla America Inc.

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Quintus Technologies

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SPEX SamplePrep

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COMPANY DESCRIPTIONS (As of 8/30/19)

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Booth 420 Thermcraft is international leading manufacturer of industrial and laboratory furnaces, ovens, heating elements, insulation packages and thermal processing accessories. At Thermcraft, customer service is our #1 Priority! <http://www.thermcraftinc.com>

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Thermo Fisher Scientific

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UES, Inc.

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Vision Research

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MS&T ANTI-HARASSMENT POLICIES



The Material Science and Technology Conference (MS&T) is organized by a partnership of the four leading materials science-related societies—ACerS, AIST, ASM International, and TMS.

All four partner societies are committed to ensuring that all MS&T activities are free from discrimination, harassment, and/or retaliation of any form. The MS&T partnership does not tolerate harassment in any form of anyone attending an MS&T event.

EACH SOCIETY HAS ITS ANTI-HARASSMENT/CODE OF CONDUCT POLICIES POSTED ON ITS WEBSITE:

The American Ceramic Society

<https://ceramics.org/AntiHarrassment>

Association For Iron and Steel Technology

<https://www.aist.org/about-aist/leadership-governance/governance-policies>

ASM International

<https://www.asminternational.org/member-terms-and-conditions>

The Minerals, Metals, and Materials Society (TMS)

<https://www.tms.org/Code-of-Conduct>

<https://www.tms.org/Anti-Harassment-Policy>

WHAT TO DO:

Anyone who witnesses or is subject to any form of harassment has two options:

1. Immediately notify any MS&T staff members located at the MS&T registration area, information booths, or at one of the Society lounges. These MS&T staff members will immediately contact the MS&T leadership who will respond to you as soon as possible.
2. If you are a member of ACerS, AIST, ASM, TMS, please consult the above-referenced policies to determine to whom and how best to report an incident.

The MS&T partnership respects the organizational sovereignty and decision-making practices employed by each partner. Therefore, each partner, based on employment of its own internal due process, has the right to deny or revoke participation in the MS&T event and/or any of its activities by any individual or business.

Thermo-Calc Software

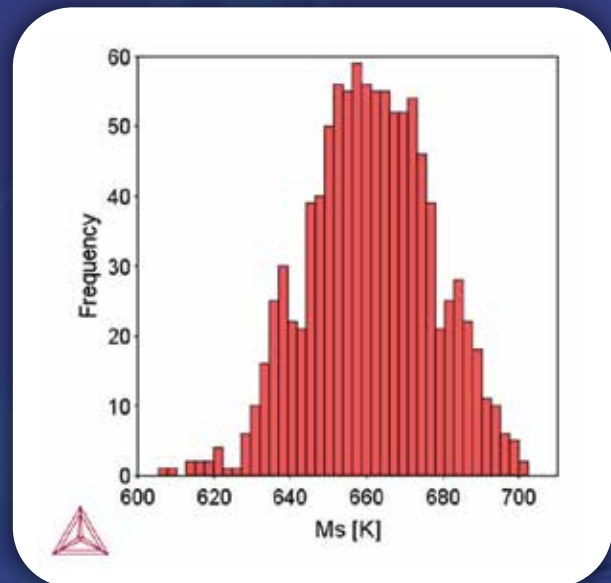
Powerful Software for Computational Materials Engineering

Software packages:

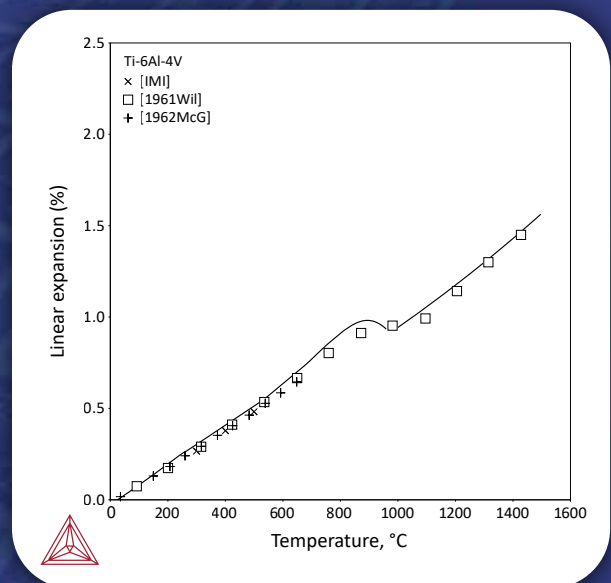
- ✓ **Thermo-Calc** for thermodynamics and phase equilibria in multicomponent systems
- ✓ **Diffusion module (DICTRA)** for modelling diffusion controlled transformations
- ✓ **Precipitation module (TC-PRISMA)** for modelling precipitation kinetics
- ✓ **Software development kits (SDKs)** for linking Thermo-Calc and add-on modules to external programs
- ✓ **Over 40 Databases** for a broad range of materials and applications

Major updates in 2019:

- ✓ **Process metallurgy module** easily set up calculations for steel and slag mixtures relevant to steelmaking and refining
- ✓ **Steel model library** calculate martensite start and finish temperatures and pearlite growth as a function of composition
- ✓ **Python based API** - link Thermo-Calc, DICTRA, and TC-PRISMA to other packages using easy to learn Python language
- ✓ **New growth models in precipitation module** Paraequilibrium and Non-Partition Local Equilibrium are now supported
- ✓ **New databases** for Titanium, Nickel, Aluminium, Copper, and Oxide/Slag



Calculated Ms temperatures for the 410 Stainless Steel composition range



Linear expansion vs T for Ti-6Al-4V

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Li	Be											Na	Mg	Al	Si	P	S	Cl	Ar
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr		
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54		
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe		
55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86		
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn		
87	88	89	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118		
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og		

59	60	61	62	63	64	65	66	67	68	69	70	71	
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
90	91	92	93	94	95	96	97	98	99	100	101	102	103
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

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