CERAMIC TECH CHAT

Episode 05

Title – "Local Manufacturing in a Global Economy: Matt Creedon (E05)"

INTRO

De Guire: "I'm Eileen De Guire, and this is Ceramic Tech Chat.

A lot of our guests so far have shared experiences spanning continents, from moving to new countries for a job or collaborating with their plants overseas. But one thing they all emphasized was that a key to successful collaboration is local specialization.

In the United States, a lot of manufacturers depend heavily on imported intermediate products, which can cause difficulties when tariff wars complicate the trading of goods. And that is why companies who produce parts here in the U.S. are so useful to local economies.

Unfortunately, those kinds of companies are not as common as they used to be."

Creedon: "Washington Mills is, I would say, it's really a kind of a dying breed, I suppose you could say. It's one of the only companies in the U.S. that does what it does in terms of boron carbide and silicon carbide, they're the only ones in North America that make those products."

De Guire: "That is Matt Creedon, R&D manager at Washington Mills, a manufacturer of abrasive grains and industrial fused minerals based in Niagara Falls, New York. In addition to being the only manufacturers of certain boron carbide and silicon carbide parts in North America, they are also the only ones in the region to use large electric arc furnaces to create their fused materials.

So, what's it like being a local manufacturer in an increasingly global economy?"

(music)

SECTION 1

De Guire: "Matt did not always plan to be a ceramic engineer. In fact, he had never heard of the career at all until his uncle introduced him to the ceramic engineering program at Alfred University when he was looking to apply to college."

Creedon: "I wasn't the kid that said, 'Man, I really love ceramics, I'm gonna go do that.' I didn't even know what ceramic engineering was when I was looking for schools. But fortunately, I had an uncle that lived near Alfred and introduced me to it the summer before my senior

year. And I thought, 'Well, I think this looks pretty interesting, I'm going to give it a try. And if it turns out I don't like it, at least I've got the first two years of engineering under my belt and I can take that wherever I want to go.' But as it turned out, I really enjoyed ceramic engineering. It was kind of a hands-on, practical, it was different, which was something that attracted me. I wanted to do something kind of unusual and unique, and it had all those aspects."

De Guire: "And when you went into Alfred and entered the program and started to realize what it could do, had you anticipated a Ph.D.? Or did that evolve over time?"

Creedon: "I didn't anticipate a Ph.D. In fact, when I got done with my bachelor's, I was so glad to be done with school and get out and get working, that was really not on the radar at all. However, after a few years in industry, I actually found that I wanted, or I ran up against a lot of questions that I felt like I didn't have the depth of knowledge to attack. So the interest in the Ph.D. started probably after about seven years of being an engineer, or kind of a development engineer. Then I ended up getting an opportunity to go back to school when I was laid off from my job. So that opportunity popped up and I went ahead and tried it. And I'm glad I did."

De Guire: "So how has having that extra knowledge made a difference in what you've been able to do in terms of product development?"

Creedon: "I think that the Ph.D. gives you that level of knowledge, gives you that ability to start looking at a problem from a much more basic level, you know, from the atomic level where I think as an engineer that's just trying to get something built and get something out the door, you don't necessarily have the opportunity or the time to do that. And so that's what the Ph.D. has given me, is that understanding at an atomic level of how things are working and allows me to attack problems a little bit differently that way."

De Guire: "Can you tell us a little bit about what you're working on right now at Washington Mills?"

Creedon: "Now I'm into the area of fused minerals, where we fuse aluminum oxide and other materials and we make synthetic alumina, synthetic materials like that for abrasive applications, like grinding wheels, sandpaper, and sandblasting media, that's another one that's very much in our portfolio. But we're also making materials like silicon carbide and boron carbide that can go into many other applications besides abrasives. So a big area for us is refractory materials. So we would be the raw materials supplier to a lot of refractories companies."

De Guire: "So how does research and product development fit into those kind of very traditional ceramic applications?"

Creedon: "Our research areas are into mainly finding new compositions that we can fuse and that people are looking for. Some of them are materials that are made in the more traditional way. Is there some advantage of using a fusion process to make that material? Refractories

companies are always looking for the next greatest refractory material even though that's another very mature area, there's always room for improvements and cost reductions and all that. So essentially just new materials."

De Guire: "Can you tell us just real briefly what the difference is between a fused mineral and nonfused mineral?"

Creedon: "A fused mineral is made through, made in an arc furnace. You take a powder or a mixture of powders and you use an electric arc furnace to melt them, and once melted and solidified, you crush it up and make whatever size fraction you want to make. It's especially handy when the raw materials that you would be using, let's say aluminum oxide, the calcined aluminum oxide, you typically have a fine powder. So if you wanted a one millimeter piece of alumina for an abrasive, you melt it, you crush it down, and now you can do that. But with the original starting material, you can't get there.

The other kind of ceramic I'll describe, which is I guess nonfused, typically ceramic compositions are made by mixing oxides and carbonates and whatever, the raw materials you need, you mix them together, you calcine them to react them, and then you have your material and that can get crushed and made into whatever you need.

So the fusion process, it has some advantages in that everything is very well mixed because you've got it in liquid form. If you have multiple things in there, multiple components, you can count on it being very well mixed. And if you need something that has large crystals, fusion also offers that because as those giant ingots cool, you end up with larger crystals in your final product."

De Guire: "How big is an ingot that would be made this way?"

Creedon: "They vary depending on the size of the furnace you're using. One of the furnaces in Niagara Falls makes ingots that are about 8,000 pounds at a time. But there's another furnace, the large one that I mentioned earlier, that one can make six tons per ingot, so 12,000-pound ingots typically. And those are kind of the two extremes. The large ingots are poured from the big furnace, but the big furnace itself pours almost 20 tons at a time."

De Guire: "So when a customer comes to you, how does a company like yours interact with a client or a customer to develop a product? So if somebody were to enter a career similar to yours, how would they expect to be able to work with other people and build the business that way?"

Creedon: "At Washington Mills, it's a pretty informal process. We have on our website, there's a section for the development, basically our whole research and development. They come to us, they can say, 'I'd really like to try to make this composition,' and we will look at it and say, 'We can give that a try and maybe make it.' So we can make small amounts and see how that works and if that meets their expectations, then we can continue to scale that up. But it's usually pretty informal. Sometimes they'll just call me, sometimes they'll just send a request through the website, or a lot of times I will reach out to them and say, 'I

think I might be able to make something that you could use. How'd you like us to try that for you?' So there's a lot of different ways but it's not, at least at Washington Mills, it's not super structured. We try to make it work however it needs to."

De Guire: "And how many people are in your department and helping you out there?"

Creedon: "Right now? Well, there's two. However, there is normally four. But basically, we have two engineers and two technicians in our group. So it's a nice small little group and we can, again very flexible, if I think of something I want to do or try, I just go try it. It's kind of nice. We get to pursue our curiosities. That's encouraged."

(music)

SECTION 2

De Guire: "As Matt mentioned, Washington Mills is in some ways a dying breed in the United States. And that's because most traditional types of manufacturers are based in other places now, particularly China."

Creedon: "Even though it's kind of an old, traditional process and company, they do kind of a unique thing now. Most of the businesses that used to do that are gone and replaced by Chinese companies, basically. All that business went to China. So we're kind of a holdout.

So how does that happen? How do you keep a business like that going in that environment? And they've kept it going by being good, by being the higher quality product. It's a little more expensive, but it's higher quality and it's right here, it's right in the U.S. So at those times when the Chinese companies or the foreign companies can't deliver, or their boat sinks on the way over, or whatever happens, we're right here to deliver in a really timely manner. So that's their niche that they're filling.

And as far as the silicon carbide and boron carbide, those businesses are going to be even more important to have here as we go forward because of the strategic place those materials have in our country. Eventually I think we're going to have to have that capability more and more here. So that's what they bring, I think."

De Guire: "What would you say are the biggest headwinds that you're facing in your industry? What kind of challenges are out there that your industry needs to address?"

Creedon: "I think we still face a lot of, it's cost. Really, we're competing against very cheap, foreign-made materials, and that's the problem. Can we continue to compete? Well, I don't know, it all depends. There's a lot of things going on right now out there that might help us with that, I hope they do, but I think the biggest thing for all those high-volume materials that we make, it's cost. It's tough because we're an American company that has the cost associated with making things here."

De Guire: “Interesting, yeah, definitely a challenge. And a hard one to control. There’s only so much you can do to influence that or manage it, really.”

De Guire: “So looking ahead in the next five years or so, what excites you about the future of your industry but also maybe our field in general?”

Creedon: “I think that the value of ceramic engineering has, I would say in the past ten years kind of declined a little bit, and I think that that’s reflected in the number of students and the number of programs out there. But I think that that’s changing. I think we’re headed back to a place where the importance of a ceramic engineer in particular is being more appreciated. I think the value that we bring and our knowledge of a pretty unique process of sintering and calcining and all those things that we just take for granted as part of our day or as part of whatever we do, most people don’t, most engineers, you know, chemical engineers, mechanical engineers, electrical ones, they have no idea. I think you can take a ceramic engineer and teach them some of those other things, but I think it’s a lot more difficult to teach other engineers what we do.

So I think the appreciation for that value is returning. And I think it shows in some of the programs that are coming up, like the technician program in Ohio, and I know there are some other schools that are considering bringing back ceramic engineering programs. So that’s what excites me, and I hope that in some way I can help with that, maybe I can get involved in that kind of thing.”

De Guire: “We’ll be in touch about that for sure.”

De Guire: “So what would you, if you were able to talk to an 18-year-old thinking about careers right now, what would you say to that young person, or suggest to them a career in ceramic engineering?”

Creedon: “I would tell them that if you want to do something unique, if you want to do something that’s practical and interesting, that can allow you to, I know for me, it’s allowed me to travel to places I never would have gone, and that ceramic engineering can give that to you.

One of the things I’ve always found interesting was how the mineralogy is part of ceramics and its connection to the earth and all the minerals that are out there. So it gives you a connection to that and also a connection to, I mean, ceramics have been made forever, right? So I would tell them that and that it can be fun. And give you a lot of opportunities. So that’s what I would say.

You can be famous and rich and all that—no.”

(laughter)

(music)

SECTION 3

De Guire: “Just like any workplace, you can have funny and completely unexpected situations occur at a ceramic engineering job as well. And that’s what happened to Matt not too long ago when he got an unexpected visitor to their pilot plant.”

Creedon: “We use a lot of rags in our pilot plant to clean up and all that, and the box of rags is on the floor, typically, and just has a hole in it where we reach in and grab them. One day I reached in to grab a rag and a raccoon had gotten into the lab. And he liked a nice warm box of rags. So I reached in there, expecting to grab a rag, and instead I felt a furry little something in there. And it scared the heck out of me.”

De Guire: “He was probably pretty frightened too.”

Creedon: “Yeah. He was pretty frightened too. And eventually we got him out of there and everything, but it was funny, mostly my reaction, when I think, ‘What were people laughing at?’ But the poor raccoon was actually injured and crawled in there to get out of the weather and all that. But, yeah, that was probably the strangest thing that’s ever happened to me at work, that’s gotta be.”

De Guire: “So as you’ve looked back on your career, what has surprised you about the arc of your career?”

Creedon: “I think the thing that I didn’t expect is to have been involved in so many different aspects of ceramics. I think that’s what I did not plan on. I think that, you know, having parents that worked at the same place for twenty-five, thirty years, I sort of thought, ‘Well, that’s what I’ll do.’ In fact, I worked at the same company my dad did for a little while when I was right out of school. And so that was my expectation of my career.

But obviously it didn’t work out that way, and now I look back at that and I think that’s a good thing because I feel like I’ve experienced most of what ceramics has to offer. Most of what I saw in school, I’ve actually seen in real life and worked on. So, that’s been my experience and I’ve enjoyed that.”

(music)

CONCLUSION

De Guire: “As Matt has showed us, a job in ceramics does not have to be a global experience. For people looking to support their local communities, ceramics offers that opportunity as well.

I’m Eileen De Guire, and this is Ceramic Tech Chat.”

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“Visit our website at ceramics.org for this episode’s show notes to learn more about Matt’s work at Washington Mills. Ceramic Tech Chat is produced by Lisa McDonald and copyrighted by The American Ceramic Society.

Until next time, I’m Eileen De Guire, and thank you for joining us.”