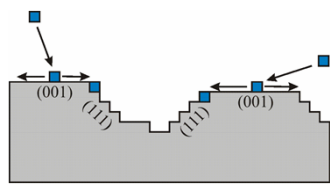


CAREER: Nanostructure Growth from the Vapor Phase

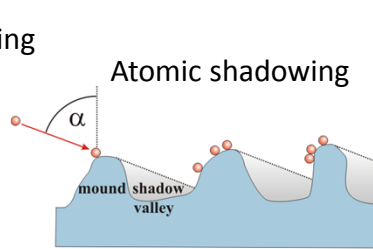
Daniel Gall

Materials Science and Engineering, Rensselaer Polytechnic Institute

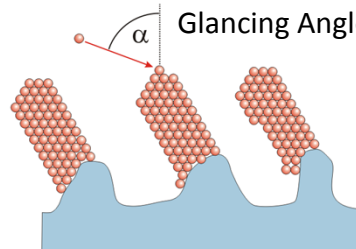
Study atomistic processes during thin film growth



Atomic shadowing

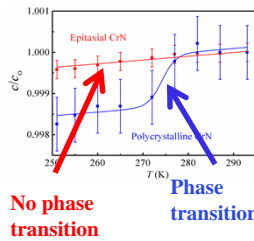
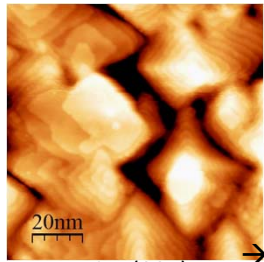


Glancing Angle Deposition

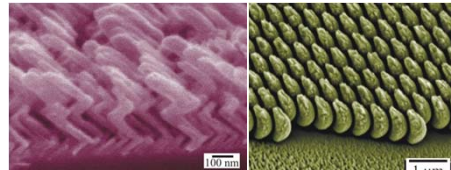


Development of scaling models that describe nanostructure morphology.

$$w_h = A_0 e^{C\langle s \rangle} h^{(p_0 + G\langle s \rangle)}$$

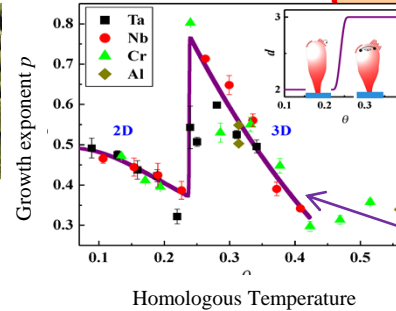


Control phase transition with epitaxial constraints



Nanostructure arrays

- Applications:
- Self lubrication
 - Nano pressure sensor
 - Nonlinear acoustics
 - Smart optical coatings
 - Fuel cell electrodes



w : Nanostructure width
 h : Height
 $\langle s \rangle$: island nucleation length (T-dependent)

Data from different materials collapse on a single curve

The Materials Machine

Educational Simulator for "Thin Film Growth"

Developed by undergraduate students

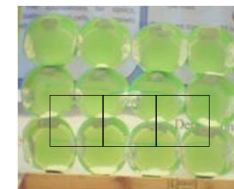
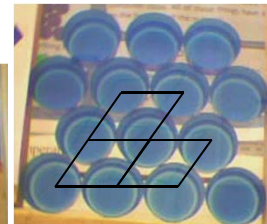
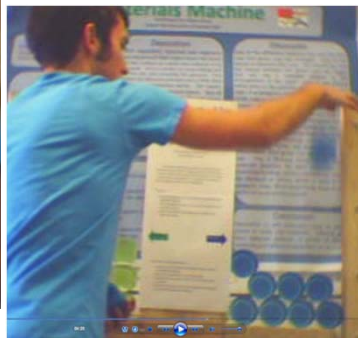
ILLUSTRATES: atoms, crystal structure, bonding, metal vs ceramic



Heather Bowman



Adam Bross



Donya Thomas

USED FOR:
 class-room
 website
 youtube
 outreach
 to high-school girls