

Mechanical Behavior & Applications of Hierarchical Nanoporous Metals

Tuesday, October 24 @ 4 PM Room: BB W250

Antonia Antoniou is an associate professor in the Woodruff School of Mechanical Engineering at Georgia Institute of Technology. She earned her Ph.D. in Engineering Mechanics from Iowa State University. She then was a postdoctoral research associate at the Center for Integrated Nanotechnologies in Los Alamos National Laboratory. In 2008, she joined the faculty at Georgia Institute of Technology as an assistant professor. Her research is focused on the mechanics of nanostructured materials with applications in energy. She is an editor for the Journal of Materials Science and is the recipient of the NSF CAREER award.



Abstract:

Recent decades saw emergence of functionalized nanoscale porous materials that offer exciting solutions for many applications. Such materials combine traditional advantages of porous media with new size-dependent effects that appear when the characteristic length scale of the microstructure approaches the nanoscale. The size effects strongly affect physical properties of the material and represent new parameter space for optimizing material properties. At the same time, they also invalidate traditionally used structure-property relations derived for low density macroscopic porous metals. In this talk, an overview will be given of the recent work on synthesis, mechanical properties, and applications of nanoporous metals with particular attention given to hierarchical nanocrystalline structures. Applications that take advantage of the very high surface to volume ratios of nanoporous metals include durable, highly active catalysts, high energy density electrodes for batteries, or high power and high temperature die-attached interconnects for microelectronics packaging. New approaches to experimental investigations of mechanical behavior will be described, including in-situ nanomechanical tests combined with modeling.



MECHANICAL ENGINEERING
COLORADO SCHOOL OF MINES