MSE SEMINAR

Materials Science and Engineering
Michigan Technological University

Tuesday, February 4, 2014
11:00 am – 12:00 pm
Room 610, M&M Building

Toward ICME Development of Co-based Gamma/Gamma-prime Superalloys: Microstructural Evolution and Phase Equilibria

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Abstract

Two-phase gamma (FCC)/gamma-prime (L12) alloys based on the Co-W-Al ternary system exhibit promising high temperature strength and creep resistance and could potentially operate at higher temperatures compared to their Ni-based analogs presently used in turbine blade and other high temperature applications. Essential to the development of these alloys are accurate descriptions of the microstructural evolution, phase equilibrium, and diffusion in ternary Co-Al-W. These composition-dependent descriptions are being develop as part of a case study under the Materials Genome Initiative (MGI), that is developing and implementing the tools necessary to facilitate efficient materials design via Integrated Computational Materials (Science &) Engineering (ICME). This talk will discuss NIST's collaborative efforts in collection and curation of materials data, use of that data to create phase-based thermo-physical properties, and ultimately employ physics based modeling tools to predict mechanical behavior and performance of materials, with specific emphasis on phase equilibria and microstructural evolution in the ternary Co-W-Al system.

Bio: Dr. Eric Lass is a Materials Research Engineer at NIST in Gaithersburg, MD. Prior to joining the staff as NIST, Eric received his B.S. in MS&E from Michigan Tech in 2001; an M.S. from RPI in 2003 and his Ph.D. from the University of Virginia in 2008, both in MS&E. He joined the Metallurgy Division at NIST in 2009 when he was awarded an NRC postdoctoral research associateship. Following a two-year term appointment, he joined the permanent staff at NIST in 2013.

Eric's research interests lie in thermodynamics and phase transformations primarily in metallic systems. Research topics have included the thermodynamics behavior of metallic glasses (Ph.D.) and Mg-based hydrogen-storage materials; as well as studying the behavior of carbon-nanotubes and graphene. Currently, Eric's research focuses experimental phase equilibria and property measurements and their relation to Integrated Computational Materials Science (ICME). He is the project leader of NIST's pilot program researching Co-W-Al alloys as a part of the Materials Genome Initiative (MGI).

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