JOIN US FOR THIS TMS2019 SYMPOSIUM:

MECHANICS AND STRUCTURAL RELIABILITY

Thermo-mechanical Response of Materials Investigated through Novel in-situ Experiments and Modeling

This symposium will discuss current research and key developments in theory, computational, and experimental methods to study and predict the thermo-mechanical properties of materials in application-orientated environments. These environments may include, but are not limited to, high temperature, cryogenic temperature, electrical and magnetic field, gas, radiation, chemical, pressure extremes, and humidity. In-situ mechanical testing using SEM, TEM, AFM, Raman, synchrotron, X-ray, IR, and FTIR observation techniques during testing are becoming increasingly popular for studying mechanical behavior of materials. Many such techniques have been developed to probe material response to stimuli across nano- to macro-length scales. At the same time, significant progress has been made in the development of high fidelity models to analyze the behavior of materials at different spatial and temporal scales. The intent of the symposium is to provide a forum for researchers from national laboratories, academia, and industry to discuss research progress in the area of in operando and/or in-situ mechanical testing for nanomechanical studies, advances in computational approaches and most importantly, integration of experiments and modeling to accelerate the development and acceptance of innovative materials and testing techniques.

Topics include:

- Development of instruments and experimental methodology for in-situ techniques and/or testing at non-ambient conditions
- Imaging and analytical techniques to correlate microstructure, defects, crystal orientation, and strain field with mechanical properties
- Microstructural observations using in-situ techniques across length scales
- Experimental characterization and multiscale modeling of deformation of high-temperature materials, high-strength materials, thin films, 1D, 2D, and other low-dimension nanostructures, and interfaces
- Uncertainty quantification and quantitative validation of computational models

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