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TMS 2026

155th Annual Meeting & Exhibition

March 15–19, 2026
San Diego Convention Center
and Hilton San Diego Bayfront
San Diego, California, USA
#TMSAnnualMeeting

SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

ADVANCED CHARACTERIZATION METHODS

Material Responses Investigated Through Novel In-Situ Experiments and Modeling

The focus of this symposium is to discuss current research and key developments in theory, computation and experiments of in-situ methods to study and predict the material responses in demanding environments. These environments may include, but are not limited to high mechanical loads, cryogenic (or high) temperatures, electrical and magnetic field, radiation, corrosion and oxidation in material fabrication processing and/or deformation. In-situ testing using SEM, TEM, AFM, Raman, synchrotron, X-ray, IR, and FTIR observation techniques are becoming increasingly popular for studying the material response in novel material processing or under external loads across time and length scales. At the same time, significant progress has been made in the development of high fidelity models to analyze (or validate hypotheses of) 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 progresses in the area of in operando and/or in-situ observations across time and length scales, advances in computational approaches and most importantly, integration of experiments and modeling to accelerate the development and acceptance of innovative material processing and testing.

Topics include:

- Development of instruments and experimental methodology for in-situ studies of material responses in material fabrication and deformation processes.
- In-situ imaging, analytical and modeling techniques to correlate processing phenomena and microstructure (including dislocations, crystallographic orientations, precipitates, phases) with material properties.
- In-situ characterization and multi-scale modeling of material responses at high-temperature and high strain rates; or of nano-/micro-structures, and materials at interfaces.
- Coupling physics-based modeling with in-situ characterisation to achieve new insights into material behaviour.

SPONSORED BY:
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