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TMS2019

148th Annual Meeting & Exhibition

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March 10–14, 2019
San Antonio, Texas, USA

JOIN US FOR THIS TMS2019 SYMPOSIUM:

NANOSTRUCTURED MATERIALS

Fracture Processes of Thin Films and Nanomaterials

This symposium will focus on recent developments in the field of fracture of thin films and small volumes, focusing on uncovering the mechanisms responsible for improved properties. Such novel insights are enabled by advanced testing technologies paired with comprehensive characterization at the nanoscale and a suited fracture-mechanical analysis. With the wide variety of applications (semiconductors, printed electronics, energy storage, protective coatings, etc.) and the required control of structural and functional properties, a better understanding of the relationship between processing, microstructures, and failure mechanisms is required to design more robust and reliable devices and structures for use in any environment. The deformation characteristics of thin films and small volumes have been explored for years using different in-situ and ex-situ techniques (nanoindentation, TEM, SEM, micro-XRD, etc). However, the need for examination of local fracture processes calls for dedicated testing techniques that permit high temporal and local resolution of structural and mechanical properties, ideally coupled with measurements of electrical or thermal characteristics under applied load. Furthermore, the enhanced understanding of the impact of interface design on fracture in thin films and nanostructured materials is of interest. The combination of advanced testing techniques with adapted fracture mechanics evaluation concepts will enable a safe design of future components based on thin films and small volumes.

The subject areas of the symposium include, but are not limited to:

- Local analysis of stress and strain around crack tips
- Fracture of nanostructured materials (thin films, printed structures, nanocrystalline materials, etc.)
- Developments in nanoporous materials for energy harvesting or storage applications
- Fracture concepts to analyze miniaturized volumes and bridge scales to macroscopic properties
- New developments in fracture testing techniques using coupled in-situ measurements (electrical, optical, mechanical, etc.) or in enhanced environments (high temperatures, humidity controlled, etc.)

A joint session on fracture in harsh environments with the Micro- and Nanomechanical Testing in Harsh Environments Symposium is planned.

ORGANIZERS

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