



SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

MECHANICS OF MATERIALS

Accelerated Discovery and Insertion of Next Generation Structural Materials

Stability of structural materials is of great importance to avoid catastrophic failures during operation across the aerospace, transportation, and energy fields. Stability is significantly affected by processing route. Understanding responses to stress, hydrostatic pressure, temperature, irradiation, or corrosive conditions is essential for designing alloys for all service environments. This symposium delves into investigations, focused on using high throughput tools for accelerated materials discovery and root cause analyses of fielded and new make parts. This symposium will also help identify some critical areas/needs in new methodologies/tools for the community to focus upon and how they are being validated and corroborated with experimental evidence.

The topics of interest to this symposium include, but are not limited to, the following:

- Integrated computational materials engineering (ICME) tools coupled with multi-scale experimentation to correlate processing history to microstructural hierarchy and ensuing property response
- Novel modeling approaches for reliable prediction of material properties, including multi-objective optimization and machine learning based approaches
- Unraveling the complex interplay between driving forces and mobility for competing microstructure evolution processes
- Mechanisms of material responses to combined chemo-thermo-mechanical loading and modeling that incorporates new mechanistic understandings of behavior
- High throughput experimental approaches to facilitate training of machine learning models
- Qualification pathways and status of qualification for next generation materials and manufacturing processes

One session of this symposium will focus on materials scientists and engineers who work on alloy development for a wide range of industrial applications providing a forum to discuss the methodology for design, property optimization, and successful and unsuccessful techniques or examples. Uniting academia and industrial research will facilitate a fruitful interaction on the newest techniques being developed and the experiences of alloy developers in their use.

This symposium has historically been primarily focused is on structural high temperature materials such as refractory alloys; high-entropy alloys, medium-entropy alloys, complex concentrated alloys and alloys proposed under similar design concepts; Co-, Ni-, Nb-, and Ti-based alloys; maraging steels; alumina-forming steels; and ODS alloys. Abstracts involving multiple processing routes are welcome, including additive manufacturing, powder metallurgy, casting, wrought processing, and combinations thereof.

SPONSORED BY:

TMS Structural Materials Division; TMS Phase Transformations Committee; TMS High Temperature Alloys Committee

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