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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

MECHANICS OF MATERIALS

Materials Kinetics and Mechanisms Under External Forcing-Driven Conditions

The materials science and engineering community increasingly encounters material systems driven far from equilibrium — e.g., by large shear, irradiation, and electrochemistry-based external forcing — where linear irreversible thermodynamics fails to capture complex material responses. Recent studies have revealed a range of peculiar phenomena in such systems beyond linear response, including the suppression and enhancement of crystallization kinetics, shear-induced atomic transport and segregation, irradiation-induced cascade mixing, and nontraditional phase transformation and defect formation that fundamentally alter material properties. This symposium aims to unite researchers investigating materials kinetics and mechanisms under strongly driven conditions to develop new theoretical frameworks and experimental methodologies. Discussions will also explore the integration of computational tools and AI to enhance predictive understanding and control of driven material systems. By bringing together experts across externally driven processes, the symposium also seeks to foster cross-disciplinary exchange and leverage fundamental insights to advance technologies in the manufacturing and energy sectors.

Topics of interest include, but are not limited to:

1. Novel experimental methodologies and findings on kinetic phenomena and mechanisms in driven systems, e.g., external forcing-induced atomic segregation, mixing, defect evolution, and phase transformation
2. Theoretical frameworks on thermodynamics and kinetics under strongly driven conditions, e.g., by large shear and ion irradiation.
3. Integration of computational tools and artificial intelligence, e.g., physics-informed machine learning, for predictive modeling of driven alloys and material systems.
4. Application of fundamental insights into driven material systems for advanced manufacturing (e.g., friction stir processing/deposition and cold spray), energy storage and conversion (e.g., electrochemical processes), and nuclear infrastructure.

SPONSORED BY:
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