

THE WORLD COMES HERE.  
**TMS2025**  
154<sup>th</sup> Annual Meeting & Exhibition



**March 23–27, 2025**  
MGM Grand Las Vegas  
Hotel & Casino  
Las Vegas, Nevada, USA  
#TMSAnnualMeeting



## SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2025 SYMPOSIUM:

### MATERIALS SYNTHESIS AND PROCESSING

## Materials Processing Fundamentals: Thermodynamics and Rate Phenomena

Materials processing involves inherently interlinked and complex chemical, thermal, mechanical, and physical operations, spanning from the extraction of raw materials to the shaping and heat treatment of final products. This symposium is dedicated to improving the understanding of materials production and process technology through multiple experimental and modeling techniques. At TMS2025, this symposium will focus on first principle and applied studies of thermodynamics and rate-governed phenomena, including reaction kinetics and meso-, macro-scale transport of mass, momentum, and energy throughout the sequence of processing operations. Studies that provide the necessary framework for improved understanding of materials manufacturing unit operations leading to optimized process designs and control are especially encouraged. This symposium is cross-functional in nature and is open to all materials, such as ferrous and nonferrous metals, composites and ceramics, and their relevant synthesis and manufacturing techniques.

Examples of subjects include, but are not limited to:

- Thermodynamic modeling (i.e., CALPHAD-based methods) for the optimization of alloy solutions, slag compositions, and other types of materials.
- Mass and energy balance simulations of material processing systems using of software such as FactSage, MPE, HSC-SIM and METSIM.
- Both experimental and numerical studies on kinetic rate theories pertaining to crucial material processes such as chemical reactions, diffusion, nucleation and phase transformations, and solidification.
- Numerical modeling and simulation, such as computational fluid dynamics (CFD), of multi-scale transport phenomena in unit operations.
- Development and application of process simulations that utilize a combination of thermodynamic, kinetic and transport equations to simulate and/or control individual unit operations and/or plants.
- Materials processing abstracts on topics other than thermodynamics and rate phenomena will also be considered for presentation.

### ORGANIZERS

**Alexandra Anderson**, Gopher Resource; **Adrian Sabau**, Oak Ridge National Laboratory; **Chukwunwike Iloeje**, Argonne National Laboratory; **Adamantia Lazou**, National Technical University of Athens; **Kayla Molnar**, Los Alamos National Laboratory

### SYMPOSIUM SPONSORS

TMS Extraction & Processing Division, TMS Materials Processing & Manufacturing Division, TMS Process Technology and Modeling Committee, TMS Computational Materials Science and Engineering Committee, TMS Phase Transformations Committee

[www.tms.org/TMS2025](http://www.tms.org/TMS2025)

### QUESTIONS?

Contact [programming@tms.org](mailto:programming@tms.org)