

## SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

### ADVANCED CHARACTERIZATION METHODS

# Advanced Real Time Imaging for Materials Science and Processing

Real time, in-situ and in operando observations of the dynamic behaviors of materials across different spatiotemporal scale can provide important and critical information for understanding the materials behavior in different conditions. Many traditional and emerging advanced imaging techniques can provide the temporal and spatial insights that other indirect conventional experimental techniques cannot access to. These may include optical, laser, electron, X-ray, neutron imaging techniques, and other emerging methods. Integrating those imaging techniques in heating, isothermal holding, and cooling under controlled atmospheres, and/or stress environments, valuable real time thermodynamic and kinetic data can be generated for studying a variety of materials and processes. This symposium may encompass a broad range of materials science topics enabling cross-cutting opportunities for multiple disciplines (structural materials, manufacturing processes, energy materials, functional materials, biomaterials, etc.) but it focuses on real time imaging techniques, which may be enhanced with innovative approaches. Presentations are solicited on the application of these methods to materials science and industrial processes, as well as on development of such techniques.

Topics include, but not limited to:

- Studies using real time optical (e.g., visible light, white light, laser, IR, UV) and non-optical (e.g., scanning probe, electron, ultrasound, X-ray, neutron) imaging techniques
- Research using in-situ, in-operando, in-vitro, and in-vivo observation imaging techniques, such as thermal imaging furnace and other real time imaging methods
- Confocal techniques, including fluorescence and reflection types, which may be equipped with capabilities such as heating/cooling chambers, gas chambers, mechanical testing, Raman spectroscope, mass spectrometry, and FTIR
- Microscopic or telescopic imaging methods include hot thermocouple, resistance heating, and sessile drop techniques used for high temperature phenomena
- Thermodynamic and kinetic data from these techniques, useful for phase diagram constructions, oxidation/corrosion modeling, phase formation kinetics studies, etc.
- Work using high speed and slow speed cameras
- Materials used in manufacturing real time imaging
  devices

- Novel technologies and methodologies for emerging imaging devices
- A joint session with the following symposium may take place:
- The Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling symposiumRespective papers may participate in part of the dedicated joint session.

### **SPONSORED BY:**

TMS Functional Materials Division; TMS Structural Materials Division; TMS Advanced Characterization, Testing, and Simulation Committee; TMS Alloy Phases Committee; TMS Thin Films and Interfaces Committee

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