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TMS 2025
154th 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:

ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

Advanced Materials for Energy Conversion and Storage 2025

This symposium intends to provide a forum for researchers from national laboratories, universities, and industry to discuss the current understanding of materials science issues in advanced materials for energy conversion and storage, including high-temperature processes, and to discuss accelerating the development and acceptance of innovative materials, and test techniques for clean energy technology. For further understanding, accelerating the innovation and making the symposium focused, we have divided the symposium into four interconnected themes, namely: (a) Energy Conversion, (b) Energy Storage, (c) Materials Design, and (d) Functional themes (each theme is described in detail in the next section). Recent developments in AI (Artificial Intelligence), big data, and Deep Learning will be a common factor for each theme. It is expected that the synergism and interdisciplinary nature of different themes as well as involvement of leading experts will provide the attendees an inclusive and holistic forum for discussion and learning new developments in Energy Conversion and Storage in the Symposium.

Theme 1: Energy Conversion

- SOFCs and reversible SOFCs/SOECs
- PEM fuel cell
- Thermoelectric Devices
- The durability of the fuel cell and stack materials
- Degradation due to thermo-mechanical-chemical effects
- Effect of microstructure evolution on the properties and efficiency
- Chromium poisoning from interconnections and Balance of Plant

Theme 2: Energy Storage

- Batteries
- Physicochemical Interaction in intercalation, conversion, and metal batteries, e.g., lithium-ion, solid-state, Na-ion, Li-S, Li-air
- Electrode microstructure - property - performance interplay
- Mesoscale modeling and characterization (e.g., X-ray tomography)
- Degradation (e.g., mechanical, chemical, electrodeposition) and safety characteristics in electrodes

Theme 3: Advanced Materials Design for Sustainability and Energy Harvesting

- Advanced Materials for Solar Energy
- Advanced Materials for Wind Energy
- Supercapacitor
- Green Tribology
- Life cycle analysis of materials and products

Theme 4: Functional Materials, including Coating, Ceramics, and Alloys

- Functional Oxides, Nitrides, and Carbides
- Ceramics and Dielectrics
- Sensors
- Thermal Energy Harvesting, Conversion, Storage, and Management Devices
- Functional Coatings for Harsh Environments
- Nanotechnology and Multifunctional Materials
- Membrane Separation Materials, Processes, and Systems (H₂, O₂, CO₂)
- Water Splitting and Other Catalyst Applications
- In-Situ Spectroscopy and Advanced Characterization of Functional Materials
- Harsh Environment Electromagnetic Materials

ORGANIZERS

Surojit Gupta, University of North Dakota; **Jung Choi**, Pacific Northwest National Laboratory; **Amit Pandey**, Lockheed Martin Space; **Partha Mukherjee**, Purdue University; **Soumendra Basu**, Boston University; **Paul Ohodnicki**, University Of Pittsburgh; **Eric Detsi**, University of Pennsylvania

SYMPOSIUM SPONSORS

TMS Functional Materials Division, TMS Structural Materials Division, TMS Energy Conversion and Storage Committee, TMS High Temperature Alloys Committee

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QUESTIONS?

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