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TMS2020
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Energy & Environment

Advanced Materials for Energy Conversion and Storage VI

The intent of this symposium is to provide a forum for researchers from national laboratories, universities, and industry to discuss 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.

Theme 1: Energy Conversion
Topics include, but are not limited to, experiments and modeling of energy conversion systems including:
• Solid Oxide Fuel Cells and PEM fuel cells
• Hydrogen generation
• The durability of the fuel cell and stack materials
• Thermal-Chemical-mechanical stresses/expansion
• Study of thermo-mechanical degradation mechanisms
• Effect of microstructure evolution on the properties and efficiency
• Role of grain boundary density, grain size, orientation, and grain growth
• Advances in the characterization and modeling techniques

Theme 2: Energy Storage
• Batteries
• Hydrogen storage
• Physicochemical interaction in lithium-ion batteries and beyond (e.g., Li-S, Li-air)
• Electrode microstructure - property - performance interplay
• Mesoscale modeling and characterization (e.g., X-ray tomography)
• Degradation (e.g., mechanical, chemical, electrodeposition) characteristics in electrodes

Theme 3: Materials Design for Sustainability and Energy Harvesting
This component of the symposium will focus on a variety of green and sustainable technologies for energy harvesting, additive manufacturing, green tribology, next-generation products and processes, and development of advanced instrumentation and control systems, etc. Proposed Session Topics include:
• Solar Energy
• Energy Harvesting
• Nanotechnology and next-generation multifunctional materials
• Additive manufacturing, 3D printing, and sustainability
• Green Tribology
• Life cycle analysis of materials and products

Theme 4: Functional Materials including High-Temperature Ceramics and Alloys
• Functional Oxides / (SOFC, sensors, others)
• Ceramics and Dielectrics / (battery, insulation Dielectrics, capacitors, sensors)
• Solid State Batteries/Electrolyzers/Solid oxide fuel cells/Membrane Separation/electrolysis cells
• Coatings for interconnections
• Membrane Separation Materials, Processes and Systems (H₂, O₂, CO₂)
• High-temperature electrolysis cells
• High-temperature performance of functional materials (electrochemical, electronic, optical, etc.)
• In-situ spectroscopy of oxidation state of functional oxides in operation

Questions?
Contact programming@tms.org


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