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TMS2019

148th Annual Meeting & Exhibition

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March 10–14, 2019
San Antonio, Texas, USA

JOIN US FOR THIS TMS2019 SYMPOSIUM:

ENERGY & ENVIRONMENT

5th Symposium on Advance Materials for Energy Conversion and Storage

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 high-temperature processes and accelerate the development and acceptance of innovative materials and test techniques for clean energy technology.

Theme 1: Energy Conversion with emphasis on SOFCs.
Topics will include experiments and modeling of the above-mentioned systems including:

- Durability of 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 with emphasis on Batteries
Topics will include:

- Physicochemical interaction in lithium-ion batteries and beyond (e.g. Li-S, Li-air, Na-ion)
- 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 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. 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
Materials / Applications:

- 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

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Topics will include:

- Coatings for interconnections
- Membrane separation materials, processes, and systems (H_2, O_2, CO_2)
- 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
- Ceramics/composite structures/alloys-solid oxide fuel cells, thermal barrier coatings, diesel particulate filters etc.
- Reliability and durability of high-temperature ceramics and alloys, including the effect of residual/operational stresses, corrosion under oxidizing and reducing environment
- Advances in the characterization and modeling techniques including multiscale and in-situ
- Microstructural reconstruction and mapping onto fundamental mechanistic models for predicting overall performance
- Nanostructuring and infiltration of functional electrode materials (SOFC, battery, capacitor) for electronic/electrochemical performance

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