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TMS 2026
155th Annual Meeting & Exhibition

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San Diego Convention Center
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#TMSAnnualMeeting

SUBMIT AN ABSTRACT FOR THE FOLLOWING SYMPOSIUM

ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

Energy Technology 2026: Advancement in Energy Materials - Theory, Simulation, Characterization, Application

With the increasing global focus on transitioning to sustainable and efficient energy systems, energy materials have become a foundation for enabling advanced energy technologies. This symposium focuses on recent breakthroughs in the development, understanding, and application of energy materials across diverse fields, including energy generation, storage, and conversion. Topics of interest include fundamental research on the design and optimization of energy materials through computational and theoretical approaches, multi-scale modelling, and advanced characterization techniques. This symposium aims to bring together a multidisciplinary community of researchers and engineers working on the cutting edge of energy materials. It will provide a collaborative platform for sharing knowledge, exchanging innovative ideas, and discussing methodologies to tackle current challenges in the field. By fostering dialogue across theory, experiment, and application, the symposium seeks to inspire novel approaches to accelerate advancements in energy materials for a sustainable future.

Exemplary topics at the symposium include but are not limited to:

- Theoretical approaches for energy materials design, including density functional theory (DFT), molecular dynamics (MD), and thermodynamic modeling, to predict the properties and behavior of energy materials. Insights into atomic structures, defect energetics, and phase stability enable the design of materials tailored for specific energy applications, such as batteries, fuel cells.
- Multiscale simulations for energy materials design and property prediction, covering quantum, atomistic, mesoscale, and continuum levels.
- Advanced characterization techniques for energy materials, including in-situ/ex-situ synchrotron X-ray diffraction, in-situ/ex-situ neutron scattering, microscopic analysis, atom probe tomography etc., which reveals micro- to nano scale features and dynamic structural and chemical changes during energy generation, storage, and conversion processes.
- Development of functional energy materials. This topic focuses on the development and application of advanced materials for energy storage (e.g. batteries, supercapacitors, and hydrogen storage) and energy conversion (e.g. fuel cells, solar cells, and thermoelectrics). Emphasis is placed on optimizing material properties, including conductivity, stability, and efficiency, for integration into sustainable energy technologies.
- Interface and surface engineering in energy materials, e.g. materials science technology to modify interface characteristics, segregation control, coating technology, to enhance energy efficiency and materials durability.
- Data-driven design and machine learning in energy materials. This topic highlights the use of data-driven approaches to analyze experimental and simulation data, predict material properties, and explore to develop next-generation energy materials.
- Applications of energy materials in sustainable technologies.

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Note regarding publication: Authors seeking an oral presentation opportunity must submit a manuscript for the Energy Technology proceedings or be accepted for publication in a TMS journal.

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