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TMS 2023

152nd Annual Meeting & Exhibition

MARCH 19–23, 2023
SAN DIEGO CONVENTION CENTER &
HILTON SAN DIEGO BAYFRONT
SAN DIEGO, CALIFORNIA, USA
#TMSANNUALMEETING

SUBMIT AN ABSTRACT BY JULY 1 FOR THE FOLLOWING TMS2023 SYMPOSIUM:

NUCLEAR MATERIALS

Ceramic Materials for Nuclear Energy Research and Applications

Nuclear energy is an integral component of any viable clean energy strategy and ceramic materials play a critical role in nuclear energy production and research. Ceramic oxides are the most commonly utilized fuel form in commercial energy production. Uranium dioxide (UO_2) is typically used in light water reactors (LWRs) and the experience base with mixed oxide (MOX) fuels is growing. In addition to fuel forms, ceramics, and ceramic coatings are being developed for alternative reactors and advanced cladding concepts. Specifically, there has been significant efforts to incorporate silicon carbide (SiC) in accident tolerant fuel (ATF) concepts. Beyond fission, ceramic materials are also an integral component of future fusion reactor designs as well (e.g., tritium-breeding ceramic materials). Finally, ceramics are being evaluated for potential end-of-life waste forms due to their ability to immobilize hazardous radionuclides.

This symposium focuses on both experimental and computational modeling studies of ceramics for nuclear energy research and applications. Both practical reactor materials and surrogate materials are of interest. The topics of interest include, but are not limited to:

- Defect production and evolution
- Mobility, dissolution, and precipitation of solid, volatile, and gaseous fission products
- Structure-property correlations
- Degradation of mechanical properties and structural integrity
- Radiation-induced phase changes

Experimental studies using various advanced characterization techniques for characterizing radiation effects in ceramics are of particular interest. Techniques such as laboratory ion beam accelerators, research, and test reactors, as well as commercial nuclear power reactors are all of interest. Computational studies across different scales from atomistic to the continuum are all welcome. Contributions focused on novel fuels such as doped UO_2, high density uranium fuels like uranium nitrides and silicides, and coatings for accident-tolerant fuel claddings are also encouraged.

This symposium is intended to bring together national laboratory, university, and nuclear industry researchers from around the world to discuss the current understanding of the radiation response of ceramics through experiment, theory and multi-scale modeling. Presentations on SiC-related topics will be coordinated with concurrent symposia on composites to minimize overlap.

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