

THE WORLD COMES HERE.
TMS2024
153rd Annual Meeting & Exhibition

MARCH 3–7, 2024
HYATT REGENCY ORLANDO
ORLANDO, FLORIDA, USA
#TMSAnnualMeeting



SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2024 SYMPOSIUM:

NUCLEAR MATERIALS

Materials Corrosion Behavior in Advanced Nuclear Reactor Environments

Advanced nuclear reactors are a promising addition to expanding the domestic and worldwide sustainable energy portfolio in the wake of climate change. However, the qualification of materials suitable to meet the operational needs of different reactor technologies has not matured, especially for corrosion performance.

According to the World Corrosion Organization, the annual direct cost of corrosion is over 1.8 trillion dollars worldwide. This issue extends into maximizing the operational lifespan of advanced nuclear reactors including molten salt nuclear reactors, sodium-cooled and lead-cooled fast reactors, and high temperature gas-cooled reactors, which introduce operational environments that require the highest performing nuclear materials to construct. Thus, there is an increasing need to expand the fundamental framework of the corrosion behaviors of nuclear structural materials.

The aim of this symposium is to provide a space to discuss current progress in our understanding of how the corrosion mechanism of nuclear structural materials is impacted by the environmental stressors introduced by advanced nuclear reactors, including temperature, corrosion medium, atmospheric composition, the presence of actinide and transuranic species, ion/neutron irradiation, etc.

Topic areas for this symposium include but are not limited to:

- The impact of actinide and fissile by-product species on corrosion mechanisms.
- The impact of irradiation on the corrosion behaviors of materials.
- The relationship between environmentally induced (e.g., temperature, irradiation, etc.) phase transformations and corrosion mechanisms.
- The intersectionality between radioactive species and irradiation on the corrosion mechanism in molten salt environments
- High temperature corrosion of nuclear structural materials and cladding in liquid sodium, lead, or lead-bismuth eutectic coolant mixtures

- Structural alloy and graphite corrosion at high temperature conditions
- The intersectionality between mechanically induced phenomena (e.g., environmentally-induced stress corrosion cracking) and corrosion mechanism

ORGANIZERS

Trishelle Copeland-Johnson, Idaho National Laboratory, USA
Cheng Sun, Idaho National Laboratory, USA
Caitlin Huotilainen, TerraPower, USA
Nidia C. Gallego, Oak Ridge National Laboratory, USA
Suraj Persaud, Queen's University, Canada
Osman Anderoglu, University of New Mexico, USA
Adrien Couet, University of Wisconsin-Madison, USA
Julie Tucker, Oregon State University, USA

SYMPOSIUM SPONSORS

TMS Structural Materials Division
TMS Corrosion and Environmental Effects Committee