

THE WORLD COMES HERE.
TMS 2025
154th Annual Meeting & Exhibition



March 23–27, 2025
MGM Grand Las Vegas
Hotel & Casino
Las Vegas, Nevada, USA
#TMSAnnualMeeting



SUBMIT AN ABSTRACT FOR THE FOLLOWING TMS2025 SYMPOSIUM:

NUCLEAR MATERIALS

Special Topics in Nuclear Materials: Lessons Learned; Non-Energy Systems; and Coupled Extremes

Nuclear materials research is continuously evolving within an environment of rapidly shifting socio-political, economic, and environmental policies and priorities, as well as in response to research advances across the broader materials science community. This symposium captures emergent topics to facilitate deep and timely discussions that will elevate the impact and visibility of these topics, and build research momentum in these areas. For TMS 2025, three emerging topics are identified: Lessons Learned: Many journal publications highlight the outcome of extensive and expensive irradiation campaigns to examine material properties or fundamental science information, but rarely address outcomes that do not paint the outcome in a positive manner. Presentations are sought that address unforeseen circumstances that interrupted or negated the scientific method when studying issues related to materials performance in extreme environments. General studies for nuclear materials that highlight what did not work as intended and the understanding gained on why the study did not work are strongly encouraged.

Examples include:

- Artefacts generated during sample preparation or experimentation
- The role of non-disclosed impurities or processing on performance
- Impacts of non-ideal specimen geometries on thermal or mechanical performance
- Radiation Effects in Non-Energy Systems: In addition to traditional reactor improvements, advancements in nuclear materials science have introduced capabilities in industrial, transportation, and material characterization applications.

Many of these critical advancements have not previously been explored in nuclear-centric symposia as they do not fit the traditional mold of nuclear materials science.

This mini-symposium seeks abstracts concerning, but not limited to, the following:

- Nuclear fission/fusion used for non-power generation applications such as industrial heat, thermal propulsion, and isotope production
- Novel applications of nuclear waste and byproducts
- Characterization of non-reactor nuclear materials, such as components of spallation neutron sources or high energy beamlines
- Coupled Irradiation-Mechanical Extremes: Structural materials in reactor environments experience an extreme combination of radiation, high temperature, and stress. However, most conventional irradiation experiments fail to investigate the effect of stress on microstructural evolution.

- Simultaneous irradiation and loading significantly affects mechanical behavior, from accelerating creep deformation to increasing fatigue lifetimes, yet remains a critically under-explored phenomenon in the field of nuclear materials science.

This mini-symposium invites abstracts investigating but not limited to:

- Novel testing methods to apply stress/strain during irradiation
- Irradiation creep mechanisms in metals and ceramics
- Irradiation fatigue phenomena in transient nuclear environments

ORGANIZERS

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SYMPOSIUM SPONSORS

TMS Structural Materials Division, TMS Nuclear Materials Committee, TMS Mechanical Behavior of Materials Committee, TMS Advanced Characterization, Testing, and Simulation Committee

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QUESTIONS?

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