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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

Phase Stability in Extreme Environments

Materials development for extreme environments including high temperature turbines and nuclear reactors involves the development of alloys which are resilient against a variety of degradation mechanisms. These degradation mechanisms include oxidation/corrosion, hydrogen embrittlement, precipitation hardening or instabilities, phase decomposition, fatigue, and wear. Traditional structural alloys such as austenitic steels and nickel superalloys, as well as new material systems such as multicomponent alloys or multiple principal element alloys, can all suffer from a variety of phase instabilities that are likely to impact long-term performance. Understanding material stability in these extreme environments is paramount to enhancing the lifetime of key components.

The purpose of this symposium is to create a forum where researchers from across academia, national laboratories, and industry can share insights on recent advancements and the practical impact of phase stability on the performance of material systems. This includes current materials for applications such as light water reactors and power/aviation turbine systems as well as future applications such as fusion reactors and hydrogen power systems. A variety of perspectives from modeling and simulation to predict behavior and lab-scale testing to failure analysis of field components will help to create a fuller understanding of mechanisms and impact. Experimental and/or theoretical studies are sought on topics including but not limited to:

- Phase separation or decomposition in extreme environments
- Radiation-induced phase transformations
- Deformation-induced phase transformations (e.g. deformation-induced martensite)
- Long-term thermal aging
- High-temperature thermal cycling
- Impact of phase stability on hydrogen embrittlement
- Impact of phase stability on stress corrosion cracking

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QUESTIONS?
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