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Radiation Damage and Irradiation-Assisted Stress Corrosion Cracking of Metallic Materials for Reactor Applications

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Deadline for manuscript submissions:
closed (30 March 2022)

Message from the Guest Editor

Most light water reactors (LWRs) of the existing fleet worldwide are expected to continue operation beyond their original operating license for 60–80 years. The reliability of structural materials for core internals is a critical and potentially life-limiting event for LWRs. Irradiation-assisted stress corrosion cracking (IASCC) is the primary degradation mechanism for stainless steel (SS) core internals. However, the detailed underlying mechanisms of IASCC is yet to be elucidated. The purpose of this Special Issue is to explore the radiation damage and radiation effects or the potential factors that influenced irradiation-assisted stress corrosion cracking in nuclear power systems.

This Speical Issue will cover but not be limited to experimental or simulation efforts (both original research or review articles) that advance our understandings in radiation damage, radiation-induced segregation, radiation-induced/enhanced precipitations, irradiation accelerated/decelerated corrosion, stress corrosion cracking, irradiation-assisted stress corrosion cracking of metallic materials in LWRs, or advanced reactors concepts.

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Message from the Editorial Board

Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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Journal Rank: JCR - Q2 (*Metallurgy and Metallurgical Engineering*) / CiteScore - Q1 (Metals and Alloys)

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