Special Issue

Recent Advances in New Irradiation-Tolerant Materials

Message from the Guest Editors

Irradiation damage in nuclear reactor materials presents significant challenges to the safe and stable operation of reactors. Understanding the damage behaviors of these metallic materials and uncovering their underlying mechanisms are essential for evaluating their performance in various nuclear environments. Additionally, the development of novel alloys, such as those inspired by additive manufacturing and high-entropy, dispersion-strengthened, and nanocrystalline alloys, offers promising avenues for enhancing irradiation tolerance. These advanced material concepts not only broaden the potential for improved radiation resistance but also pave the way for innovative applications in nuclear environments. In this Special Issue, we welcome contributions focused on the development of new irradiation-tolerant alloys, encompassing but not limited to the following: the exploration of irradiation resistance mechanisms in additive manufacturing and high-entropy alloys, alongside process improvements aimed at enhancing irradiation tolerance.

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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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