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Performance and Behaviour of Metallic Nuclear Fuels and Cladding Materials

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Message from the Guest Editor

Metals, alloys and intermetallics are of high interest to the nuclear industry due to their extensive use in nuclear fuel assemblies. The development of novel metallic nuclear fuels, fuel claddings and coating materials is driving the deployment of accident tolerant fuel (ATF) technology into the current generation of nuclear power plants. In addition, new high-density metallic fuels (HDFs) offer the possibility of replacing highly enriched uranium fuel (HEU), which is currently used in test reactors, with lower-enriched fuels with the aim of reducing proliferation risks. However, through their deployment, these novel metallic fuels, cladding and coating materials may be exposed to high levels of radiation damage and burnup, high temperature environments and oxidative or corrosive atmospheres. This can occur during normal operation or in off-normal accident scenarios, particularly in water-cooled nuclear reactors.

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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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