Special Issue

Zirconium Alloys

Message from the Guest Editor

Zirconium alloys are used as the primary structural components in the nuclear power industry, because of their low thermal neutron absorption cross section, high corrosion resistance, good ductility, and satisfactory strength. In general, several interconnected problems are given special attention: (1) Corrosion. Corrosion of zirconium alloys is one of the main factors in the degradation of zirconium alloys during service. (2) Coating. The coating can provide a protective layer for the zirconium alloy that can reduce oxidation and hydrogen pick-up. (3) Irradiation-induced damage. Neutron irradiation can affect microstructural evolution, and the mechanical and corrosion properties of zirconium alloys. A new generation of reactors will offer higher fuel burn-up, higher efficiency and excellent safety of operation. The performance and high efficiency of these advanced reactors are linked to more severe service environments. New zirconium alloys with improved resistance to the environment of high temperature, high pressure, high corrosion and high radiation field are necessary.

Guest Editor

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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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