Special Issue

Alloy: Creep–Fatigue Interaction, Damage Mechanisms and Environmental Effects

Message from the Guest Editor

A comprehensive understanding of the deformation and damage mechanisms of structures and materials operating at high temperatures plays a critical role in driving the advancement of the technologies. For components in the energy systems that are exposed to combined cyclic loading and high temperatures over an extended period, one dominant damaging mechanism is creep–fatigue interaction. Creep–fatigue interaction significantly reduces the lifespan of components in high-temperature environments. Evaluating creep–fatigue damage involves assessing a material's ability to withstand these combined environmental effects through experimental testing, analytical modeling, and computer simulations. The aim of creep–fatigue evaluation is to estimate the remaining useful life of components, identify potential failure mechanisms, and establish design guidelines for mitigating creep–fatigue damage and ensuring sufficient safe design margin. We welcome your valuable contributions investigating the latest developments in creep–fatigue evaluation and on creep–fatigue interaction damage.

Guest Editor

Dr. Yanli Wang
Oak Ridge National Laboratory, Material Science and Technology Division, Oak Ridge, TN 37831, USA

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Metals
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
metals@mdpi.com

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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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