Special Issue

Single Crystal Super Alloy Material Fatigue Behaviour Compared to Ceramic Matrix Composites for Aerospace and Turbine Engine Applications

Message from the Guest Editor

Nickel-based single-crystal superalloy materials are generally used for hot turbine engine components such as turbine blades, rotor disks, vanes, and combustor liners. The operating environment is known to be complex and extremely harsh due cyclic high temperatures and high stresses, which lead to fatigue. Besides fatigue loading, these critical engine components are challenged by the occurrence of external and internal surface damage, including corrosion, oxidation, crack formation, erosion, and foreign objects. Combined, these factors accelerate the rate of failure caused by the fatigue loading of such components. However, much improved life prediction models have recently been developed, where the constitutive behavior of the materials was employed to simulate deformation and allow reliable prediction of fatigue life and of probability of failure. This Special Issue welcomes studies on various types of superalloys and ceramic matrix composites that are used by end users, such as in aerospace and defense, automotive, energy and power, and electrical, and electronics fields.

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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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