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Fatigue and Fracture Assessment of Additive Manufactured Metallic Materials

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Deadline for manuscript submissions:
closed (31 March 2025)

Message from the Guest Editors

Dear Colleagues,

Additive manufacturing technology is increasingly demonstrating significant potential in the field of material processing. Unlike traditional casting or forging materials, additive manufacturing metallic materials and alloys exhibit unique behavior in terms of fatigue and fracture properties. During the additive manufacturing process, alloy materials undergo special thermal cycling, resulting in microstructures with distinctive characteristics such as grain refinement, anisotropy, residual stress, and microscopic cracks. While grain refinement helps to enhance the strength and toughness of the alloy, it may also increase the alloy's susceptibility to crack initiation. Therefore, optimizing process parameters and post-processing strategies for additive manufacturing and reducing or eliminating defects are crucial for improving the fatigue properties of additive manufacturing alloys.

In this Special Issue, we welcome articles that focus on the effects of microstructures on the fatigue properties and lifetimes of additive manufacturing Metallic Materials, the behavior and mechanisms of fatigue crack initiation and propagation, and fatigue prediction models.

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Message from the Editor-in-Chief

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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Journal Rank: JCR - Q2 (Metallurgy and Metallurgical Engineering) / CiteScore - Q1 (Metals and Alloys)

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