Special Issue

Research on Fabrication Technologies and Service Performance of Metal Materials in Additive Manufacturing

Message from the Guest Editors

Additive manufacturing (AM) technology is increasingly demonstrating significant application potential in the field of material processing. AM alloys undergo unique cyclic thermal histories and layer-by-layer stacking during fabrication, resulting in distinct microstructural characteristics such as cellular structures, directional growth, grain refinement, anisotropy, residual stress, micropores, and microcracks. Consequently, understanding the formation mechanisms of various defects in AM processes and developing defect control strategies have attracted growing attention. Future research directions may focus on the following aspects:

- Elucidating the microstructural evolution mechanisms of AM alloys.
- Optimizing AM process parameters and post-processing strategies.
- Investigating the fracture mechanisms of AM materials under service conditions.
- Establishing more accurate and reliable fracture prediction models.
- Developing novel high-performance AM metals and composites.
- Exploring the service performance of AM alloys in extreme environments.

Guest Editors

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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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