Special Issue

Innovations and Challenges in Wire Arc Additive Manufacturing of High-Performance Metals and Alloys

Message from the Guest Editors

Wire arc additive manufacturing (WAAM) is an advanced manufacturing technique with advantages such as the ability to create complex, near-net-shape components using wire feedstock and a welding arc as the heat source. WAAM has recently been the subject of significant interest due to its high deposition rate, cost-effective material use, and greater efficiency compared to powder-based additive manufacturing (AM) methods, making it particularly appealing for quality-critical industries such as aerospace, automotive, and biomedical engineering. However, WAAM still faces challenges, including residual stress, distortion, non-isotropic properties from its layer-by-layer deposition method, and difficulties in maintaining consistent quality, process stability, and achieving precise surface finishes. This Special Issue invites researchers to submit work that addresses these challenges and explores various solutions through advancements in process monitoring, microstructure control, and theoretical modeling.

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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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