

Special Issue

Advanced Structural Metals: Integrating Mechanics, Processing, and Performance Characterization

Message from the Guest Editors

The pursuit of structural metals with superior performance, efficiency, and reliability continues to drive progress in aerospace, energy, and biomedical engineering. Central to this effort is the enduring challenge of predicting how processing, microstructure, and mechanical properties interact across scales, a relationship long defined by the process–structure–property (PSP) framework. While this principle remains essential, the field is entering a new phase shaped by the convergence of architected materials, advanced alloys, additive manufacturing (AM), and digital methods such as computational mechanics and artificial intelligence (AI). This Special Issue aims to capture the synergies arising from these intersections. This is a unique moment in materials science. Architected design, alloy innovation, manufacturing technologies, and digital intelligence are no longer separate tracks but interconnected engines of progress. We warmly invite you to contribute to this Special Issue and help capture this exciting transition.

Guest Editors

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About the Journal

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.

Editor-in-Chief

Prof. Dr. Yong Zhang

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