Special Issue

Advances in Strengthening Mechanism and Plastic Properties of Metallic Materials

Message from the Guest Editors

This Special Issue focuses on advancing our understanding of strengthening mechanisms and plastic properties in metallic materials. Plastic deformation in metals involves complex interactions among dislocations, phase structures, and microstructural features such as grain size, precipitates, and texture. Deeper insight into these mechanisms is essential for designing high-performance metals for diverse engineering applications. We invite original research and reviews on strengthening and plasticity at various scales. Topics include dislocation slip, cross-slip, twinning, transformation-induced plasticity, solid solution strengthening, precipitation hardening, and HDI strengthening. Studies on grain refinement, texture evolution, and thermomechanical effects on uniaxial/cyclic plasticity are also encouraged. Submissions using advanced experimental methods and multiscale simulations (molecular dynamics, crystal plasticity) that elucidate microstructure–property relationships are especially welcome. This issue aims to promote cross-disciplinary dialogue and physics-based approaches to guide the development of next-generation metals with superior mechanical performance.

Guest Editors

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Dr. Jianfeng Zhao

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Deadline for manuscript submissions

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About the Journal

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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