Special Issue

Advances in High-Strength Steels: Microstructure, Mechanical Properties and Applications

Message from the Guest Editors

High-strength steels are essential in transportation, deep-sea exploration, aerospace, advanced manufacturing, and defense industries, meeting demands for lightweight design, safety, and performance under extreme conditions. They include automotive steels (hot-stamped, dual-phase, TRIP, Q&P, medium-Mn), armor, wear-resistant, spring, and maraging steels. Recent advancements have led to the development of novel materials and broader applications. Research has focused on optimizing the composition–processing–microstructure–property relationship, improving strength–ductility/toughness trade-offs, and enhancing properties such as oxidation resistance, bulletproof capability, fatigue, corrosion, wear resistance, hydrogen embrittlement resistance, as well as formability and weldability.

This Special Issue aims to present cutting-edge research on the microstructure, mechanical properties, and applications of high-strength steels. Topics include composition design, processing, microstructure control, strength–ductility mechanisms, welding, service performance, and applications. Contributions from both academia and industry are welcome.

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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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