

## Special Issue

# New Insights into Aluminum Alloys: Processing, Microstructure and Mechanical Properties

### Message from the Guest Editors

The performance and reliability of aluminum alloys are fundamentally determined by solidification behavior and microstructure development, making new insights into these processes essential for modern applications. Solidification governs nucleation, grain growth, and intermetallic phase evolution, directly shaping the mechanical and functional properties of both cast and additively manufactured components. New findings on the interplay among alloying elements, melt treatment, and cooling conditions are crucial for advancing high-performance alloy design.

Simultaneously, emerging technologies such as additive manufacturing, near-net-shape casting, and simulation-driven process optimization offer unprecedented control over thermodynamic behavior and microstructure tailoring.

This Special Issue aims to present new insights into solidification mechanisms, microstructure evolution, and innovative processing routes for aluminum alloys. We welcome contributions on solidification modeling, advanced characterization, additive manufacturing, recycling strategies, and next-generation alloy concepts.

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### Guest Editors

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### Deadline for manuscript submissions

31 December 2026



## Metals

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Impact Factor 2.5  
CiteScore 5.3



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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.

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### Editor-in-Chief

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