



Solidification Processes of Light Metal Alloys

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Message from the Guest Editor

Solidification is at the origin of microstructure, macrostructure, and defects in many processing methods for light metals: Casting, welding, remelting processes, and additive manufacturing techniques. The link between process conditions and the structure formed during solidification is an inherently multiscale problem. Progress is therefore made on many fronts, ranging from mechanisms of nucleation and grain refinement, microstructure evolution during solidification, solutal, hydrodynamic and mechanical interactions in the mushy zone, to process-scale heat and mass transfer. Finally, an understanding of the coupling of some of these aspects of physics can be achieved by targeted experiments and multiscale modeling.

This Special Issue is intended to gather articles reporting latest advances on the following aspects of solidification processing in light metals:

1. Grain nucleation and grain refinement.
2. Formation of solidification microstructures.
3. Mushy zone dynamics (e.g., solidification kinetics in presence of inter-grain interactions).
4. Heat and mass transfer and fluid flow at the process scale and the links to microstructure and defect formation during solidification.





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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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