Special Issue

Simulation on Casting and Solidification Process of Crystalline Metals and Alloys

Message from the Guest Editor

This Special Issue brings together cutting-edge research focused on simulating casting and solidification processes in crystalline metals and alloys. As computational modeling continues to evolve, its role in understanding and optimizing metallurgical processes has become increasingly vital. The contributions in this Issue highlight advancements in numerical techniques, including finite element analysis, phase-field modeling, and computational fluid dynamics, to simulate heat transfer, fluid flow, nucleation, and grain growth during solidification. Key topics include the following:

- Numerical modeling of casting processes;
- Solidification dynamics and phase transformations;
- Grain structure prediction and microstructure evolution;
- Application of phase-field, cellular automata, and finite element methods;
- Modeling of dendritic growth and grain refinement techniques;
- Multiscale and multiphysics simulation approaches;
- Prediction and control of casting defects;
- Thermo-mechanical modeling during solidification and cooling;
- Validation of simulations with experimental and industrial data;
- Simulation of additive manufacturing processes involving solidification.

Guest Editor

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About the Journal

Message from the Editor-in-Chief

Welcome to *Crystals*, the journal dedicated to the fascinating world of crystallographic research! Crystals are more than mere decorative elements; they hold the key to understanding the fundamental structure of matter. Our mission is to explore the crucial significance of this research across various fields. From medicine to technology, chemistry to geology, crystals play a vital role. Their structure provides insights into new advanced materials, innovative drugs, and groundbreaking technologies. Through *Crystals*, we delve into the microscopic world to discover solutions that will shape the future. Join us on a journey through the *Crystals*, where science merges with beauty and innovation.

Editor-in-Chief

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