Special Issue

Numerical Simulation of Solidification Processes

Message from the Guest Editor

Solidification is a critical step for many manufacturing processes, including casting, welding, and additive manufacturing. Numerical simulation of solidification processes can help scientists to gain a better understanding of the kinetics governing the macroscopic as well as microscopic features of the solidification process. From an industrial point of view, solidification modeling enables engineers to predict the properties of the material and subsequently modify the process parameters in order to produce materials of higher quality. However, several physical phenomena are involved during the solidification processes that in turn make the simulations very complex. In the wake of promising progress in the area of solidification modeling, this Special Issue embraces studies on numerical simulation of solidification processes ranging from atomistic models to micro-scale and macro-scale process models.

- Solidification
- Numerical Simulation
- Microstructural Evolution
- Phase Transformations
- Dendrite Growth
- Atomistic Modeling
- Phase Field
- Cellular Automata
- Integrated Computational Materials Engineering
- Casting
- Additive Manufacturing

Guest Editor

Prof. Mohsen Eshraghi

California State University, Los Angeles, CA, USA

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Metals
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
metals@mdpi.com

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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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Prof. Dr. Hugo F. Lopez
Department of Materials Science and Engineering, College of Engineering & Applied Science, University of Wisconsin-Milwaukee, 3200 N. Cramer Street, Milwaukee, WI 53211, USA

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Beijing Advanced Innovation Center of Materials Genome Engineering, State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing, 30 Xueyuan Road, Beijing 100083, China

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