Special Issue

Microstructure, Mechanical Properties and Solidification Behavior of Metals and Alloys

Message from the Guest Editor

Solidification is one of the oldest processes for producing complex shapes for applications ranging from art to industry. It is a multidisciplinary field which is highly important when it comes to the comprehension of industrial processing involving molten alloys such as welding, continuous casting, powder metallurgy and foundry. Many research groups have conducted valuable research regarding particular subjects, such as nucleation, structural transitions, as-cast microstructure, porosity, macrosegregation, metal/mold interface, interdendritic fluid flow, additive manufacturing and the mechanical and corrosion properties of as-cast metals. The knowledge of the physical phenomena occurring between liquid and solid phases, is fundamental for the control of the microstructure in all the solidification processes, from casting to welding. The comprehension of solidification remains essential for the development of various recently proposed processes. For example, additive manufacturing processes are still to be interpreted concerning how much the solidification thermal parameters can be used to design the solidification microstructure, as well as to solve quality problems.

Guest Editor

Dr. Crystopher Cardoso de Brito
School of Engineering, Campus of São João da Boa Vista, São Paulo State University, UNESP, São João da Boa Vista 13876-750, SP, Brazil

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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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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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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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