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Numerical Modeling of Grain Boundary Migration at the Polycrystal Scale

Guest Editor:

Prof. Dr. Marc Bernacki
CEMEF - MINES ParisTech, 06904 Sophia Antipolis, France

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Message from the Guest Editor

The properties of metallic materials are strongly related to their microstructures, which are themselves inherited from thermal and mechanical processing. The understanding and modeling of microstructural evolutions, at the polycrystal scale are thus of prime importance for the control of the final in-use material properties. Being able to predict the microstructure became crucial for metallurgy industry and remains a real challenge from a scientific point of view. Completing this challenge requires the development of numerical modeling capabilities based on realistic description of the intricate multiscale physical phenomena undergone by the material. In this context, numerous mesoscale methods have been developed, over the last decades, to simulate migration of grain boundaries at the polycrystal scale. Nowadays, arising from an ever-increasing complexity of metallic alloys coupled to a better understanding of the involved mechanisms and a surge in the available experimental data, await responses. We propose, in this Special Issue, to focus on recent trends and advances concerning full field simulations of grain boundary migration at the polycrystal scale in metallic materials.

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Editors-in-Chief

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

Prof. Dr. Yong Zhang
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

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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Contact Us

Metals Editorial Office
MDPI, St. Alban-Anlage 66
4052 Basel, Switzerland

Tel: +41 61 683 77 34
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