

Special Issue

Solidification of Metals— Fundamental Uses and Applications of Modern Alloys

Message from the Guest Editors

The solidification of metals and alloys is fundamental in metallurgy, with a long history dating back to the Iron Age. It be exploited for processing and forming metals. Specially, solidification has become an important area of research in multiple engineering fields, such as casting and welding. Since the millennium, there has been renewed interest in the solidification of alloys, with its application in additive manufacturing, particularly in 3D printing, gaining significant attention. Further complications arise due to the complexity of the materials involved, which are a blend of elements from a broad range within the periodic table, and the technical complexity caused by the fine and multiple heat inputs. Consequently, the studies also involve solid-state problems. However, thanks to the technical advancements in testing and analysis, significant development has been made towards understanding these problems. This Special Issue encompasses the historical significance of the solidification of metals, as well as state-of-the-art processing techniques and research using modern alloys, combined with advanced analytical techniques and computational theories and predictions.

Guest Editors

Dr. Nils Warnken

School of Metallurgy and Materials, University of Birmingham,
Edgbaston, Birmingham B15 2TT, UK

Dr. Hiroto Kitaguchi

School of Metallurgy and Materials, University of Birmingham,
Birmingham, UK

Deadline for manuscript submissions

closed (20 September 2025)



Materials

an Open Access Journal
by MDPI

Impact Factor 3.2
CiteScore 6.4
Indexed in PubMed



mdpi.com/si/196346

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

[mdpi.com/journal/
materials](https://mdpi.com/journal/materials)





Materials

an Open Access Journal
by MDPI

Impact Factor 3.2
CiteScore 6.4
Indexed in PubMed



[mdpi.com/journal/
materials](https://mdpi.com/journal/materials)



About the Journal

Message from the Editorial Board

Materials (ISSN 1996-1944) was launched in 2008. The journal covers twenty-five comprehensive topics: biomaterials, energy materials, advanced composites, advanced materials characterization, porous materials, manufacturing processes and systems, advanced nanomaterials and nanotechnology, smart materials, thin films and interfaces, catalytic materials, carbon materials, materials chemistry, materials physics, optics and photonics, corrosion, construction and building materials, materials simulation and design, electronic materials, advanced and functional ceramics and glasses, metals and alloys, soft matter, polymeric materials, quantum materials, mechanics of materials, green materials, general. *Materials* provides a unique opportunity to contribute high quality articles and to take advantage of its large readership.

Editors-in-Chief

Prof. Dr. Maryam Tabrizian

1. Department of Biomedical Engineering, Faculty of Medicine and Health Sciences, McGill University, Montreal, QC H3A 2B6, Canada

2. Faculty of Dentistry and Oral Health Sciences, McGill University, 3640 Rue University, Montreal, QC H3A 0C7, Canada

Prof. Dr. Yuguang Ma

State Key Laboratory of Luminescent Materials and Devices, South China University of Technology, Guangzhou 510640, China

Author Benefits

Open Access:

free for readers, with article processing charges (APC) paid by authors or their institutions.

High Visibility:

indexed within Scopus, SCIE (Web of Science), PubMed, PMC, Ei Compendex, CaPlus / SciFinder, Inspec, Astrophysics Data System, and other databases.

Journal Rank:

JCR - Q2 (Metallurgy and Metallurgical Engineering) /
CiteScore - Q1 (Condensed Matter Physics)