Special Issue

Mathematical Modelling of the Ironmaking Blast Furnace

Message from the Guest Editors

The blast furnace (BF) is the traditional process in the steel industry for converting the iron oxides in iron ore to liquid iron (hot metal), but the process is facing major challenges because of its environmental impact. During the transition period, when novel, more environmentally benign ironmaking processes are being developed, it is of particular importance to further optimize the operation of the BF to minimize the need for raw materials and energy and to suppress harmful emissions. A key to these improvements lies in mathematical modeling for gaining a deeper understanding of the complex processes involved and for better decision making and control of the state of the BF. This Special Issue focuses on novel developments in the field of modeling of the blast furnace, including detailed first-principles simulation models, control models, and statistical and data-driven models. The intent of the issue is to demonstrate the state of the art of mathematical modeling of the BF and to provide the reader with insight into the latest developments in the field.

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Deadline for manuscript submissions

closed (31 March 2023)

Metals

an Open Access Journal by MDPI

Impact Factor 3.1
CiteScore 5.7

mdpi.com/si/106126

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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.

Editor-in-Chief

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