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Advanced Simulation Technologies of Metallurgical Processing

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Message from the Guest Editor

Traditional models describing metallurgical processes such as sintering, precipitation, solidification, etc. range from turbulent flow to multi-phase flow models including heat transfer. However, at the heart of these processes very complex multi-phase and multi-physics processes including complex chemistry, often spanning multiple time and length scales, take place. Under these circumstances, empirical data is difficult to obtain and modelling is a complementary and promising path. In conjunction with experimental data, an analysis of predicted results furnishes a deeper insight into the physics. Furthermore, modelling is a welcomed tool to analyse metallurgical processes in depth such as a blast furnace due to the high costs and energy consumption. In fact, process simulations derived from versatile mathematical, physical or data-driven models have the potential of effective analysis tools to improve metallurgical processes, resulting in enhanced quality at lower costs and often contribute to a higher sustainability. Therefore, the special issue is intended to collect latest developments on advanced simulation technologies for metallurgical processes and also identifying gaps.

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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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