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Hydrogen Based Direct Reduction of Metals Oxides

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Message from the Guest Editor

In a route based on hydrogen and direct reduction, the output after the reduction process is the porous material of DRI, or sponge iron, which can potentially be transported to an EAF in a different location (or pressed to hot briquetted iron, HBI, which is favorable for transportation). As the hydrogen content in the mixture increases, the total energy consumption in the reactor decreases. A strong decrease in electricity consumption is recorded as the hydrogen content increases, and the availability of DR-grade pellets is limited with respect to the total international steel production. Taking into account all the described aspects, a good solution appears to be the integration of a direct reduction with large smelting furnaces. In this way, BF-grade pellets could be reduced in the DR reactor by overcoming the problem of the availability of high-quality DR-grade pellets.

For all the described aspects, this Special Issue aims to present the latest research findings in the field of hydrogen-based direct reduction. This Special Issue is open to all the researchers involved in this field and invites them to contribute their most recent results.

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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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