Some Computational Studies on Steelmaking Processes by FactSage

Emre Alan[1] and Bora Derin[2]

[1] Steelmaking and Casting R&D Department, Ereğli Iron and Steel Works, Co. (Erdemir), Turkey
[2] Department of Metallurgical and Materials Engineering, Istanbul Technical University, Turkey

Thanks to continuous improvements in computational thermochemistry methods and databases, the complex reaction calculations are now much easier and more accurate. There are many high temperature processes (BF, BOF, LD, RH, VLD, CC etc) in integrated steelmaking plants starting from the sintering to the end product in the form of different grades and shapes of steel. So, in order to understand the reactions mechanisms of these processes, rapid and precise thermochemical calculations are needed. In the present study, we will give some introductory examples on the FactSage simulations which were constructed for ongoing project studies carried out in Erdemir steel plant. These examples consist of simulations of interactions between liquid steel and slag, estimation of non-metallic inclusions, proper alloy design, cooling behavior of steel/slags, and phase diagrams of both alloyed steel and complex oxides.