

## Development of a Thermodynamic Model for Ladle Metallurgy Steel Making Processes Using Factsage and Its Macro Facility

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**Abstract :** To produce high-quality steel in larger volumes, dynamic control of composition and temperature throughout the process is essential. In this paper, we developed a mass transfer model based on thermodynamics to simulate the ladle metallurgy steel-making process using FactSage and its macro facility. The overall heat and mass transfer processes consist of one equilibrium chamber, two non-equilibrium chambers, and one adiabatic reactor. The flow of material, as well as heat transfer, occurs across four interconnected unit chambers and a reactor. We used the macro programming facility of FactSage™ software to understand the thermochemical model of the secondary steel making process. In our model, we varied the oxygen content during the process and studied their effect on the composition of the final hot metal and slag. The model has been validated with respect to the plant data for the steel composition, which is similar to the ladle metallurgy steel-making process in the industry. The resulting composition profile serves as a guiding tool to optimize the process of ladle metallurgy in steel-making industries.

**Keywords :** desulphurization, degassing, factsage, reactor

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