

Dynamic on-line monitoring and end-point control of dephosphorisation in the BOF. SimuSage Modelling - Part I

ELENA JIPNANG

SMS Group, Düsseldorf, Germany

Abstract

SMS Group concerns itself with plant construction and mechanical engineering for the steel and nonferrous metals processing industry. The simulations with SimuSage at SMS Group aim to evaluate and optimise new metallurgical processes concepts.

Next of the points of SimuSage application at SMS Group is the modelling of conventional steelmaking processes for the customer support. The present state of the LD-Sage model for the BOF process is described. The LD-Sage model concept enables the modelling of non-equilibrium phenomena by a specific combination of equilibrium calculations.

The original concept was based on the general knowledge that reaction rates are usually high at high temperatures. Locally, reaction progress can therefore be calculated assuming thermochemical equilibrium.

Deviations from equilibrium, which occur in technical process, were thus caused by limitations in mass and heat transfer between different domains of the BOF. The reactor is subdivided into several main reaction zones.

These can differ in their phase composition, being either homogenous or disperse. The fluid system can be defined as well as combinations of fluid and solid phases. Inside these main reaction zones, mass and heat transfer limitations are neglected. The main reaction zones are modelled by ideal reactors, e.g. steady-state mixed flow reactors.