Investigation of convertor slag properties and their influence on steel refining by means of thermodynamic modelling with Factsage and Chemapp.

L. De Vos[1], I. Bellemans[1], C. Vercruyssen[2], K. Verbeken[1]

1 Department of Materials, Textiles and Chemical Engineering, Ghent University, Belgium.

2 ArcelorMittal Gent, Ghent, Belgium.

The converter process is a necessary step in the steel production during which carbon, phosphorus and other impurities present in the hot metal from the blast furnace are removed and steel is produced. Gaining insight in the process, the working principle and the interaction between the slag and metal phase is difficult due to the complexity of the process and the limited possibility for on-line measurements. Even though there is general agreement on the importance of the slag and its functions in steelmaking, a complete understanding of slags is hitherto lacking.

Thermodynamic modelling of the process with Factsage and Chemapp, provides an opportunity to gain insight and gather more knowledge about the mechanisms involved. This PhD is part of a collaboration between ArcelorMittal Ghent and the sustainable materials science research group at Ghent University. This doctoral work will apply thermodynamic models and calculations upon the industrial converter process to gain fundamental knowledge and understanding of the functions of the slag phase and its interactions. Furthermore, slag properties such as viscosity, surface tension and foaming parameters will be calculated. Combining the results of the thermodynamic software packages (Factsage and Chemapp) with the enormous amount of process data and knowledge available at ArcelorMittal Ghent, yields the opportunity to create a feedback loop and optimize the used models. This presentation will give an overview of the outline of the project. The different approaches to integrate Factsage and Chemapp calculations into the research topics will be discussed.