



Thermodynamic modelling and reaction kinetics of processes

THE PROJECT

The Institute was asked to develop a thermodynamic and kinetic process model for the compositional evolution process model for the compositional evolution of steel, slag and inclusions produced in a secondary steelmaking reaction vessel at operating conditions of 1550-1700 °C.

A key component of this model was an understanding and modelling of the thermodynamic equilibrium between slag and steel. Various parameters were included in the model such as stirring, alloying, chemical re-heating, desulphurisation and slag-steel-inclusion reactions. Understanding and applying these factors allows the accurate prediction of composition changes of the steel, slag and inclusion chemistry over time.

The model was developed by working closely with plant personnel and has been validated with process data and offline chemical analysis.

THE OUTCOME

The model has been developed as an offline tool to review and analyse a complex process. This has led to an improvement in process efficiency and product quality by optimisation of process parameters.

