Simulation of Deoxidation and Refining Process Using SimuSage

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ABSTRACT

The objective of steel refining processes is to provide steel with specified chemical composition and temperature. The homogenization of chemical composition and steel temperature is occurred by the argon injection. The final result of refining operations depends on liquid steel initial composition, alloys addition and refining slag composition. A new concept of modeling of steel deoxidation during tapping and the ladle furnace steel refining process has been elaborated. The mathematical description of the steel stirring processes base on the tank theory and the thermodynamic description of the reactions occurring at the metal-slag interface has been used to develop a hybrid model of process. The SimuSage package has been used to extend a modeling program. This resolution enables the process simulation to be carried out in real time. The results of the model have been verified in industrial conditions for a ladle of 140 [Mg] capacity.