

Formation and Modification of Non-metallic Inclusions Through Slags During Ladle Treatment

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Abstract

As ladle treatment is the last step before casting the behavior of non-metallic inclusion during this stage directly influences the quality of the final product. Most inclusions are generated during deoxidation and float-up to the top slag. The chemical composition of the remaining inclusions is transformed according to the composition of the ladle slag and ladle refractory.

The influence of different slag components on the formation and modification of non-metallic inclusions has been investigated by thermodynamics through FactSage. A model has been created which accounts for the different thermodynamic situations at the interface between steel melt and slag as well as between steel melt and non-metallic inclusions in the bulk of the ladle. With the help of this model the modification of inclusions as well as the resulting steel and slag composition can be followed throughout the process of ladle treatment.

Results have been obtained for a low-alloyed carbon steel and an alloyed tool steel. The effect of different slag components has been evaluated and compared.