

Theoretical Study of Equilibrium Reactions between Metal Droplets and Slag

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The dispersion of metal droplets in slag was investigated through analysis of slag samples taken during ladle refining at Scana Steel in Björneborg, Sweden. The chemical composition of steel droplets found in the ladle slag was determined for five industrial-scale heats. Possible reactions occurring between the steel droplets and slag were identified, as were differences in steel-droplet and steel-bulk composition. Three different slag models were used to calculate the activities of oxide components (Al_2O_3 and SiO_2) in the slag. These results were then used in the dilute-solution model, whereby oxygen activities in the steel droplets were calculated and compared with measured oxygen activities in the steel bulk. Significant differences were found in the comparison of both the calculated and measured oxygen activities and the steel bulk and droplet compositions.

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