COMPARISON BETWEEN RESULTS OF DIFFERENTIAL THERMAL-ANALYSIS (DTA) AND COMPUTATIONAL THERMODYNAMICS SIMULATION IN SLAGS COLLECTED IN A STEELMAKING PLANT[1]

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Abstract
The slag phase in steelmaking is not necessarily bad, but a crucial part of modern steelmaking practices. High quality steel production demands the control of chemical composition and internal cleanness, as well as the attainment of low costs of production, and the prolongation of refractory life in the ladle furnace, depends, directly, of an adequate slag. The slags used in steelmaking are ionic solutions consisting of molten metal oxides or sulfides that, among other functions cover and protect the liquid metal from oxidation and absorption of gases, improve the steel quality by absorbing non-metallic inclusions, promote the desulfurization in the ladle and insulate liquid steel to minimize heat losses. At steelmaking temperatures, the slag cannot be completely liquid; it may present a solid fraction. The increase on solid fraction modifies the slag apparent fluidity and can affect its physical and chemical behavior. In this work, slag samples, collected at a national steelmaking plant in the stages of refinement and continuous casting of an aluminum killed low carbon steel (SAE 1010) were analyzed. Tests of Differential Thermal-Analysis (DTA) had been carried-out to verify the slag melting temperature and the results of DTA analyses have been compared with computational thermodynamics simulations.

Key-words: Slag, Low carbon steel, Differential Thermal-Analysis (DTA), Computational thermodynamics simulation.

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