عنوان مقاله:

Evaluation of Reduction of Electric Arc Furnace (EAF) Dust Using Volatile Matter of Non-Coking Coal

محل انتشار:

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خلاصه مقاله:

In this research, the reduction of iron and zinc oxides of Electric Arc Furnace (EAF) dust using volatile matter of non-coking coal was investigated. Reduction was performed by two types of coals at three different heating rates in the temperature range of ۲۵-۹۵۰ . The weight percentages of volatile matters in types ۱ and ۲ of the coal were ۳۷% and ۲۴%, respectively. Factsage ۶.۱ software was used to determine thermodynamic feasibility of the reduction process. The chemical composition of the dust was determined by ICP method, before and after the reduction process. The results of thermodynamic simulations show that decreasing the heating rate of the coal from ۱۸.۴ to ۱۳.۵ /min leads to complete reduction of iron and zinc oxides in both types of coals. A higher amounts of volatile matter in coal ۱ has caused higher amounts of reduction degree. Experiments show that at high heating rates of the coal, only small fraction of iron and zinc oxides are reduced. At lower heating rates, reduction degree increases and the results of experiments are closer to the those of thermodynamic simulations. The best results were obtained at a heating rate of ۱۳.۵ /min for coal ۱. Under these conditions, reduction of iron and zinc oxides takes place by ۷۵% and ۸۹%, respectively. In addition, the weight percentage of iron in the dust has increased from ۳۱% to ۴۶% that provides the possibility of dust recharge into the furnace.

کلمات کلیدی:

Electric Arc Furnace Dust, Non-coking coal, volatile matter, Coal Heating Rate, Reduction