

عنوان مقاله:

Thermodynamic and Kinetic Analysis of Carbothermic Reduction of Ferro-Chromium Electric Arc Furnace Dust

محل انتشار:

هشتمین کنفرانس و نمایشگاه بین‌المللی مهندسی مواد و متالورژی و سیزدهمین همایش ملی مشترک انجمن مهندسی متالورژی و مواد ایران و انجمن ریخته‌گری ایران (سال: 1398)

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خلاصه مقاله:

The carbothermic reduction of low-carbon ferro-chromium electric arc furnace dust (EAFD) to remove volatile species and increase Cr₂O₃ content of the dust experimentally has been studied. Two types of sample were prepared from mixture of EAFD and graphite. The first type includes samples prepared from mixture of dust and graphite without any pelletizing and the second type includes samples prepared by mixing and followed pelletizing. Samples have been reduced in the range of 825-1050 oC and different thermodynamic and kinetic aspects of the reduction process have been studied. Reduction degree of samples, relative weight loss of volatile species, degree of Cr₂O₃ enrichment, rate controlling step and activation energy of reduction are obtained. The results show nearly complete reduction and separation of volatile oxides at high temperatures in all samples. Also an activating energy of 20 kJ/mole for dust-graphite powder and 2.5 - 10 kJ/mole for dust-graphite pellets are obtained.

کلمات کلیدی:

Electric Arc Furnace Dust, Ferro-Chromium, Carbothermic Reduction, Kinetic, Thermodynamic

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