

عنوان مقاله:

The effect of mechanical activation on the carbothermic reduction kinetics of hematite-graphite mixture

محل انتشار:

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خلاصه مقاله:

The effect of mechanical activation on structural changes and kinetics of carbothermic reduction of hematite with graphite was studied in this research. Hematite powder mixture with graphite (with stoichiometry ratio C/O=1) was milled for the time periods of zero to ۵۰ hours, and the structural changes were studied using X ray diffraction (XRD). The effect of mechanical activation on the kinetics of hematite carbothermic reduction was studied by performing thermal analysis tests and by employing model-free and constant slope methods. The activation energy as well as the reaction mechanism was then determined. The results showed that by mechanical activation for a time period of ۵۰ h, the activation energy is decreased from ۳۸۷ kJ/mol^{-۱} to ۱۸۶ kJ/mol^{-۱}, and the starting temperature of the reaction is decreased from ۱۱۲۵ to ۶۲۰°C. The Boudouard chemical reaction was determined as the rate controlling step

کلمات کلیدی:

Mechanical activation, Thermal Analysis, Kinetic analysis, Activation Energy, Hematite, Carbothermic reduction

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