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Research Details :

Research Title : GAMMA-RADIATION EFFECTS ON THE REDUCTION OF HEMATITE TO IRON IN THE GRAPHITE-IRON(III) OXIDE SYSTEM
GAMMA-RADIATION EFFECTS ON THE REDUCTION OF HEMATITE TO IRON IN THE GRAPHITE-IRON(III) OXIDE SYSTEM

Descriptipn : The effects of Co-60-gamma radiation and of various sample composition on the reduction of hematite to iron in the graphite-iron(III) oxide system in air were studied using isothermal and dynamic TG techniques. Kinetic analysis of isothermal data were performed according to various theoretical models of heterogeneous reactions and the results showed that the three-dimensional phase boundary model gives the best fit of data. Analysis of dynamic TG data were made using Ozawa integral method, Coats-Redfern method and a composite method based on the modified Coats and redfern equation. The activation parameters were calculated and the results of the different methods were compared and discussed. Radiation apparently did not introduce a change in the reaction model or mechanism. However, there is a decrease in activation energy and frequency factor upon irradiation and a decrease in the half-life time of the reaction which is remarkable at the higher temperatures and higher doses.

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