

CONTEMPORARY METALLIC MATERIALS

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Iskandar Idris Yaacob
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Edited by:

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Kinetic Study of Reduction Roasting of Mixed Laterite Ore and Coal

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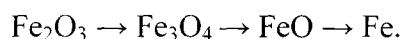
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Keywords: coal, reduction-roasting, laterite ore, magnetization, kinetic reduction

Abstract. Overburden Indonesia's laterite ore from Pomalaa, Sulawesi have characteristic low grade of iron, 41.88%, high content of silica and aluminum oxide, 18.47% and 9.46% respectively considered as iron cap. Limonite iron mineral dominates in the ore in range 80-90% unutilized with water content of around 40%. Proven deposits of laterite iron ore almost are 222 million tons. As a significant resources iron ore to be use as raw material for iron and steel industries the iron content must upgraded to meet the requirement of iron making industry. Magnetizing roasting technique can be conducted to transforms paramagnetic mineral (hematite, goethite, limonite or siderite) into magnetite that has high magnetic intensity. So can be concentrates using low intensity of magnetic. Availability of coal with ease of supply may provide the development of coal base magnetizing roasting processes. Reduced iron pellets from many different processes have been used as a main feed mixed with steel scrap. Feedstock of iron ore, in the other hand, is getting dominated by low grade lateritic iron ore with specific content of water crystal.

These abandon amount of low grade lateritic iron ore and low rank coal in Indonesia may suit the above condition which become the challenge to be faced. In this paper the coal based magnetizing roasting as a means of lateritic upgrading and kiln reduction kinetic of lateritic ore have been studied. The parameters result can be used for the development of lateritic iron ore as one alternative for metalized iron feed.

Kinetics of heterogeneous reduction reaction has been analyzed using shrinking un-reacted core model with respect to structure change from



Formulation of the governing reduction rate equation was combined reaction interface, diffusion, and mixed control.

Introduction

Indonesia has raw lateritic minerals for iron making industry; however the effective utilization has never been so advanced. Lateritic iron minerals content of 30-40% Fe₃ with metal impurities Ni, Co and Cr. So suitable technology for processing this mineral has begun to be studied.