

CONTEMPORARY METALLIC MATERIALS

Md Abdul Maleque
Iskandar Idris Yaacob
Zahurin Halim



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Edited by:

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Upgrading of Iron Sand by Magnetic Concentration and Reduction

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Keywords: Ironsand, Sponge iron, Coal, Pre-reduced pellet, Ironmaking

Abstract: In order to fulfill the specification of iron ore from ironsand to be used as ironmaking material, the beneficiation and pelletizing were conducted. Direct pelletizing of ironsand concentrate without reduction produced weak burned pellet. Therefore, it is necessary to develop a new approach in the beneficiation of ironsand. The present work on upgrading of ironsand had produced a concentrate with grade of 60.6 % Fe. Several partial reduction of iron concentrate pellet using coal as reductant resulted in pellet with increase in the physical properties and total Fe content of 76.9%. The pre-reduced pellet has comprehensive strength of 250 kg/pellet and makes it possible to be used in blast furnace feed material as well as raw material in direct reduction processes by natural gas to produce sponge iron.

Introduction

Ironsand is a kind of titania-ferrous ore containing major element of iron and titanium as minor element. However, instead of its huge deposit, the utilization is limited for construction and building materials, and also has been utilized as additive material for Portland cement production. It has been investigated that the ironsand deposit contains titanomagnetites [1-3] consist of layers of lamella ilmenite in the particle magnetite structure but since the magnetite is only partially liberated, a concentrate of marketable grade cannot be produced economically by simple magnetic separation techniques. Previous studies of the technical and economical feasibility of producing a marketable product by considering at least two possible products i.e. (1) sinter feed for direct sale as blast furnace feed stock and (2) pellet feed, suitable for pelletizing and direct reduction to sponge iron. Recently, several overseas pilot scale tests have been performed to produce pig iron for smelting process using such as Ausmelt and SL/RN technology. However, it was reported that the pig iron specification product is below expectation and the process unable to recover the vanadium [3].

The research reported here was carried out on a typical high grade in iron of deposit. The iron sand occurs in alluvial titanomagnetite deposit. The mineralization has derived from weathering of volcanic andesitic and basaltic lavas. A geological interpretation suggest that the concentration of mineral in the existing beach has resulted from initial concentration by wave action as the region has gradually risen above sea level, with later erosion by wind