

CHAPTER I

INTRODUCTION

The world steel markets, especially the iron market and its industrial structures, have been changing for the several years due to growing demands. Additionally, a higher production cost come from the transportation cost. The mass production method which has been used by the iron and steel manufacturers is no longer effective, as this rising cost condition becomes more serious today (Seki, 2008).

Kobe Steel and Midrex have been seriously concerned about this problem. They have developed many ironmaking processes. Typically, the ironmaking methods are the blast furnace and the natural gas-based direct reduction (DR) which have many disadvantageous issues: high capital and maintenance costs, a lot of slag in the product, and environmental problems with coke ovens and sintering plants. The solution of these issues is a new technology known as IT Mark Three (ITmk3) (Rutherford, 2009).

ITmk3 has a number of advantages for ironmaking. It uses iron ore fines, either magnetite or hematite, and non-coking coal. It uses low-grade iron ores as a raw material to produce a high-quality pig iron. The process occurs within one step without handling of the hot metal. The plant is easy to start up and shut down, and it is relatively safe to operate. (Rutherford, 2009)

The purpose of this investigation is to study and optimize the parameters that are suitable for making iron nuggets from the ITmk3 process on a laboratory scale.