

A material and energy flow analysis based on the gray box model in iron making process

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The iron and steel industry has been pressed to reduce energy consumption and CO₂ emission because the gas emissions from iron and steel making process are the main culprit of global warming. Especially, in iron making process, ore is reduced using carbon based reducing agent like coke and a large amount of greenhouse gas is emitted in this process. Thus the optimization of material and energy flow in this process is a most important method for reducing of greenhouse gas emissions in the entire steel industry. However it is difficult to control all detail processes, the gray box model of process unit is used in this study. An optimization model, which can be used to evaluate CO₂ emission in the iron making process including coke making process and sintering process, is investigated. By applying the material and energy flow analysis, the model could be used to evaluate energy consumption in the iron making process. Through this flow analysis model, potential reduction amount of CO₂ emission in iron making process is estimated and a more optimized process is proposed.