

Evaluation of energy efficiency of ironmaking process using exergy analysis

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The steel industries account for a significant amount of CO₂ emission and it is closely related to the use of energy in steel manufacture process. In particular, iron-making process which involves sinter, coke oven and blast furnace is a highly energy intensive process and requires a large amount of natural resources. Thus, analyzing the present status of energy use and energy efficiency helps to evaluate and improve the energy efficiency of the iron-making process. In this study, we apply the concept of exergy for evaluating the effective use of energy in the process, which reflects the irreversibility of a system and the loss of work that cannot be explained with the enthalpy. To sum up, based on the exergy analysis, we evaluate the present status of the energy use and energy efficiency of the iron-making process. And also we perform several case studies under other process conditions. From the case study, we derive the result that the composition of raw material and the condition of the process play a significant role in increasing or decreasing the energy efficiency.