

Utilization of Energy Sources other than Coke in the Sintering Process

Synopsis

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ABSTRACT

Following the Paris Agreement adopted in 2015 and the SDGs, reduction of CO₂ emissions has been taken up as an issue worldwide, and the steel industry, which has a particularly large emission, is required to significantly reduce it. Especially, most of the CO₂ generated in the steel industry is generated from the ironmaking process, which is due to the use of coke and its raw material coal in the ironmaking process.

JFE Steel Corporation has been considering the use of hydrocarbon-based gaseous fuels and liquid fuels as a partial alternative to coke breeze used in the sintering process since 2006, immediately after the Kyoto Protocol came into effect in 2005. In the laboratory study, a pot test was used to investigate the effect of the type of fuel, its amount and its injection method to the heat pattern in sinter bed. As a result, authors developed the technology, which a predetermined amount of gas fuel or liquid fuel was injected from the surface of sintering bed, is possible to extend the holding time of 1200 °C or higher at which liquid phase sintering occurs in the layer, and improved the sinter strength while reducing the amount of coke breeze. The authors succeeded in putting this technology to practical use using hydrocarbon-based gas fuel in 2009, and achieved a maximum annual reduction of 60,000 tons of CO₂ per sintering machine.

In this report, authors introduce the results of laboratory studies on the use of various energy sources, the practical application of the technology for injecting hydrocarbon-based gaseous fuel into the sintering machine, and the operational results.