

# Promoting assimilation of magnetite fine ore for CO<sub>2</sub> reduction from sintering process

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## ABSTRACT (USE 'HEADING 1' STYLE)

In general, Fe content in iron ore is gradually decreasing. This fact affects worse performance of BF operation, for example, increase of RAR and Slag ratio. Depletion of high grade iron ore deposits is moving us to use concentrates in sintering process.

Through magnetite concentration deteriorates reducibility because of high FeO content in sinter product. Such situation makes it to promote oxidation of magnetite iron ore during sintering process for improving sinter reducibility. In addition, promoting oxidation of magnetite possibly increases sinter strength with using oxidation heat. Effective utilization of magnetite in the sintering process has the potential not only to produce high-quality iron but also to suppress the use of concentrates

When utilizing magnetite for sintering, assimilability with CaO component is also an important factor that dominates reducibility. However, there are little fundamental research for mechanism of assimilability at sintering magnetite.

The purpose of this research is to investigate assimilability of magnetite with limestone fundamentally at sintering for purpose of elucidating mechanism of physical and chemical reacting properties relating sinter strength and reducibility.

Two experiments were performed.

### (1) Assimilability of fine particles

Assuming sinter reaction in adherent layer of pseudo-particles consisting of fine particles, pressed and compacted tablets of hematite or magnetite ore iron ore or chemical reagent with lime stone were sintered in an electric furnace under an air stream, with simulating sintering temperature profile. In addition, as a case assuming reaction with limestone after oxidation of magnetite to hematite, pre-oxidized magnetite ore were also evaluated.

The sintered prepared were evaluated by strength test and by structure observation.

### (2) Interaction of granule magnetite and sintering melt

Assuming magnetite granule with sintering melt forming from fine iron ore and lime stone. Experimental method and evaluating method are same as experimental (1).

Key words; sinter, magnetite, assimilability, oxidation, iron ore,