

Influence of the occurrence state of Al_2O_3 on the metallurgical performance of product sinter

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ABSTRACT

Al_2O_3 in natural iron ores generally occurs in goethite, kaolinite, gibbsite, hematite and iron carbonate. When the content of alumina in sinter increases from 1.11% to 3.50%, the reducibility of sinter decreases with the addition of four different types of alumina. When gibbsite and kaolinite are added, the low temperature reduction disintegration ($\text{RDI}_{+3.15}$) of sinter increases with the increase of Al_2O_3 content in the range of 1.5% to 3.5%. When adding pure reagent alumina, the increase of Al_2O_3 content in the range of 1.5% to 3.0% will increase the $\text{RDI}_{+3.15}$ of sinter. The addition of ferric oxide–alumina spinel with the Al_2O_3 content in the range of 1.5% to 2.5%, the $\text{RDI}_{+3.15}$ of sinter is also increased. The influence difference is resulted by the change of the mineral composition and microstructure of sinter because of Influence of the occurrence state of Al_2O_3 . Under the condition that Al_2O_3 content of sinter is 2%, the porosity of sinter with kaolinite is 37.26%, and the shape is irregular. When gibbsite and ferric oxide–alumina spinel are added, the porosity of sinter is about 16%, and the pores are round. When pure reagent alumina is added, the porosity of sinter is 17.49%, and the pores are regular and small. When kaolinite, gibbsite and

ferric oxide–alumina spinel are added, plate-shaped calcium ferrite is mainly formed in the sinter, and some of them are columnar calcium ferrite; when pure reagent alumina is added, in addition to plate-shaped columnar calcium ferrite, acicular calcium ferrite is also formed in the sinter.