Effect of alumina and its occurrence on sintering performance

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Abstract: With the rapid expansion of the Chinese steel industry and exhaustion of iron ore deposits, high-grade iron ore resources has been in short supply globally. More and more mid-low grade iron ores with high Al_2O_3 content has been exploited and imported from overseas in China. Undoubtedly, the undesired Al_2O_3 content in iron ores certainly has an adverse impact on subsequent sintering process. It is of significant importance to know the sintering performance of mid-low iron ores with different alumina occurrence. In this paper, the influence of alumina and its occurrence, such as gibbsite, aluminosilicates and diaspore, on sintering performances was investigated. The results show that sintering of this high Al_2O_3 iron ores is likely to require higher fuel as higher temperatures are required to generate the bonding phases. Meanwhile, with an increase in Al_2O_3 content, the sinter tumble index and yield are decreased significantly. In addition, the addition of Al_2O_3 also adversely affects the metallurgical performance of sinter products. However, the effect of various types of alumina present in iron ore fines on sintering performances and metallurgical properties of sinter is quite different. Based on this, the mechanism of alumina and its occurrence on sintering process was revealed as well.

Key words: alumina occurrence; gibbsite; kaolinite; aluminous goethite; iron ore sintering