

Decomposition, Reduction and Dissolution Mechanism of Calcium Sulfate in Iron Oxide Dust Pellet

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Iron oxide dust generated during oxygen blowing in the BOF process contains a high content of iron. This iron oxide dust can be used as a material of iron source in the BOF slag reduction process or as de-silicisation flux or de-phosphorization flux of hot metal pretreatment. One of the most practical uses of iron oxide dust is recycling as a form of pellets in the BOF considering easy application and the amount that can be recycled. In the process of making iron dust pellets cement is used as a binder that contains a lot of calcium sulfate. This calcium sulfate is reduced and dissolved in the molten metal during refining in the BOF. If the oxygen content in slag and molten steel is high enough, the reduced sulfate cannot be dissolved into molten metal and it can be removed as SO_x gas. The behaviour of calcium sulfate has been studied using of 50kg high frequency induction furnace and industrial-scale plant tests were carried out at a 300ton BOF. The results show that for low carbon steels the evaporation of decomposed sulfate increases with increasing oxygen content in the slag while for high carbon steels the decomposed sulfate is reduced into the molten metal.

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