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磁铁矿中磁性物成分的测定及可选性评价

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Determination of the Magnetic Material Composition in Magnetite Ore and Processability Evaluation

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中文摘要:

对磁铁矿样品分别用磁选管和手工内磁选法进行磁选,并对原矿样品和样品的磁性物中TFe、P、S、V_2O_5、TiO_2、SiO_2、Al_2O_3、CaO、MgO、Sn、Cu、Pb、Zn的含量进行测定。分析结果表明,采用手工内磁选和磁选管对磁铁矿进行磁选所得的结果一致,为了简便操作,本文均采用手工内磁选法选出磁性物。A矿区磁性铁(mFe)含量(22.42%)比B矿区mFe含量(22.59%)低,但A矿区样品的磁性物中TFe含量(磁铁精矿品位)大于66%,比B矿区样品的磁性物中TFe含量(小于57%)高,A矿区的磁铁矿选矿效果明显好于B矿区,说明对磁性物中TFe含量的测定能够更好地反映矿石的可选性。原矿样品中P、S的含量分别为0.328%、0.271%,而样品的磁性物中P、S的含量为0.021%、<0.005%,均达到铁矿石冶炼标准;原矿样品中V_2O_5、TiO_2的含量分别为0.156%、1.37%,而样品的磁性物中V_2O_5、TiO_2含量分别为0.823%、13.62%,达到了铁矿石冶炼标准。原矿样品的(CaO+MgO)/(SiO_2+Al_2O_3)值为0.876,为自熔性矿石,而其磁性物的(CaO+MgO)/(SiO_2+Al_2O_3)值为0.453,为酸性矿石。由此说明,单纯测定原矿样品中的各成分尚不能对磁铁矿的可选性进行科学性评价,只有进一步测定磁铁矿的磁性物中各成分的含量,才能够对磁铁矿进行可靠的评价。本文通过对磁铁矿中磁性物成分的测定,为磁铁矿的选冶性能提供了新的评价方法。

英文摘要:

Magnetite samples were magnetically separated with a magnetic tube and artificial magnetic separation. The contents of TFe, P, S, V_2O_5, TiO_2, SiO_2, Al_2O_3, CaO, MgO, Sn, Cu, Pb and Zn in the magnetite samples were determined. The results of the two separation methods were consistent. Consequently, artificial magnetic separation in subsequent experiments was chosen in order to simplify the process. The average content of mFe in mining area A (22.42%) was lower than that in mining area B (22.59%), but the content of TFe in the magnetic material of mining area A magnetite samples (>66%) was higher than that in mining area B (<57%). The results indicate that the effect of mineral processing of mining area A is much better than that of mining area B since the content of TFe in magnetic material can better reflect processability. The contents of P and S were 0.328% and 0.271% in the magnetite ore samples, 0.021% and <0.005% in the magnetic material, which met the requirements of the iron ore smelting standards as P<0.15% and S<0.15% in the magnetite. The contents of V_2O_5 and TiO_2 were 0.156% and 1.37% in the magnetite ore samples, 0.823% and 13.62% in the magnetic material, which meet the requirements of the iron ore smelting standards as V_2O_5>0.15% and TiO_2>3% in the magnetite. The magnetite with a(CaO+MgO)/(SiO_2+Al_2O_3) ratio of 0.876 is the self-fluxing ore, but the magnetic material of this magnetite with a (CaO+MgO)/(SiO_2+Al_2O_3) ratio of 0.453 is acid ore. This indicates that the evaluation of the magnetite does not depend on the contents of each component in the ore sample, but rather depends on the contents of each component in the magnetic material of the magnetite. Through the determination of magnetic materials in magnetite ore, a new evaluation method for magnetic separation and smelting has been determined.

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