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Mineralogical Characterizations of Langkawi Ilmenite Ore for Carbothermal Reduction

Abstract

The mineralogical characterizations of Langkawi's ilmenite were investigated using XRD, XRF and SEM/EDS for morphological analysis. The minerals mainly consisted the phases of $FeTiO_3$, Fe_3O_4 and TiO_2 and Rietveld refinement indicated that the ore contained 35.85% of TiO_2 and 26.52% of Fe_3O_4. The amount of the elements calculated form the quantitative and XRF analysis are reliable and in acceptable ranges. The morphology of the ore showed that the ore is formed mainly in sub-rounded grains with titanium and iron as main elements. The ore was categorized as a low-grade ore, but it can be upgraded for TiO_2 production using carbothermal reduction reactions, where the results of XRD, XRF, SEM showed extractable amount of TiO_2 more than 32wt%.

Keywords

Chemical composition; Ilmenite ore; Phase and structure analysis; Titanium dioxide