

PENGARUH ADITIF *FERRO BORON* (FeB) TERHADAP KARAKTERISTIK SERBUK HEMATIT (α -Fe₂O₃)

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ABSTRAK

Telah dilakukan penelitian mengenai pengaruh aditif *Ferro Boron* (FeB) terhadap karakteristik serbuk hematit (α -Fe₂O₃). Proses preparasi sampel dilakukan dengan mencampurkan α -Fe₂O₃ dan FeB menggunakan metode milling kering dengan alat *Planetary Ball Mill* (PBM). Variasi komposisi aditif FeB adalah 4 dan 8 wt.% dengan suhu kalsinasi 900, 1000 dan 1100 °C. Karakterisasi sampel melalui uji *Particle Size Analyzer* (PSA), *true density*, *X-Ray Diffraction* (XRD) dan *Vibrating Sample Magnetometer* (VSM). Dari hasil eksperimen ditunjukkan terjadi peningkatan ukuran partikel yang berkaitan dengan penurunan *true density* pada sampel 8 wt.% dengan nilai sebesar 2,80 μm dan 2,47 g/cm^3 . Karakterisasi XRD menunjukkan pada sampel 8 wt.% dan suhu kalsinasi 1000 °C dan 1100 °C terbentuk *fasa iron boride* (Fe₂B). Sedangkan pada sampel tanpa aditif terbentuk fasa maghemit (γ -Fe₂O₃) dan magnetit (Fe₃O₄) setelah proses kalsinasi. Karakterisasi VSM menunjukkan bahwa proses kalsinasi mengakibatkan sifat magnet semakin besar dan penambahan FeB cenderung menurunkan sifat magnet pada sampel sebelum dan setelah kalsinasi.

Kata Kunci : Hematit (α -Fe₂O₃), *ferro boron*, *mechanical alloying* dan kalsinasi

EFFECT OF FERRO BORON (FeB) ADDITIVES ON THE POWDER CHARACTERISTICS OF HEMATITE (α -Fe₂O₃)

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ABSTRACT

The study about effect of ferro boron (FeB) additive towards characteristic of hematite (α -Fe₂O₃) powder has been done. The powders of FeB and α -Fe₂O₃ was milled with dry milling method using Planetary Ball Mill (PBM) for 12 hours. Variation of FeB compositions are 4 and 8 wt.%. The milled powder was calcined at temperatures of 900, 1000 and 1100 °C. The characterization of the powders was performed by Particle Size Analyzer (PSA), true density, X-Ray Diffraction (XRD) and Vibrating Sample Magnetometer (VSM). The results effect of additives FeB showed an increasing of particle size which related to decrease of true density of sample 8 wt.% composition with a value 2.80 μ m and 2.47 g / cm³. Respectively the XRD characterization of sample with 8 wt.% composition with the calcination temperature of 1000 and 1100 °C showed that iron boride (Fe₂B) phase was formed. Maghemite (γ -Fe₂O₃) and magnetite (Fe₃O₄) was formed during calcination for non-additive sample. The VSM characterization showing the effect of the calcination temperature are increasing the magnetic properties and the addition of FeB tends to lower the magnetic properties within samples before and after calcined.

Key word: Hematite (α -Fe₂O₃), ferro boron, mechanical alloying and calcination