

INTISARI

KAJIAN SUSEPTIBILITAS PADA NANOPARTIKEL MAGNETIK *BISMUTH FERRITE* YANG DIENKAPSULASI DENGAN SILIKA (SiO₂)

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Penelitian ini menggunakan metode kopresipitasi proses sintesis *bismuth ferrite*, kemudian dienkapsulasi dengan persentase konsentrasi silika. Hasil karakterisasi *X-ray Diffraction* (XRD) menunjukkan bahwa ukuran kristalit nanopartikel *bismuth ferrite* sebesar $(37,8 \pm 0,2)$ nm, setelah dienkapsulasi silika 20%, ukuran kristalit menjadi $(42,0 \pm 0,1)$ nm. Sifat kemagnetan diuji dengan melakukan pengukuran suseptibilitas magnetik menggunakan metode Gouy pada nanopartikel *bismuth ferrite* yang dienkapsulasi dengan silika dengan konsentrasi 0%, 5%, 10%, 15%, dan 20%. Berdasarkan Hasil pengukuran, diperoleh nilai suseptibilitas $(27,6 \pm 2,9) \times 10^{-7} \text{ m}^3/\text{kg}$, $(16,3 \pm 3,1) \times 10^{-7} \text{ m}^3/\text{kg}$, $(15,7 \pm 1,2) \times 10^{-7} \text{ m}^3/\text{kg}$, $(15,0 \pm 1,7) \times 10^{-7} \text{ m}^3/\text{kg}$, dan $(9,8 \pm 1,0) \times 10^{-7} \text{ m}^3/\text{kg}$. Hasil penelitian menunjukkan bahwa enkapsulasi dengan silika mempengaruhi nilai suseptibilitas magnetik *bismuth ferrite*. Semakin besar konsentrasi silika, nilai suseptibilitas *bismuth ferrite* semakin kecil.

Kata Kunci : *Bismuth ferrite*, kopresipitasi, enkapsulasi, silika, suseptibilitas magnetik, *X-ray Diffraction* (XRD).

ABSTRACT

THE STUDY OF SUSCEPTIBILITY OF BISMUTH FERRITE MAGNETIC NANOPARTICLES (MNPs) ENCAPSULATED BY SILICA (SiO₂)

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The study used the co-precipitation method for the synthesis of *bismuth ferrite*, then encapsulated with the concentration of silica. The results of the X-ray Diffraction (XRD) characterization showed that the crystall size of bismuth ferrite nanoparticles amounted to (37.8 ± 0.2) nm, after encapsulation of 20% silica, the crystall size of bismuth ferrite nanoparticles became (42.0 ± 0.1) nm. Magnetic susceptibility of nanoparticles was measured at room temperature using a Gouy balance method on Bismuth ferrite nanoparticles encapsulated by silica with concentrations of 0%, 5%, 10%, 15%, and 20%. The result of susceptibility on concentration of encapsulated silica are $(27.6 \pm 2.9) \times 10^{-7}$ m³/kg, $(16.3 \pm 3.1) \times 10^{-7}$ m³/kg, $(15.7 \pm 1.2) \times 10^{-7}$ m³/kg, $(15.0 \pm 1.7) \times 10^{-7}$ m³/kg, and $(9.8 \pm 1.0) \times 10^{-7}$ m³/kg. The susceptibility values of bismuth ferrite, are affected by silica encapsulated concentration. The increasing of silica concentration which had been given, make the value of susceptibility of Bismuth ferrite became decrease.

Keyword : *Bismuth Ferrite, co-precipitation, encapsulation, silica, Magnetic susceptibility.*