

INTISARI

ANALISA GUGUS FUNGSI PADA NANOPARTIKEL MAGNETIK (MNPs) *CORE-SHELL* $\text{CoFe}_2\text{O}_4@ZnO$ YANG DISINTESIS DENGAN METODE KOPRESIPITASI

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Nanopartikel magnetik *core-shell* $\text{CoFe}_2\text{O}_4@ZnO$ telah berhasil disintesis dengan menggunakan metode kopresipitasi dengan variasi perbandingan molar antara *core* dan *shell* yaitu 1:2, 1:3, 1:4, dan 1:5. Hasil dari *X-Ray Diffraction* (XRD) menunjukkan adanya fasa kubik spinel ferit pada nanopartikel CoFe_2O_4 dengan ukuran kristalit ($11,6 \pm 0,1$) nm. Kemudian pada nanopartikel magnetik *core-shell* $\text{CoFe}_2\text{O}_4@ZnO$ terdapat fasa wurtzite yang merupakan ciri khas dari ZnO dengan ukuran kristalit ($8,3 \pm 0,1$) nm. Hasil *Transmission Electron Microscopy* (TEM) menunjukkan aglomerasi dari nanopartikel sehingga butir nanopartikel sulit dibedakan. Analisis gugus fungsi dilakukan menggunakan *Fourier Transform Infra Red* (FTIR). Spektrum FTIR menunjukkan adanya ikatan vibrasi $M_{\text{oct}} - O$ di sekitar $355,2 \text{ cm}^{-1}$, $M_{\text{tet}} - O$ di sekitar $559,5 \text{ cm}^{-1}$, serta ikatan vibrasi $Zn - O$ di sekitar $463,2 \text{ cm}^{-1}$.

Kata kunci: nanopartikel magnetik $\text{CoFe}_2\text{O}_4@ZnO$, kopresipitasi, *core-shell*.

ABSTRACT

FUNCTIONAL GROUP ANALYSIS OF *CORE-SHELL* $\text{CoFe}_2\text{O}_4@ \text{ZnO}$ MAGNETIC NANOPARTICLES (MNPs) SYNTHESIZED BY THE CO-PRECIIPITATION METHOD

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$\text{CoFe}_2\text{O}_4@ \text{ZnO}$ core-shell magnetic nanoparticles have been synthesized through coprecipitation methods with variations a core to shell ratio of 1: 2, 1: 3, 1: 4, and 1: 5. Characterization using X-Ray Diffraction (XRD) showed CoFe_2O_4 nanoparticles was spinel ferrite with crystallite size ($11,6 \pm 0,1$). The XRD result of $\text{CoFe}_2\text{O}_4@ \text{ZnO}$ showed a wurtzite phase of ZnO with crystallite size ($8,3 \pm 0,1$) nm. Based on transmission electron microscopy (TEM) image, the nanoparticles tend to agglomerate. As a result, grain between the particle was indistinguishable. The functional group was analyzed using Fourier Transform Infra Red (FTIR). The FTIR spectrum showed the $\text{M}_{\text{oct}} - \text{O}$ vibrational bond around $355,2 \text{ cm}^{-1}$, $\text{M}_{\text{tet}} - \text{O}$ around 559.5 cm^{-1} , and the Zn - O vibration bond around $463,2 \text{ cm}^{-1}$.

Keywords: magnetic nanoparticles $\text{CoFe}_2\text{O}_4@ \text{ZnO}$, coprecipitation, core-shell.