

INTISARI

Struktur Kristal dan Gugus Fungsi pada Nanopartikel *Bismuth Ferrite/Polyethylene Glycol (BiFeO₃/PEG)*

Oleh

Akhdan 'Azmi

16/398432/PA/17393

Nanopartikel BiFeO₃ telah berhasil disintesis dengan menggunakan metode kopresipitasi pada suhu 80 °C dan dienkapsulasi dengan PEG-4000. Massa PEG-4000 divariasikan menjadi 1 gram, 2 gram, 3 gram, dan 4 gram. Hasil dari *X-Ray diffraction* (XRD) menunjukkan fase sekunder Bi₂₅FeO₄₀ dominan muncul dengan ukuran kristalit (35,8 ± 0,1) nm. Setelah dilakukan enkapsulasi PEG-4000, muncul fasa baru Bi₂Fe₄O₉ dan ukuran kristalit menjadi (32,3 ± 0,1) nm. *Fourier-transform infra red* (FTIR) menunjukkan bahwa ikatan vibrasi Fe-O *stretching* dan Bi-O *stretching* mengalami pergeseran bilangan gelombang dari 470,63 cm⁻¹ dan 578,64 cm⁻¹ menjadi 462,92 cm⁻¹ dan 524,64 cm⁻¹ disebabkan oleh enkapsulasi PEG-4000.

Kata kunci: nanopartikel BiFeO₃, PEG-4000, enkapsulasi, kopresipitasi, FTIR, XRD

ABSTRACT

Crystal Structure and Functional Group of Nanoparticles Bismuth Ferrite/Polyethylene Glycol (BiFeO₃/PEG)

By

Akhdan 'Azmi

16/398432/PA/17393

BiFeO₃ nanoparticles have been successfully synthesized using coprecipitation method at 80 °C and encapsulated with PEG-4000. The mass of PEG-4000 was varied into 1 gram, 2 gram, 3 gram, and 4 gram. The results of X-Ray diffraction (XRD) showed that the secondary phase of Bi₂₅FeO₄₀ dominantly appeared with (35.8 ± 0.1) nm crystallite size. After PEG-4000 encapsulation, a new phase of Bi₂Fe₄O₉ appeared and the crystallite size became (32.3 ± 0.1) nm. Fourier-transform infrared (FTIR) showed that the Fe-O stretching bond vibration and Bi-O stretching bond vibration was changed from wave number 470,63 cm⁻¹ and 578,64 cm⁻¹ to 462,92 cm⁻¹ and 524,64 cm⁻¹ because of PEG-4000 encapsulation.

Keywords: nanoparticles BiFeO₃, PEG-4000, encapsulation, coprecipitation, FTIR, XRD