

ABSTRAK

PENGARUH KONSENTRASI NANOKOMPOSIT $\text{CoFe}_2\text{O}_4/\text{Cdots}$ TERHADAP GUGUS FUNGSI, SIFAT OPTIK DAN STRUKTUR MORFOLOGI MENGGUNAKAN METODE SINTESIS HIJAU

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Nanokomposit $\text{CoFe}_2\text{O}_4/\text{Cdots}$ telah berhasil disintesis melalui penggabungan CoFe_2O_4 yang disintesis dari ekstrak *Moringa oleifera* (MO) dan Cdots yang disintesis dari kulit semangka. Nanokomposit $\text{CoFe}_2\text{O}_4/\text{Cdots}$ disintesis menggunakan metode sintesis hijau. Penelitian ini diawali dengan menyintesis MO, menyintesis CoFe_2O_4 , menyintesis Cdots, lalu menyintesis $\text{CoFe}_2\text{O}_4/\text{Cdots}$. Sehingga diperoleh $\text{CoFe}_2\text{O}_4/\text{Cdots}$ -10, $\text{CoFe}_2\text{O}_4/\text{Cdots}$ -20, dan $\text{CoFe}_2\text{O}_4/\text{Cdots}$ -30 yang masing-masing didasarkan pada variasi konsentrasi Cdots pada nanopartikel CoFe_2O_4 yaitu 10, 20, dan 30 ml. Setelah proses sintesis, dilakukan karakterisasi menggunakan FTIR, UV-Vis dan TEM. Hasil pengujian FTIR pada nanokomposit menunjukkan keberadaan gugus fungsi khas dari Cdots dan gugus fungsi khas dari CoFe_2O_4 . Penggabungan keduanya menghasilkan pergeseran bilangan gelombang yang diakibatkan oleh munculnya ikatan baru antara Cdots dan CoFe_2O_4 . Hasil pengujian UV-Vis menunjukkan penambahan Cdots tidak mempengaruhi secara signifikan pada absorbansi, tetapi terjadi pergeseran puncak absorbansi ke kiri seiring penambahan variasi Cdots. Hal ini yang mengakibatkan naiknya nilai *band gap energy*. Hasil pengujian TEM menunjukkan morfologi kedua sampel berbentuk *semi-spherical* dan cenderung aglomerasi seiring penambahan Cdots. Akan tetapi penambahan konsentrasi Cdots menghasilkan ukuran diameter partikel semakin mengecil dan relatif lebih seragam. Hal ini mengakibatkan luas permukaan semakin besar dan efektif untuk digunakan pada berbagai aplikasi. Hasil *Selected Area Electron Diffraction* (SAED) menunjukkan cincin difraksi dengan keberadaan kisi masih berada pada fasa CoFe_2O_4 .

Kata Kunci: FTIR, nanokomposit $\text{CoFe}_2\text{O}_4/\text{Cdots}$, konsentrasi Cdots, sintesis hijau, TEM, UV-Vis.

ABSTRACT

THE EFFECT OF CONCENTRATION OF CoFe₂O₄/Cdots NANOCOMPOSITES ON FUNCTIONAL GROUPS, OPTICAL PROPERTIES AND MORPHOLOGICAL STRUCTURE USING GREEN SYNTHESIS METHOD

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CoFe₂O₄/Cdots nanocomposites have been successfully synthesized by combining CoFe₂O₄ synthesized from *Moringa oleifera* (MO) extract and Cdots synthesized from watermelon rind. CoFe₂O₄/Cdots nanocomposites were synthesized using a green synthesis method. This study began with synthesizing MO, synthesizing CoFe₂O₄, synthesizing Cdots, then synthesizing CoFe₂O₄/Cdots. So it's obtained CoFe₂O₄/Cdots-10, CoFe₂O₄/Cdots-20, and CoFe₂O₄/Cdots-30. That each based on variations in Cdots concentration on CoFe₂O₄ nanoparticles that is 10, 20, and 30 ml. After the synthesis process, characterization was carried out using FTIR, UV-Vis and TEM. The results of FTIR testing on nanocomposites show the presence of typical functional groups from Cdots and typical functional groups from CoFe₂O₄. The combination of both results in a shift in wave numbers caused by the emergence of new bonds between Cdots and CoFe₂O₄. The results of UV-Vis testing show that the addition of Cdots does not significantly affect the absorbance, but there is a shift in the absorbance peak to the left along with the addition of Cdots variations. This causes the band gap energy value to increase. The TEM test results show that the morphology of both samples is *semi-spherical* and tends to agglomerate with the addition of Cdots. However, the addition of Cdots concentration results in a smaller particle diameter and is relatively more uniform. This results in a larger surface area and is effective for use in various applications. The *Selected Area Electron Diffraction* (SAED) results show that the diffraction ring with the presence of a lattice is still in the CoFe₂O₄ phase.

Keywords: FTIR, CoFe₂O₄/Cdots nanocomposite, Cdots concentration, green synthesis, TEM, UV-Vis.