Green Synthesis dan Karakterisasi Nanokomposit ZnO/NiWO4 menggunakan Ekstrak Daun Alpukat (Persea americana) serta Uji Aktivitas Fotokatalitiknya = Green Synthesis of ZnO/NiWO4 Nanocomposite Using Alpukat (Persea americana) Leaf Extract and Its Photocatalytic Application

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Abstrak

Pada penelitian ini, nanopartikel ZnO, NiWO4, dan ZnO/NiWO4 berhasil disintesis dengan cara metode green synthesis menggunakan ekstrak daun alpukat (Persea americana) dalam sistem satu fasa. Kandungan ekstrak air daun alpukat adalah alkaloid, saponin dan polifenol. Nanopartikel ZnO, NiWO4, dan ZnO/NiWO4 dikarakterisasi menggunakan spektrofotometer Ultraviolet-Visible Diffuse Reflectance Spectroscopy (UV-Vis DRS), X-Ray Diffraction (XRD), Fourier Transform InfraRed (FTIR), Transmission Electron Microscopy (TEM) dan Scanning Electron Microscopy Energy Disperse X-Ray (SEM-EDX). Hasil karakterisasi UV-Vis DRS, nanopartikel ZnO, NiWO4, dan ZnO/NiWO4 memiliki band gap 3,15 eV, 2,35 eV, dan 3,03 eV. Hasil uji aktivitas fotokatilitiknya menggunakan nanokomposit ZnO/NiWO4 terhadap malasit hijau dibawah iradiasi sinar tampak selama 2 jam memiliki persen degradasi tertinggi dibandingkan dengan NiWO4 dan ZnO. Persen degradasi ZnO/NiWO4, NiWO4, ZnO adalah 96,20%, 79,22%, 48,30%.

.....In this research, ZnO, NiWO4, and ZnO/NiWO4 nanoparticles were successfully synthesized by means of green synthesis method using avocado (Persea americana) leaf extract in a single phase system. The secondary metabolites of avocado leaf water extract are alkaloids, saponins and polyphenols. ZnO, NiWO4, and ZnO/NiWO4 nanoparticles were characterized using a spectrophotometer Ultraviolet-Visible Diffuse Reflectance Spectroscopy (UV-Vis DRS), X-Ray Diffraction (XRD), Fourier Transform InfraRed (FTIR), Transmission Electron Microscopy (TEM) and Scanning Energy Microscopy Electron Disperse X-Ray (SEM-EDX). The results of the photocathylytic activity test using the ZnO/NiWO4 nanocomposite against malachite green under visible light irradiation for 2 hours had the highest degradation percent compared to NiWO4 and ZnO. The degradation percentages of ZnO/NiWO4, NiWO4, ZnO were 96.81%, 79.71%, 51.38%.