

Ekstrak daun Afrika (*vernonia amygdalina del.*) sebagai media green synthesis nanopartikel Nd₂O₃-Ag₂O dan studi aktivitas fotokatalitiknya = Green synthesis Nd₂O₃-Ag₂O nanoparticle by *vernonia amygdalina del.* leaf extract and its photocatalytic activities

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Abstrak

Green synthesis nanopartikel Nd₂O₃, Ag₂O dan nanopartikel Nd₂O₃-Ag₂O dilakukan karena mudah, murah dan ramah lingkungan. Dalam penelitian ini, ekstrak daun afrika (*Vernonia Amygdalina Del.*) kemudian diberi nama EDA digunakan untuk mensintesis nanopartikel Nd₂O₃-Ag₂O. Metabolit sekunder pada EDA berperan sebagai sumber basa dan capping agent, yang ditentukan melalui uji fitokimia. Pola difraksi dan kristalinitas ketiga nanopartikel tersebut dikonfirmasi menggunakan X-Ray Diffraction, sedangkan morfologi ditentukan menggunakan Scanning Electron Microscopy-Energy Dispersive X-ray Analysis dan Transmitted Electron Microscopy. Fourier Transform-Infra Red digunakan untuk menunjukkan interaksi antara EDA dengan nanopartikel. Bilangan gelombang Nd-O pada nanopartikel Nd₂O₃ muncul di daerah 426 cm⁻¹, Ag-O pada nanopartikel Ag₂O di daerah 825 cm⁻¹. Sedangkan bilangan gelombang Ag-O (855 cm⁻¹), Nd-O (424 dan 667 cm⁻¹) terdapat pada nanopartikel Nd₂O₃-Ag₂O. Ukuran distribusi dari ketiganya berada di antara 1-100 nm yang dikonfirmasi menggunakan Particle Size Analyzer. Band gap nanopartikel Nd₂O₃-Ag₂O yaitu sebesar 3,29 eV. Aktivitas fotokatalitik nanopartikel Nd₂O₃-Ag₂O disimulasikan terhadap degradasi Metilen Biru (MB). Hasil degradasi sebesar 93,71%.

<hr>Green synthesis of Nd₂O₃, Ag₂O and Nd₂O₃-Ag₂O nanoparticles has been investigated lately due to its properties of inexpensive, easy to use, and eco-friendly material. At current research, *Vernonia amygdalina Del.* leaf extract was used to synthesize Nd₂O₃, Ag₂O and Nd₂O₃-Ag₂O nanoparticles. The secondary metabolite of *Vernonia amygdalina Del.* leaf extract plays a role as a base source and a capping agents, which can be determined by phytochemical test. The diffraction pattern and crystallinity of Nd₂O₃, Ag₂O and Nd₂O₃-Ag₂O nanoparticles were confirmed by using X-ray Diffraction, while the morphology can be determined using Scanning Electron Microscopy-Energy Dispersive X-ray Analysis and Transmitted Electron Microscopy. Fourier Transform-Infra Red (FT-IR) spectra was used to show the interaction between *Vernonia amygdalina Del.* leaf extract and nanoparticles. FT-IR characterization showed the wave number of Nd₂O₃ at 426 cm⁻¹, Ag₂O at 825 cm⁻¹, and Nd₂O₃-Ag₂O nanoparticles at 424 and 855 cm⁻¹. The size distribution of Nd₂O₃, Ag₂O and Nd₂O₃-Ag₂O nanoparticles at 1-100 nm were confirmed by Particle Size Analyzer. UV-Vis DRS characterization proved the energy band gap of Nd₂O₃-Ag₂O nanoparticles at 3,29 eV. The photocatalytic activity of Nd₂O₃-Ag₂O nanoparticles was observed by determining the degradation of methylene blue, which was identified at 93.71%.