

ABSTRAK

**PEMANFAATAN TANAMAN BAYAM DAN KELOR PADA GREEN
SYNTNTHESIS NANOKOMPOSIT $\text{Fe}_3\text{O}_4/\text{rGO}/\text{ZnO}$ SEBAGAI
FOTOKATALIS UNTUK MENDEGRADASI RHODAMIN-B**

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Degradasi limbah larutan pewarna Rhodamin-B (RhB) menggunakan fotokatalis $\text{Fe}_3\text{O}_4/\text{rGO}/\text{ZnO}$ telah berhasil dilakukan. Nanokomposit disintesis dengan metode green synthesis memanfaatkan ekstrak tanaman bayam (*Amaranthus Viridis*) dan tanaman kelor (*Moringa Oliefera*). Sampel $\text{Fe}_3\text{O}_4/\text{rGO}/\text{ZnO}$ dikarakterisasi menggunakan *X-Ray Diffraction* dan Spektrofotometer UV-Vis. Hasil Karakterisasi XRD menunjukkan ukuran kristal nanokomposit sebesar 8,79 nm. Spektrum absrobansi dari spektrofotometri UV-Vis menunjukkan energi celah pita sebesar 2,62 eV. Aktivitas fotokatalitik pada degradasi limbah RhB dilakukan dengan variasi massa katalis 0,025 gram; 0,050 gram; 0,075 gram dan 0,1 gram dengan total massa sebesar 0,25 gram. Semakin besar massa menunjukkan pengaruh pada persentase degradasi. Variasi massa tertinggi merupakan massa efektif dalam proses degradasi RhB selama 180 menit dan mencapai persentase degradasi hingga 97,2%

Kata Kunci: Degradasi, Fotokatalis, Green Synthesis, Rhodamin-B, Nanokomposit

ABSTRACT

UTILIZATION OF AMARANTHUS VIRIDIS AND MORINGA OLIFERA PLANTS IN GREEN SYNTHESIS NANOCOMPOSITE $\text{Fe}_3\text{O}_4/\text{rGO}/\text{ZnO}$ AS A PHOTOCATALYST TO DEGRADE RHODAMIN-B

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The degradation of Rhodamin-B (RhB) dye waste water using the $\text{Fe}_3\text{O}_4/\text{rGO}/\text{ZnO}$ photocatalyst was successfully carried out. The nanocomposite was synthesized through a green synthesis method utilizing plant extract from *Amaranthus Viridis* and *Moringa Oliefera*. The $\text{Fe}_3\text{O}_4/\text{rGO}/\text{ZnO}$ samples were characterized using X-Ray Diffraction (XRD) and UV-Vis Spectrophotometry. XRD analysis revealed that the nanocomposite had a crystal size of 8.79 nm, while the UV-Vis absorbance spectrum indicated a band gap energy of 2.62 eV. The photocatalytic activity for the degradation of RHB was investigated by varying the catalyst mass at 0.025; 0.050; 0.075 and 0.1 grams. With a total sample mass of 0.25 grams. An increase in catalyst mass was found to significantly influence the degradation efficiency. The highest catalyst mass resulted in the most effective photocatalytic performance, achieving a degradation percentage of up to 97.2% within 180 minutes

Keywords: Degradation, Green Synthesis, Photocatalyst, Rhodamin-B, Nanocomposite