

# Green Synthesis ZnO-AB<sub>2</sub>O<sub>4</sub> menggunakan Ekstrak Daun Patikan Kebo (*Euphorbia Hirta* L.) dengan sistem dua fasa dan uji fotokatalitiknya terhadap zat warna organik = Green Synthesis ZnO-AB<sub>2</sub>O<sub>4</sub> using *Euphorbia Hirta* L. and its photocatalytic test against organic dyes

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## Abstrak

ZnO/NiBi<sub>2</sub>O<sub>4</sub>, NiBi<sub>2</sub>O<sub>4</sub>, dan ZnO berhasil disintesis secara green synthesis menggunakan ekstrak daun patikan kebo (EDPK) dalam sistem dua fasa melalui metode sol gel. Hasil sintesis dilakukan karakterisasi menggunakan Spektroskopi FTIR, Spektrofotometer UV-Vis DRS, XRD, dan FE-SEM. Kandungan metabolit sekunder seperti alkaloid, saponin, dan steroid pada ekstrak daun patikan kebo berperan penting dalam proses sintesis yang telah dikarakterisasi dengan FTIR dan Spektrofotometer UV-Vis. Alkaloid berperan sebagai sumber basa lemah sedangkan saponin berperan sebagai capping agent dalam proses sintesis. Didapatkan nilai band gap untuk ZnO/NiBi<sub>2</sub>O<sub>4</sub>, NiBi<sub>2</sub>O<sub>4</sub>, ZnO masing masing sebesar 2,72 eV, 1,83 eV, dan 3,11 eV yang diukur dengan Spektrofotometer UV-Vis DRS. Hasil studi aktivitas fotokatalitik ZnO/NiBi<sub>2</sub>O<sub>4</sub> menunjukkan degradasi malachite hijau yang lebih baik dibandingkan dengan ZnO dan NiBi<sub>2</sub>O<sub>4</sub>. Persentase degradasi malachite hijau 5 mg nanokomposit ZnO/NiBi<sub>2</sub>O<sub>4</sub>, nanopartikel NiBi<sub>2</sub>O<sub>4</sub>, dan nanopartikel ZnO masing masing sebesar 92,30%, 77,33%, dan 55,99 dibawah sinar tampak selama 120 menit.

.....In this rearch, ZnO/NiBi<sub>2</sub>O<sub>4</sub>, NiBi<sub>2</sub>O<sub>4</sub>, and ZnO were successfully synthesized by green synthesis using patikan kebo leaf extract (EDPK) in a two-phase system using the sol gel method. The results of the synthesis were characterized using FTIR Spectroscopy, UV-Vis Spectrophotometer DRS, XRD, and FE-SEM. The content of secondary metabolites such as alkaloids, saponins, and steroids in patikan kebo leaf extract plays an important role in the synthesis process which has been characterized by FTIR and UV-Vis Spectrophotometer. Alkaloids act as a source of weak bases while saponins act as capping agents in the synthesis process. The band gap values for ZnO/NiBi<sub>2</sub>O<sub>4</sub>, NiBi<sub>2</sub>O<sub>4</sub>, ZnO were 2.72eV, 1.83 eV, and 3.11 eV, respectively, as measured by the DRS UV-Vis Spectrophotometer. The results of the study on the photocatalytic activity of ZnO/NiBi<sub>2</sub>O<sub>4</sub> showed better degradation of green malachite than ZnO and NiBi<sub>2</sub>O<sub>4</sub>. The degradation percentage of 5 mg green malachite nanocomposite ZnO/NiBi<sub>2</sub>O<sub>4</sub>, NiBi<sub>2</sub>O<sub>4</sub> nanoparticles, and ZnO nanoparticles were 92.30%, 77.33%, and 55.99 respectively under visible light for 120 minutes.