

# Potensi ekstrak daun Ketapang (*Terminalia catappa*) dalam sintesis nanomaterial Nd<sub>2</sub>O<sub>3</sub>-CdO dan aktivitas fotokatalitik metilen biru = Potention of terminalia catappa extract in synthesis of Nd<sub>2</sub>O<sub>3</sub>-CdO nanocomposites and Its photocatalytic activity on methylene blue

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## Abstrak

### <b>ABSTRAK</b><br>

Pada penelitian ini nanomaterial Nd<sub>2</sub>O<sub>3</sub>-CdO berhasil disintesis dengan menggunakan ekstrak daun ketapang (*Terminalia catappa*) sebagai sumber basa (-OH) dan capping agent. Nanopartikel Nd<sub>2</sub>O<sub>3</sub>, CdO, dan nanomaterial yang terbentuk selanjutnya dikarakterisasi menggunakan instrumentasi Spektrofotometer UV-Vis, DRS, FTIR, XRD, PSA, TEM-SAED, dan SEM-EDX. Karakterisasi dengan XRD membuktikan bahwa nanopartikel Nd<sub>2</sub>O<sub>3</sub> memiliki struktur kristal heksagonal, CdO dengan bentuk kubik, sedangkan nanomaterial Nd<sub>2</sub>O<sub>3</sub>-CdO memiliki puncak khas gabungan kristal keduanya. Berdasarkan karakterisasi TEM, diketahui bahwa nanomaterial Nd<sub>2</sub>O<sub>3</sub>-CdO memiliki ukuran 80 nm dengan bentuk oval.

Karakterisasi dengan UV-Vis DRS membuktikan band gap nanomaterial Nd<sub>2</sub>O<sub>3</sub>-CdO sebesar 2,8 eV. Studi aktivitas fotokatalitik nanomaterial Nd<sub>2</sub>O<sub>3</sub>-CdO diamati dengan degradasi metilen biru menggunakan radiasi sinar tampak. Persentase degradasi untuk nanopartikel Nd<sub>2</sub>O<sub>3</sub>, CdO dan nanomaterial Nd<sub>2</sub>O<sub>3</sub>-CdO masing-masing adalah 29,74%; 35,17%; dan 71,97% selama 2 jam waktu penyinaran. Perhitungan kinetika reaksi fotodegradasi metilen biru didapatkan bahwa reaksi mengikuti kinetika pseudo orde satu.

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### <b>ABSTRACT</b><br>

In this study, the synthesis of Nd<sub>2</sub>O<sub>3</sub>-CdO nanomaterials was successfully performed using ketapang leaf (*Terminalia catappa*) extract as a base source (-OH) and capping agent. The synthesized nanoparticles and nanomaterials were characterized with spektrophotometer UV-Vis, UV-Vis-DRS, FTIR, XRD, PSA, TEM-SAED and SEM-EDX instrumentation. Characterization with XRD proves that Nd<sub>2</sub>O<sub>3</sub>-NPs nanoparticles have a hexagonal crystal structure, CdO NPs have an cube crystal structure, whereas Nd<sub>2</sub>O<sub>3</sub>-CdO nanomaterials have their own distinctive combined crystal peak. Based on TEM characterization, it is known that the Nd<sub>2</sub>O<sub>3</sub>-CdO nanomaterials have a size of 80 nm with ovale shape. Characterization with UV-Vis DRS has proven that the Nd<sub>2</sub>O<sub>3</sub>-CdO nanomaterials have band gap energy of 2.8 eV. The study of photocatalytic activity of Nd<sub>2</sub>O<sub>3</sub>-CdO nanomaterials were observed with methylene blue degradation using visible light radiation. Percentages of degradation for Nd<sub>2</sub>O<sub>3</sub>, CdO and Nd<sub>2</sub>O<sub>3</sub>-CdO nanomaterials were 29,74%, 35,17% and 71,97%.