

Aktivitas fotokatalitik nanopartikel zno didop cu dan penambahan zeolit dalam mendegradasi dye methyl orange = Photocatalytic activity of cu doped zno nanoparticle assisted by zeolite in degradation of dye methyl orange

Bobby Sulistyio Febrian, author

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Abstrak

Nanopartikel ZnO didop Cu yang ditambah dengan Zeolit telah berhasil disintesis dengan metode Kopresipitasi dengan empat variasi doping Cu. Karakterisasi sampel nanopartikel ini diuji menggunakan Energy Dispersive X-ray (EDX), X-Ray Diffraction (XRD), Field Emission Scanning Electron Microscope (FE-SEM), Fourier Transform Infrared (FTIR), UV- Visible (UV-VIS) dan Electron Spin Resonance (ESR). Hasil karakterisasi EDX, FTIR dan ESR telah mengkonfirmasi berhasilnya doping atom Cu pada seluruh sampel. Hasil XRD menunjukkan bahwa seluruh sampel memiliki struktur heksagonal wurtzite beserta nilai grain size dan strain dari masing-masing sampel. Morfologi sampel ditunjukkan dari hasil FE-SEM yang menunjukkan permukaan sampel yang kasar. Hasil UV-Vis menunjukkan nilai celah pita energi yang berkurang dengan kehadiran doping logam Cu dan zeolit. Hasil uji fotokatalitik doping Cu sebanyak 7 at.% memiliki prosentase dekolokasi paling tinggi yaitu 77% sebanding dengan nilai rate tertinggi yaitu sebesar 0.0116 min⁻¹.

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Cu-doped ZnO Nanoparticles assisted by Zeolite were successfully synthesized by Co-precipitation method with four doping variations of Cu. Characterization of nanoparticle samples were investigated by Energy Dispersive X-ray (EDX), X-Ray Diffraction (XRD), Field Emission Scanning Electron Microscope (FE-SEM), Fourier Transform Infrared (FTIR), UV- Visible (UV-VIS) dan Electron Spin Resonance (ESR). Characterization results of EDX, FTIR and ESR confirmed the doping of Cu in all samples. XRD results showed that all samples have hexagonal wurtzite structure as well as grain size and strain calculations for each sample. Sample morphology was depicted by FE-SEM result showing the rough surface of sample. UV-Vis results showed the decreasing of the energy gap along with the loading of copper doping and zeolite. Photocatalytic activity result of Cu doping of 7 at% has the highest decolorization percentage of 77% which proportional to the highest rate constant of 0.0116 min⁻¹.