Pengaruh surfaktan kationik terhadap efektivitas fotokatalitik nanopartikel zno didop cr = The influence of cationics surfactant on the effectiveness of photocatalytic activity of cr doped zno nanoparticles

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Abstrak

Nanopartikel ZnO didop Cr disintesis menggunakan metode kopresipitasi untuk empat variasi konsentrasi Cr. Karakteristik nanopartikel dipelajari menggunakan Energy Dispersive X-Ray (EDX), X-Ray Difraction (XRD), Electron Spin Resonance (ESR), Field Emision - Scanning Electron Microscope (FESEM), Fourier Transform-Infrared (FTIR), and spektroskopi Ultra Violet- Visible (UV- Vis). Uji aktivitas nanopartikel diukur melalui degradasi Methyl Orange (MO) dan Methylene Blue (MB) pada daerah sinar Ultraviolet (UV). Hasil menunjukkan keberadaan Cr dan cetyltrimethylammonium bromide (CTAB) dalam sistem ZnO nanopartikel. Nanopartikel yang dihasilkan berfase tunggal dengan struktur heksagonal wurtzite dan mempunyai bentuk spherical-like. Peningkatan konsentrasi dopan Cr dan kehadiran surfaktan kationik CTAB menyebabkan berkurangnya celah energi dan lebih lanjut lagi meningkatkan aktivitas fotokatalitik. Kehadiran surfaktan kationik CTAB menyebabkan nanopartikel ZnO didop Cr lebih efektif dalam mendegradasi zat pewarna anionik MO dibanding kationik MB.

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Cr doped ZnO nanoparticles were synthesized by coprecipitation methods with four variation Cr concentrations. The nanoparticles were characterized by using Energy Dispersive X-Ray (EDX), X-Ray Difraction (XRD), Electron Spin Resonance (ESR), Field Emision - Scanning Electron Microscope (FESEM), Fourier Transform-Infrared (FTIR), and UltraViolet-Visible (UV-Vis) Spectroscopy. The photocatalytic activity of nanoparticles were evaluated by measuring degradation of Methyl Orange (MO) and Methylene Blue (MB) in Ultraviolet (UV) region. The results confirmed the presence of Cr dopant and cationic surfactant cetyltrimethylammonium bromide (CTAB) in the ZnO nanoparticles system. The resulting nanoparticles have single-phases with hexagonal wurzite structures and spherical-like shapes. Increasing the Cr dopant concentrations and the presence of cationic surfactant CTAB cause a reduction in energy gap and more futher improve the photocatalytic activity. The presence of cationic surfactant CTAB causes the Cr doped ZnO nanoparticles were more effective in degrading MO anionic dyes than MB cationic dyes.