Preparation, characterization and photoluminescence property of CdO photocatalyst

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Abstract: CdO nanostructures had been synthesized by precipitation method by using sodium dodecyl sulfate (SDS) as a surfactant. The presence of functional groups and chemical bonding had been confirmed by FT-IR spectroscopy. The UV-vis spectrum showed adsorption band edge at 335 nm and the corresponding band gap was found to be 3.70 eV. The photoluminescence (PL) spectrum ($\lambda_{\text{excitation}} = 480$ nm) showed two strong intense peaks at 685 and 703 nm (red emission) due to the deep trap emission and surface state emission, respectively. The photocatalytic activity of CdO was studied by monitoring the photodegradation of reactive red (RR141) azo dye under visible light irradiation. The initial concentration of the dye was fixed at 10 mgL$^{-1}$. About 50 mg of CdO photocatalyst was dispersed in 200 mL dye solution. The concentration of the dye was determined by monitoring the absorbance at $\lambda_{\text{max}}$ of 544 nm using UV-vis spectroscopic analysis technique. The CdO photocatalyst displayed high photodegradation efficiency of 90% toward photodegradation of the dye for 180 min. The degradation of the dye under UV light and natural solar light irradiation will be investigated.

Keywords: CdO; Photocatalytic degradation; Azo dyes; Visible light