



Photodegradation study of congo red, methyl orange, methyl red and methylene blue under simulated solar irradiation catalyzed by ZnS/CdS nanocomposite

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ABSTRACT

The nanocomposites of $Zn_xCd_{1-x}S$ were synthesized via controlled co-precipitation. The X-ray diffraction pattern, transmission electron microscopy image and BET method were used to characterize the synthesized nanocomposites. The cubic structure of nanocomposites were confirmed using X-ray diffraction pattern. The photodegradation of congo red, methyl orange, methyl red and methylene blue catalyzed by prepared nanocomposites was studied under simulated solar irradiation. The $Zn_{0.4}Cd_{0.6}S$ show the highest photoactivity among nanocomposites. The effect of samples pH and $Zn_{0.4}Cd_{0.6}S$ dosage were adjusted to optimize the photodegradation process of dyes. The degradation efficiency of 95% were obtained within 20 min for congo red and 60 min for other dyes with initial concentration of 10 mg/l. The $Zn_{0.4}Cd_{0.6}S$ indicate the stability in samples with pH of 3–11. The mineralization of dyes was confirmed using determination of chemical oxygen demand of solutions after photodegradation process.

Keywords: Dye; Degradation; ZnS; CdS; Composite; Photocatalyst

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