



Aromatic compounds photodegradation catalyzed by ZnS and CdS nanoparticles

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ABSTRACT

The photodegradation of aromatic compounds such as nitrobenzene (NB), phenol, 2-nitrophenol (2-NP), 3-nitrophenol (3-NP), 4-nitrophenol (4-NP), 4-chlorophenol (4-CP), 2,4-dichlorophenol (2,4-DCP) and 2,4,6-trichlorophenol (2,4,6-TCP) are catalyzed by nanoparticles of zinc and cadmium sulfides. The photocatalytic degradation is studied in aqueous samples. The results show the highest degradation in pH of 11. The optimum dosages of catalysts obtained 0.3 and 0.5 g l⁻¹ in degradation of NB and other aromatic compounds, respectively. The degradation kinetic of pollutants follows pseudo-first-order kinetic. The CdS semiconductor with band-gap 2.42 eV in comparison to ZnS with band-gap 3.54 eV indicates a higher photoactivity. The studies show the degradation rate of aromatic compounds in this order: NB > phenol, 2-NP > 4-NP > 3-NP > phenol and 2,4,6-TCP > 2,4-DCP > 4-CP > phenol. A reduction 90% in COD value and increasing 91% in TOC removal are obtained after photo-degradation of a sample contains all of aromatic compounds at duration time of 24 h.

Keywords: Photodegradation; Aromatic; Nanoparticle; ZnS; CdS

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