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Photo-catalytic Degradation of Victoria Blue-B Dye using ZnS and Ag-N co-doped ZnS Nanoparticles under Visible Radiation

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ABSTRACT

ZnS , Ag-doped, N-doped and Ag-N co-doped ZnS nanoparticles were prepared by Chemical method under optimal conditions and characterized using XRD, TEM and UV-Visible spectroscopic techniques. As-synthesized nanomaterialwere used as a photo-catalysts for the degradation of Victoria Blue-B dye. Effects of photo-catalyst load and substrate initial concentration on degradation of the dye in aqueous solution have been investigated. Maximum degradation (94.8 %) of Victoria Blue-B was observed using catalyst load (ZnS-Ag-N): 1.0g 250mL of 25 mg L^{-1}. Photocatalytic degradation of the dye follows pseudo first order kinetics. Using Victoria Blue-B initial concentration, 100mg L^{-1}, the dye degradation rate constant under visible radiation and photocatalyst load, was 5.33 x 10^{-3} min^{-1}.

Keywords: Degradation, Victoria Blue-B, nanoparticles, rate constant, XRD