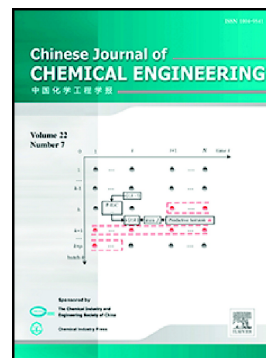


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Catalysis, Kinetics and Reaction Engineering

Ag-Co₃O₄: Synthesis, characterization and evaluation of its photo-catalytic activity towards degradation of rhodamine B dye in aqueous medium

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ABSTRACT

Synthesis, characterization of Co₃O₄ and Ag-Co₃O₄ composites and evaluation of their photo-catalytic activities towards photo-degradation of aqueous solution of rhodamine B dye under irradiation of visible light have been described in this paper. Co₃O₄ was prepared by solid phase mechano chemical process using Co(NO₃)₂.6H₂O and NH₄HCO₃ as precursor materials. Ag was deposited on Co₃O₄ from AgNO₃ using *Calotropis gigantea* extract as reducing agent. XRD, SEM and FTIR were used for characterization of prepared composites. Photo-catalytic efficiencies of as-prepared Co₃O₄ and Ag-Co₃O₄ were evaluated for aqueous phase photo-degradation of rhodamine B. It was found that deposition of Ag on Co₃O₄ highly enhanced the photo-catalytic activity of Co₃O₄. Photo-catalytic degradation followed the Eley–Rideal mechanism. About 100% and 91% photo-degradation of 40 mL dye solution achieved at 313 K in 90 and 120 min over 0.05 g of Ag-Co₃O₄ as photo-catalyst using 100 and 200 mg/L as initial concentration of dye respectively.

Key words: Co₃O₄; Ag-Co₃O₄; Photo-catalysis; Photo-degradation; *Calotropis gigantea*; Rhodamine B; Eley-Rideal mechanism

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