



Hydrothermal synthesis of SnS₂ nanocrystals for photocatalytic degradation of 2,4,6-trichlorophenol under white LED light irradiation

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ABSTRACT

In this study, SnS₂ nanocrystals with controlled morphology were successfully synthesized by a simple hydrothermal method using thiosemicarbazide both as a sulfur source and as a capping agent. The X-ray powder diffraction analysis confirmed the hexagonal phase of these as-prepared SnS₂ nanocrystals. Morphological features were studied by field-emission scanning electron microscopy, indicating that the as-prepared SnS₂ crystals were nanoparticles. The optical property was studied by ultraviolet-visible diffused reflectance spectroscopy, indicating that the bandgap of SnS₂ samples is ~2.2 eV. Under white LED light irradiation ($\lambda = 450$ nm), the as-prepared SnS₂ nanocrystals exhibited a high photocatalytic activity for degrading 2,4,6-trichlorophenol solution. This work suggests that SnS₂ nanocrystal is a potential photocatalyst for detoxification.

Keywords: Hydrothermal synthesis; SnS₂ nanocrystals; LED light; Photocatalytic activity; 2,4,6-Trichlorophenol

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