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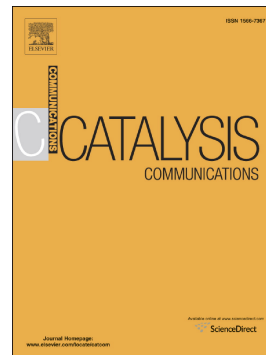
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One-step synthesis of urchinlike SnS/SnS₂ heterostructures with superior visible-light photocatalytic performance

Kaili Yao^a, Jun Li^a, Shaoyun Shan^{*a}, Qingming Jia^{*a}

Faculty of Chemical Engineering, Kunming University of Science and Technology, Kunming 650500, China

* Corresponding authors, Tel: +86-0871-65920353; Fax: +86-0871-3801114

E-mail address: shansy411@163.com; jiaqm411@163.com.

Abstract: Urchinlike SnS/SnS₂ p-n heterogeneous composite photocatalysts were successfully synthesized by a one-step solvothermal method. The samples are characterized by XRD, XPS, SEM, TEM, BET and DRS. SnS/SnS₂ (Sn/S=39.87:60.13) heterostructure exhibited the higher photocatalytic activity, the removal efficiency of MO was 83.25% in illuminate 60 min, and degradation reaction was calculated by adopting the pseudo-first-order reaction kinetics, the k value was $3.351 \times 10^{-2} \text{ min}^{-1}$ which was higher than pure SnS and pure SnS₂ under visible light irradiation. The mechanism of enhanced photocatalytic activity has been discussed through scavenger experiments. In addition, the main active species for degradation of methyl orange (MO) were investigated using electron spin resonance (ESR) measurement and the possible degradation pathway of MO was also presented.

Keywords: SnS/SnS₂; Urchinlike; Heterogeneous composites; Photocatalysts; Mechanism.

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