In situ synthesis of AgI/SnS₂ heterojunction photocatalysts with superior photocatalytic activity

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In present study, novel visible-light-driven photocatalyst AgI/SnS₂ heterojunctions were prepared with hydrothermal-precipitation method. The resulting AgI/SnS₂ heterojunctions exhibited superior and stable visible photocatalytic activity on Rhodamine B (RhB) removal. The optimal heterojunction with 4:1 mass ratio of AgI: SnS₂ exhibited the highest rate constant of 0.064 min⁻¹ for removal of RhB, which was about 2.1 and 3.4 times as much as pure AgI and SnS₂, respectively. In addition, the study by photoluminescence spectroscopy (PL) indicated that the improvement of the photocatalytic efficiency could be mainly owing to the truth that the photogenerated carriers were separated and transferred effectively, resulted from the appropriate band gap match of AgI and SnS₂. In addition, it was found that •O₂⁻ radicals and h⁺ were the main oxidative species responsible for removal of RhB. These features demonstrate that AgI/SnS₂ heterojunction has great application potentials for pollutants removal from wastewater.

Keyword: SnS₂ nanosheets; AgI nanoparticles; Heterojunctions; Photocatalysis

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