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Synthesis of Zinc Ferrite/Silver Iodide Composite with Enhanced Photocatalytic Antibacterial and Pollutant Degradation Ability

Yuanguo Xu^{*a}, Qingqing Liu^a, Meng Xie^a, Shuquan Huang,^a Minqiang He,^a Liying Huang^a, Hui Xu^b, Huaming Li^{*b}

^a School of Chemistry and Chemical Engineering, School of Pharmacy, Jiangsu University, Zhenjiang 212013, PR China.

^b Institute for Energy Research, Jiangsu University, Zhenjiang 212013, PR China.

*E-mail: xuyg@ujs.edu.cn; lhm@ujs.edu.cn

Abstract

ZnFe₂O₄/AgI composites were first prepared successfully with a hydrothermal method, and ZnFe₂O₄ nanoparticles were uniformly decorated on the surface of AgI particles. The photocatalytic activities of the obtained ZnFe₂O₄/AgI composites were investigated by the degradation of organic pollutants and the inactivation of bacteria under visible light irradiation. The results showed that the introduction of ZnFe₂O₄ greatly enhanced the light harvesting ability and improved the separation efficiency of the photogenerated charge carriers, which contributed to the enhanced generation of reactive species and thus promoted the photocatalytic performance. The 5% ZnFe₂O₄/AgI composite exhibited the optimal photocatalytic disinfection of *E. coli* (100% removal efficiency in 80 min) as well as the photocatalytic degradation of rhodamine B (RhB) (98.5% removal rate in 40 min). Furthermore, four consecutive cycles also demonstrated the stable photocatalytic activity of the as-prepared ZnFe₂O₄/AgI composites. In addition, H₂O₂ was identified as the predominant active species in the photocatalytic inactivation of bacteria. This study indicated that

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