BIO-INSPIRED SYNTHESIS AND CHARACTERIZATION OF CEO₂/Bi₂WO₆ PHOTOCATALYST AND ITS APPLICATION IN DEGRADING ORGANIC POLLUTANT

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The two dimensional photocatalysts have the advantages of distinctive physical and chemical properties, such as high surface area, enriched catalytic sites and better electron or charge mobility compared with their counterparts. The Bi₂WO₆ nanosheet can be a suitable photocatalyst for degrading organic pollutants. However, its band gap is about 3.1 eV that limits possible large-scale application. Here, we report a kapok fiber-derived CeO₂/Bi₂WO₆ heterostructure as an effective photocatalyst for the degradation of the organic Congo Red (CR) dye under visible light. The as-synthesized catalyst has a fibrous morphology and consists of CeO₂ nanoparticles and Bi₂WO₆ nanosheets. The optimized CeO₂/Bi₂WO₆ heterostructure exhibits a reaction rate constant of 0.278 min⁻¹, which is much higher than that of the individual CeO₂ and Bi₂WO₆ products. This hybrid photocatalyst has a unique hierarchicallyporous morphology and a suitable band gap, leading to its exceptional synergetic adsorption-photocatalytic activities under visible light irradiation in the degradation of the CR.

Keywords: Photocatalyst, Degradation, Organic pollutants

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