

## Photocatalytic properties of bismuth oxyiodide nanomaterials with different morphologies

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### ABSTRACT

The morphology of bismuth oxyiodide (BiOI) was regulated by co-precipitation method by changing the solvent dosage and pH value. X-ray diffraction, scanning electron microscopy, surface area and pore structure analyzer, high-resolution transmission electron microscopy, UV-Vis diffuse reflection spectrum (UV-Vis DRS) were used to characterize the phase structure, morphology, specific surface area and pore structure, microstructure, optical properties and band structure of the samples. In addition, the effects of morphology and amount of photocatalyst on the photocatalytic performance of BiOI were evaluated by degradation of Rhodamine B (RhB). The experimental results demonstrated that the morphology of BiOI nanopowders (flower-like, microspherical and layered) can be adjusted by changing the solvent dosage and pH value. The flower-like BiOI prepared by this method maintains a single-phase tetragonal structure with a small crystallite size and good crystallization. Flower-like structure BiOI exhibits excellent visible light absorption ability and the narrowest bandgap. Microspherical BiOI displays the best photocatalytic activity for RhB degradation. In addition,  $\cdot\text{OH}$ ,  $\cdot\text{O}_2^-$  and  $\text{h}^+$  all played a certain role in the photocatalytic degradation process. And the possible photocatalytic activity mechanism was also proposed.

*Keywords:* Bismuth oxyiodide; Morphology; Microstructure; Photocatalytic activity

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