

Facile Fabrication Of Mesoporous Biocl/Bi₂O₃/(Bio)₂CO₃ Ternary Flower-Like Heterostructured Microspheres With Enhanced Visible-Light-Driven Photoactivity

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Extended Abstract

A novel anion exchange method followed by a simple solid-state reaction process has been developed for controllable synthesis of mesoporous BiOCl/Bi₂O₃/(BiO)₂CO₃ ternary flower-like heterostructured microspheres (HMSs) using uniform BiOCl microspheres as templates. Firstly, the transformation of BiOCl microspheres into BiOCl/(BiO)₂CO₃ binary HMSs was achieved through a facile in-situ anion exchange reaction in the presence of Na₂CO₃ aqueous solution at 800C for 8h. Secondly, the mesoporous BiOCl/Bi₂O₃/(BiO)₂CO₃ ternary HMSs were obtained by thermal decomposition of the BiOCl/(BiO)₂CO₃ composites at 400°C for 4 h in air. Importantly, the Bi₂O₃ and (BiO)₂CO₃ contents in the ternary system can be conveniently tuned by varying the Na₂CO₃ concentration in the anion exchange reaction process. Benefiting from the unique structural features, the as-obtained mesoporous BiOCl/Bi₂O₃/(BiO)₂CO₃ ternary flower-like HMSs exhibit the remarkably enhanced photocatalytic activity for the degradation of organic pollute under visible-light irradiation compared with binary BiOCl/(BiO)₂CO₃, Bi₂O₃/(BiO)₂CO₃, and the mechanical mixture of BiOCl, Bi₂O₃, and (BiO)₂CO₃ (BBB-mixture) composites.