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Enhanced Visible Light Photocatalytic Activity of Copper-doped Titanium Oxide–Zinc Oxide Heterojunction for Methyl Orange Degradation

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Highlights

- The novel Cu-Ti₂O₃/ZnO heterojunction nanocomposite were synthesized for the first time via a two-step process.
- The Cu-Ti₂O₃/ZnO heterostructures exhibited an enhanced visible-light-driven photocatalytic activity for MO degradation.
- The heterostructure could be recycled during the degradation of MO in a three-cycle experiment with good stability.

Abstract

A novel Cu-doped TiO₂ coupled with ZnO nanoparticles (Cu-TiO₂/ZnO) was prepared by sol-gel method and subsequent precipitation for methyl orange (MO) photodegradation under visible light irradiation. The compositions and shapes of the as-prepared Cu-TiO₂/ZnO nanocomposites were characterized by photoluminescence spectroscopy, X-ray diffraction, X-ray photoelectron spectroscopy, field emission scanning electron microscopy, transmission electron microscopy, UV–vis diffuse reflectance spectra and Brunauer–Emmett–Teller adsorption isotherm techniques. The Cu-TiO₂/ZnO nanocomposites showed considerably higher photocatalytic

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