

Bi/ α -Bi₂O₃/TiO₂ nanotubes arrays heterojunction for highly efficient photocatalytic applications

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Abstract

α -Bi₂O₃/TiO₂ nanotube arrays (α -Bi₂O₃/TiNT) and Bi/ α -Bi₂O₃/TiNT photocatalysts have been successfully fabricated by anodization combined with electrodeposition methods. UV–Vis diffuse reflectance spectroscopy revealed that the combined consequence of both Bi and α -Bi₂O₃ in the as-synthesized ternary composite considerably enhanced optical properties with significant red shift. This activity is attributed to the more efficient charge separation/transportation and the presence of Bi with strong plasmon resonance (SPR) effect. Moreover, the photocatalytic (PC) performances of the prepared samples were examined by the photocatalytic oxidation of methylene bleu (MB) under visible light irradiation. The Bi/ α -Bi₂O₃/TiNT photocatalyst showed higher photocatalytic activity than that of α -Bi₂O₃/TiNT and TiNT.

Key words: Bi/ α -Bi₂O₃/TiNT heterostructure, surface plasmon resonance, photocatalytic degradation.