PS9

PHOTOCATALYTIC DEGRADATION OF TETRACYCLINE USING AERO-TiO_2

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Numerous nanomaterials have been investigated for the photocatalytic breakdown of antibiotics. These include graphene-based materials [1], metal oxides [2], or modified semiconductor materials including doping or functionalization mechanisms [3]. Amongst a range of nanomaterials, TiO_2 has garnered considerable interest due to its remarkable photocatalytic characteristics, facilitating the breakdown of organic contaminants when exposed to UV or visible light [4,5]. In this work, a novel nanomaterial composed of TiO_2 hollow microtetrapods with a wall thickness of only 50 nm, with $ZnTi_3O_8$ intrusions is fabricated by Atomic Layer Deposition technique [6] and its photocatalytic performance is investigated by degradation of tetracycline under visible or UV light irradiation. The Raman and XRD study showed the presence

of rutile phase TiO_2 according to the observed Raman active vibrations and reflections detected in the XRD spectrum. The material's optical bandgap was found to be 3.12 eV according to the Tauc plot determined from the diffuse reflectance spectrum. The photocatalytic performance showed a degradation rate of tetracycline of 0.0064 min^{-1} and 0.0119 min^{-1} by irradiation with visible or UV light, respectively.

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