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材料工程专栏

Preparation and Characterization of Three-dimensional Photocatalyst-TiO2 Particulate Film Immobilized on Activated Carbon Fibers

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摘要 A novel three-dimensional photocatalyst, TiO2 particulate film immobilized on activated carbon fibers (TiO2/ACFs), was prepared by liquid phase deposition. The photocatalyst was characterized by SEM, XRD, BET surface area and photodegradation of methylene blue solution. TiO2 particulate film, with a thickness of nearly 200 nm and grain sizes of 30~50 nm, was deposited on almost each carbon fiber. The inner space between adjacent fibers remained as unmodified ACFs, therefore, both UV illumination and polluted solutions were allowed to pass through the felt-form photocatalyst to form a three-dimensional environment for photocatalytic reactions. With BET surface areas of 400~600 m2/g, the TiO2/ACFs exhibited an enhanced adsorption of pollutants for photocatalysis. Comparative degradations indicated that photocatalytic activity of the TiO2/ACFs was slightly higher than that of Degussa P-25 TiO2. Two special properties, the three-dimensional structure and combined effects of ACFs' adsorption and titania's photodegradation, made contribution to high photocatalytic activity. Additionally, the TiO2/ACFs exhibited high stability and potentially application for practical usage.

关键词 liquid phase deposition,TiO2 particulate film,activated carbon fibers,three-dimensional structure,photocatalytic activity

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