

Rare Earth Oxide-Treated Fullerene and Titania Composites with Enhanced Photocatalytic Activity for the Degradation of Methylene Blue

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摘要 Rare earth oxide-treated fullerene and titania composites (Y-fullerene/TiO₂) were prepared by the sol-gel method. The products had interesting surface compositions. X-ray diffraction patterns of the composites showed that the Y-fullerene/TiO₂ composites contained a single and clear anatase phase. The surface properties were observed by scanning electron microscopy, which gave a characterization of the texture on the Y-fullerene/TiO₂ composites and showed a homogenous distribution of titanium particles. The energy-dispersive X-ray spectra showed the presence of C and Ti with strong Y peaks. The composite obtained was also characterized with transmission electron microscopy and UV-Vis spectroscopy. The photocatalytic results showed that the Y-fullerene/TiO₂ composites had excellent activity for the degradation of methylene blue under visible light irradiation. This was attributed to both the effects on the photocatalysis of the supported TiO₂ by charge transfer by the fullerene, and the introduction of yttrium to enhance photo-generated electron transfer.

关键词: fullerene yttrium titania visible light methylene blue

Abstract: Rare earth oxide-treated fullerene and titania composites (Y-fullerene/TiO₂) were prepared by the sol-gel method. The products had interesting surface compositions. X-ray diffraction patterns of the composites showed that the Y-fullerene/TiO₂ composites contained a single and clear anatase phase. The surface properties were observed by scanning electron microscopy, which gave a characterization of the texture on the Y-fullerene/TiO₂ composites and showed a homogenous distribution of titanium particles. The energy-dispersive X-ray spectra showed the presence of C and Ti with strong Y peaks. The composite obtained was also characterized with transmission electron microscopy and UV-Vis spectroscopy. The photocatalytic results showed that the Y-fullerene/TiO₂ composites had excellent activity for the degradation of methylene blue under visible light irradiation. This was attributed to both the effects on the photocatalysis of the supported TiO₂ by charge transfer by the fullerene, and the introduction of yttrium to enhance photo-generated electron transfer.

Keywords: fullerene, yttrium, titania, visible light, methylene blue

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