Co-modified Commercial P25 TiO₂ by Fe Doping and g-C₃N₄ Coating as High Performance Photocatalyst under visible light irradiation

Yao Fang¹, Yongkui Huang¹, ZhiJiang Ni¹, ZhiLei Wang¹, Shifei Kang^{2,*}, Yangang Wang^{2,*}, Xi Li^{1,*}

¹Department of Environmental Science and Engineering, Fudan University, Shanghai 200433, China

²School of Environment and Architecture, University of Shanghai for Science and Technology, Shanghai 200093, China

*E-mail: xi_li@fudan.edu.cn, sfkang@usst.edu.cn

doi: 10.20964/2017.07.77

Received: 27 April 2017 / Accepted: 24 May 2017 / Published: 12 June 2017

The g-C₃N₄-coated and Fe-doped TiO₂ visible-light-driven photocatalysts were synthesized by a simple mixing method combined with calcination process, in which the commercial Degussa P25 TiO₂ was used as a titanium source. The new photocatalysts were investigated by X-ray diffraction, transmission electron microscopy, X-ray photoelectron spectroscopy, ultraviolet-visible diffuse reflection spectroscopy, scanning electron microscopy, and Fourier transform infrared spectroscopy. The co-presence of uniform g-C₃N₄ coating layers and doped metal ions was proved and the visible light absorption was significantly enhanced after modification. The photocatalytic efficiency and stability of the new photocatalysts in degradation of dyes and Cr(VI) under visible-light irradiation were remarkably enhanced, and were mainly dependent on the ratio of g-C₃N₄ and metal ions. Based on the electrochemical impedance spectroscopy results, we believe the interfacial effect between g-C₃N₄ and TiO₂ and the doping Fe ions in the heterojunction could improve the separation and transfer of photo-induced charge carriers and thereby enhanced the photocatalytic performance.

Keywords: TiO₂; g-C₃N₄; Fe-doping; heterojunction; photocatalyst

[FULL TEXT](#)

© 2017 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).