Short Communication

Hydrogen Peroxide Activated Commercial P25 TiO₂ as Efficient Visible-light-driven Photocatalyst on Dye Degradation

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The extension of the photoactive wavelength region of TiO₂ photocatalysts into the visible region is desirable for popularizing TiO₂ photocatalysts into practice. Among all the strategies to modifying TiO₂, the presence of hydrogen peroxide (H₂O₂) was report to be able to induce visible-light activity for bare TiO₂. However, the activation mechanism of this cheap and convenient proposal for the photocatalytic activity improving of TiO₂ was still not completely understood. In this work, commercial available P25 TiO₂ was used to verify the sensitization effect of H₂O₂ surface modification. Remarkably, the RhB photocatalytic degradation over P25 TiO₂+H₂O₂ sample is efficient and nearly 60% of the dye is completely removed after 210 min under visible light irradiation, which indicates the excellent photocatalytic performance of hydrogen peroxide treated P25 TiO₂. Electrochemical impedance spectroscopy (EIS) was employed to determine the electrical conductivity and photogenerated charge separation character of P25 TiO₂ with or without H₂O₂ surface modification. Our results clearly support the commercial application of H₂O₂ activated P25 TiO₂ as efficient visible-light-driven photocatalyst.

Keywords: TiO₂, H₂O₂, Visible-light-driven Photocatalyst, Surface modification, Electrochemical impedance spectroscopy

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