

Effects of nitridation treatment on the visible light photocatalytic activity of TiO_2 and Pt-TiO_2

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We have investigated the effects of nitridation treatment of TiO_2 and Pt-TiO_2 for the visible light photocatalytic degradations of 4-CP and DCA degradation. Nitridation treatment changed the physicochemical properties of TiO_2 and Pt-TiO_2 . The primary particle size of nitrided samples, $n\text{-TiO}_2$ and $n\text{-Pt-TiO}_2$, was slightly smaller than that of untreated samples. Surface area was increased more than two times after nitridation treatment. Thermal phase transformation (anatase to rutile) was retarded by the nitridation treatment. The visible light absorption of $n\text{-Pt-TiO}_2$ was more extended than that of Pt-TiO_2 and Pt(II)/Pt(IV) ratio in $n\text{-Pt-TiO}_2$ was lower than that in Pt-TiO_2 . Enhanced photocatalytic activities of nitrided samples were observed for 4-CP degradation under UV and visible irradiation. However, the enhancement effect of nitridation treatment was not observed under visible irradiation for DCA degradation. Photocatalytic activity was restrictively enhanced and significantly affected by the kind of substrates.