

Photocatalytic effect of nitrogen-doped mesoporous TiO₂ under visible light

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Heterogeneous photocatalysts have been researched in order to purify air and water. Titanium dioxide (TiO₂) is a well-known photocatalyst with high photocatalytic activity, high chemical stability and low toxicity. However, TiO₂ could be utilized as a catalyst under ultraviolet irradiation only. the utilization of visible light for photocatalysis has attracted increasing attention. For using visible light, a new visible light active material was needed. There are several methods for this such as doping method, using other metal oxides, and synthesis of mixed metal oxides. In this study, nitrogen atom was doped into TiO₂ and for the sake of high surface area, mesoporosity also was introduced. The photocatalytic activity is evaluated with methylene blue under visible light and UV light for comparing. N-doped mesoporous TiO₂ has higher photocatalytic activities than TiO₂ under visible light. The characterization of the catalysts was done by X-ray diffraction (XRD), N₂-sorption isotherm, UV-Vis spectrometer, Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), Energy-dispersive X-ray Spectroscopy (EDS), and Diffuse Reflectance UV-Visible Spectra (DRS).