

Fe-based mesoporous Metal Oxide Composite for Photocatalysis

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Nowadays, photocatalysis has come about as an alternative technique to decontaminate wastewaters due to the decrease in the quality of drinking water available. Titanium dioxide (TiO_2) is a well-known photocatalyst that has high photocatalytic activity, high stability and low toxicity. However, TiO_2 alone can only photodegrade organics under ultraviolet (UV) light, but less visible (Vis) light. Due to the small portion of UV light in sunlight, the utilization of Vis light for photocatalysis has lots of attention, so Tin, zirconium, iron etc. have been used.

In this study, Fe-based mesoporous metal oxide composites were synthesized, which has photocatalytic activity under Vis light, by using highly ordered mesoporous silica, KIT-6, as a hard-template method. The photocatalytic activity was measured with methylene blue and Rhodamine B under Vis light and UV light, and Fe-based mesoporous metal oxide composites have higher photocatalytic activities than TiO_2 under Vis light. The catalysts were characterized by X-ray diffraction (XRD), N_2 -sorption, UV-Vis spectrometer, Electron Microscopy, Energy-dispersive X-ray Spectroscopy (EDX), and Diffuse Reflectance UV-Visible Spectra (DRS).