

Enhanced photocatalytic activity of fish scale loaded TiO₂ composites under solar light irradiation

Abstract

Fish scale (FS) loaded TiO₂ composites were investigated as photocatalysts in degradation of Methyl Orange under solar light irradiation. Composites were prepared through sol-gel method by varying mass ratio of TiO₂/FS at 90:10, 70:30 and 50:50, respectively. The catalysts prepared in this study were characterized by using XRD, SEM, FT-IR and nitrogen sorption. The effects of solar irradiation, mass ratio of TiO₂/FS composites, irradiation time and catalyst loadings were studied. Synergistic effect was found in TiO₂/FS of 90:10 composite which performed higher photocatalytic degradation than synthesized TiO₂ under solar light irradiation. However, further increasing fish scale content in the composites reduced the photocatalytic activity drastically. Under solar light irradiation, all the catalysts in this study exhibited photocatalytic activity, except TiO₂/FS of 50:50 composite that only acted as a weak biosorbent without performing any photocatalytic property. Photocatalytic degradation increased with increasing catalyst loading and irradiation time but decreased with increased of initial dye concentration.