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Fe Doped Titania Photocatalyst for Degradation of Methyl Orange

Devagi Kanakaraju[a*], Muhamad Hazim bin Ya[a], Muhamad Akif Aizuddin bin Jasni[a], Mohammad Sufian bin Endra[a], Ying-Chin Lim[b]

aFaculty Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia
b School of Chemistry and Environment, Faculty of Applied Sciences, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

Abstract

Surface modification of titanium dioxide (TiO_2) by doping method is one of the ways to lower TiO_2 band gap and thus increasing its absorption to the visible region. This study was conducted to demonstrate a feasible modification of TiO_2 by using iron (Fe) metal as the doping agent. Fe-doped TiO_2 photocatalyst with the ratio of 1:1 was prepared by using the wet-impregnation method. The prepared photocatalyst was applied for the degradation of methyl orange (MO) under ultraviolet (UV) and visible light irradiation. A 0.20 g/L of Fe-doped TiO_2 efficiently degraded 82.8% and 74.4% of 5 ppm MO under UV light and visible light irradiation, respectively. MO removal up to 85% was attained using bare TiO_2 in the presence of UV compared to only 11% under visible light. The UV-Vis Diffuse Reflectance spectroscopy confirmed the reduction of TiO_2 band gap upon Fe doping.

* Corresponding author. Tel.: +6082 583023 .
  E-mail address: kdevagi@unimas.my