

Preparation of Titania Doped Argentum Photocatalyst and Its Photoactivity Towards Palm Oil Mill Effluent Degradation

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ABSTRACT

This paper reports on the photocatalytic degradation of pre-treated palm oil mill effluent (POME) over titania loaded with photocatalyst. The argentum loading on the titania was varied from 0.25 to 1.0 wt% via wet-impregnation technique. X-ray diffraction characterization of all the photocatalysts showed that the photo-active rutile phase was still intact after the photocatalyst synthesis. In addition, the UV–Vis diffuse reflectance measurements indicate an improved visible light energy absorption and that the band gap energy was significantly reduced (averaging 2.50 eV) when titania was loaded with argentum, compared to the pristine titania that recorded a reading of 3.20 eV. The 0.50 wt% argentum/titania photocatalyst offered the most effective degradation of pre-treated POME under the irradiation of 100 W of UV light (25.0%) and also visible light (16.0%), respectively, over a loading of 0.2 g/L. Significantly, the maximum photocatalyst loading determined from the current work was 1.0 g/L.

KEYWORDS: Argentum; Photocatalysis; Silver; POME; Titania; Wastewater

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