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Author: A. Hamdi S. Boufi S. Bouattour

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Phthalocyanine/Chitosan-TiO₂ photocatalysts: characterization and photocatalytic activity

A. Hamdi¹, S. Boufi², S. Bouattour^{1*}.

¹ LCI, Faculté des Sciences de Sfax, Université de Sfax, BP 802-3018, Tunisia

² LMSE, Faculté des sciences de Sfax, Université de Sfax BP 802-3018 Sfax, Tunisia

Abstract

Chitosan (CS) was used as a template to prepare a hybrid chitosan-phthalocyanine-TiO₂ (PC/CS-TiO₂) photocatalyst at room temperature without any calcination treatment. The as-prepared hybrid photocatalyst (PC/CS-TiO₂) was characterized using X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR) and UV-vis diffuse reflectance spectroscopy (DRS). The results of the photodegradation of aniline, used as a model pollutant, revealed that the hybrid photocatalyst (PC/CS-TiO₂) exhibited a photocatalytic activity under visible-light irradiation. The enhanced activity of the hybrid catalyst is attributed to the cooperative role of the three components of the photocatalyst; chitosan as a template to immobilize crystalline TiO₂ nanoparticles, phthalocyanine the light absorption to the visible range and TiO₂ as an acceptor of electrons generated by the photons absorption to produce superoxide radicals.

Keywords: Sol-Gel processes; Raman and IR Spectroscopy; chitosan-TiO₂

• Corresponding author. Tel.: +216 98660535; fax: +216 74274437.
E-mail address: soraaboufi@yahoo.com (S. Bouattour).

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