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## Novel Pd/TiO<sub>2</sub> nanocomposite prepared by modified sol-gel method for photocatalytic degradation of methylene blue dye under visible light irradiation

By: [Abdelaal, MY](#) (Abdelaal, M. Y.)<sup>[1,2]</sup>; [Mohamed, RM](#) (Mohamed, R. M.)<sup>[1,3]</sup>

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### Abstract

TiO<sub>2</sub> nanoparticles were prepared using the modified sol-gel method. TiO<sub>2</sub> impregnated with Pd and/or chitosan (CS) was prepared using the impregnation method. The Pd/TiO<sub>2</sub> composite photocatalyst was characterized by XRD, TEM, UV-Vis, PI, and BET. A methylene blue dye (MB) was used as a model pollutant to study the photocatalytic activity of TiO<sub>2</sub> under visible light irradiation. The influence of the type and amount of catalyst as well as the initial concentration of MB was investigated. The results indicate that CS can effectively prevent the agglomeration of TiO<sub>2</sub> nanoparticles. UV-Vis spectra demonstrated that the composite's ability to absorb visible light is greatly improved. The photocatalytic degradation of MB was found to follow first-order kinetics. Recycling experiments confirmed the relative stability of the catalyst. (C) 2013 Elsevier B.V. All rights reserved.

### Keywords

**Author Keywords:** Chitosan; Nano-TiO<sub>2</sub>; Pd impregnation; Visible photocatalyst; MB dye

**KeyWords Plus:** NANOCRYSTALLINE TiO<sub>2</sub>; TITANIUM-DIOXIDE; CONGO-RED; AZO-DYE; NANOPARTICLES; CHITOSAN; UV; OXIDE; PHOTODEGRADATION; DECOLORIZATION

### Author Information

**Reprint Address:** Abdelaal, MY (reprint author)

King Abdulaziz Univ, Dept Chem, Fac Sci, POB 80203, Jeddah 21589, Saudi Arabia.

#### Organization-Enhanced Name(s)

King Abdulaziz University

#### Addresses:

[ 1 ] King Abdulaziz Univ, Dept Chem, Fac Sci, Jeddah 21589, Saudi Arabia

#### Organization-Enhanced Name(s)

King Abdulaziz University

[ 2 ] Mansoura Univ, Dept Chem, Fac Sci, ET-35516 Mansoura, Egypt

[ 3 ] Cent Met R&D Inst, Adv Mat Dept, Cairo 11421, Egypt

**E-mail Addresses:** [myabdelaal@gmail.com](mailto:myabdelaal@gmail.com)

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