Enhanced Photocatalytic Activity of ZrO2-SiO2 Nanoparticles by Platinum Doping

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INTERNATIONAL JOURNAL OF PHOTOENERGY
Article Number: 812097
DOI: 10.1155/2013/812097
Published: 2013
View Journal Impact

Abstract

ZrO2-SiO2 mixed oxides were prepared via the sol-gel method. Photo-assisted deposition was utilized for doping the prepared mixed oxide with 0.1, 0.2, 0.3, and 0.4 wt% of Pt. XRD spectra showed that doping did not result in the incorporation of Pt within the crystal structure of the material. UV-reflectance spectrometry showed that the band gap of ZrO2-SiO2 decreased from 3.04 eV to 2.48 eV with 0.4 wt% Pt doping. The results show a specific surface area increase of 20%. Enhanced photocatalysis of Pt/ZrO2-SiO2 was successfully tested on photo degradation of cyanide under illumination of visible light. 100% conversion was achieved within 20 min with 0.3 wt% of Pt doped ZrO2-SiO2.

Keywords

KeyWords Plus: TITANIUM-DIOXIDE; VISIBLE-LIGHT; BAND-GAP; TIO2; CATALYSTS; DEGRADATION; OXIDES; FILMS; ZRO2

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Publisher

HINDAWI PUBLISHING CORPORATION, 410 PARK AVENUE, 15TH FLOOR, #287 PMB, NEW YORK, NY 10022 USA

Categories / Classification

Research Areas: Chemistry; Energy & Fuels; Optics; Physics

Web of Science Categories: Chemistry, Physical; Energy & Fuels; Optics; Physics, Atomic, Molecular & Chemical

Document Information

Document Type: Article

Language: English

Accession Number: WOS:000315971700001

ISSN: 1110-662X

Journal Information

Table of Contents: Current Contents Connect

Impact Factor: Journal Citation Reports

Other Information

IDS Number: 104DY

Cited References in Web of Science Core Collection: 24

Times Cited in Web of Science Core Collection: 2