Photocatalytic remediation of atrazine under visible light radiation using Pd-Gd2O3 nanospheres

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JOURNAL OF ALLOYS AND COMPOUNDS
Volume: 682 Pages: 766-772
DOI: 10.1016/j.jallcom.2016.05.015
Published: OCT 15 2016
View Journal Impact

Abstract

A hydrothermal method was used to prepare gadolinium oxide nanospheres. A photo-assisted deposition method was used to dope palladium onto the surface of a gadolinium oxide nanosphere. Gadolinium oxide and palladium-doped gadolinium oxide nanospheres were characterized by different techniques such as BET surface area, photoluminescence spectra, transmission electron microscopy, UV-Vis diffuse reflectance spectra and X-ray diffraction. The results reveal that the nanosphere is the shape of gadolinium oxide, and dots that appear on the surface of gadolinium oxide are referred to as doped palladium on the surface of gadolinium oxide. Doping of palladium on the surface of a gadolinium oxide nanosphere changes the electronic and optical properties of the gadolinium oxide nanosphere. The photocatalytic remediation of atrazine under visible light radiation using Pd-Gd2O3 nanospheres is more efficiency than the photocatalytic remediation using Gd2O3 nanospheres. The weight percent of doped palladium on the surface of the gadolinium oxide nanosphere determines the photocatalytic activity of the gadolinium oxide nanosphere, and the best photocatalytic activity for degradation of atrazine is achieved using a 0.6 wt% Pd-Gd2O3 nanosphere. Additionally, the photocatalytic activity of the 0.6 wt% Pd-Gd2O3 nanosphere remains unchanged after five uses. (C) 2016 Elsevier B.V. All rights reserved.

Keywords

Author Keywords: Gadolinium oxide; Nanosphere; Palladium doping; Atrazine removal

KeyWords Plus: AQUEOUS-SOLUTIONS; WASTE-WATER; TIO2; DEGRADATION; PESTICIDES; PHOTODEGRADATION; REMOVAL; NANOPARTICLES; DIOXIDE; BLUE

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Funding

Funding Agency	Grant Number
Deanship of Scientific Research (DSR), King Abdulaziz University, Jeddah	988-130-D1435

Citation Network

DSR	

View funding text

Publisher

ELSEVIER SCIENCE SA, PO BOX 564, 1001 LAUSANNE, SWITZERLAND

Categories / Classification

Research Areas: Chemistry; Materials Science; Metallurgy & Metallurgical Engineering

Web of Science Categories: Chemistry, Physical; Materials Science, Multidisciplinary; Metallurgy & Metallurgical Engineering

Document Information

Document Type: Article

Language: English

Accession Number: WOS:000378833400099

ISSN: 0925-8388

eISSN: 1873-4669

Other Information

IDS Number: DP9RB

Cited References in Web of Science Core Collection: 31

Times Cited in Web of Science Core Collection: 1