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Enhancement of photocatalytic properties of Ga₂O₃-SiO₂ nanoparticles by Pt deposition

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CHINESE JOURNAL OF CATALYSIS

Volume: 34 Issue: 6 Pages: 1167-1172

DOI: 10.1016/S1872-2067(12)60570-1

Published: JUN 2013

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Abstract

Ga₂O₃-SiO₂ nanoparticles were prepared by a sol-gel method and Pt was then immobilized on their surface via photo-assisted deposition (PAD). The produced samples were characterized using X-ray diffraction (XRD), ultraviolet and visible spectroscopy, photoluminescence emission spectroscopy, and surface area measurements. The catalytic performances of the Ga₂O₃-SiO₂ and Pt/ Ga₂O₃-SiO₂ samples were evaluated for the degradation of cyanide using visible light. XRD and EDX results showed that the Pt was well dispersed within the Ga₂O₃-SiO₂ phase and was detected on the surface of the catalyst, which confirmed the successful loading of Pt ions by the PAD method. BET results revealed that the surface area of Ga₂O₃-SiO₂ was higher than that of Pt/Ga₂O₃-SiO₂. 0.3 wt% Pt/Ga₂O₃-SiO₂ exhibited the highest photocatalytic activity for degradation of cyanide under visible light. The catalyst could be reused with no loss in activity for the first 10 cycles. (c) 2013, Dalian Institute of Chemical Physics, Chinese Academy of Sciences. Published by Elsevier B.V. All rights reserved.

Keywords

Author Keywords: Gallic oxide; Silica; Visible light; Cyanide removal

KeyWords Plus: SEMICONDUCTOR PHOTOCATALYSIS; BETA-GA2O3; PERFORMANCE; FILMS

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Funding

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Funding Agency	Grant Number
Deanship of Scientific Research (DSR), King Abdulaziz University, Jeddah	247-002-D1433
DSR	

[View funding text](#)

Publisher

SCIENCE PRESS, 16 DONGHUANGCHENGGEN NORTH ST, BEIJING 100717, PEOPLES R CHINA

Categories / Classification

Research Areas: Chemistry; Engineering

Web of Science Categories: Chemistry, Applied; Chemistry, Physical; Engineering, Chemical

Document Information

Document Type: Article

Language: English

Accession Number: WOS:000320747400014

ISSN: 0253-9837

Journal Information

Table of Contents: [Current Contents Connect](#)

Impact Factor: [Journal Citation Reports](#)

Other Information

IDS Number: 168ZU

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