

Accepted Manuscript

Sonochemically generated Cerium doped ZnO nanorods for highly efficient photocatalytic dye degradation

Satish P. Meshram, Parag V. Adhyapak, Satish K. Pardeshi, Imtiaz S. Mulla, Dinesh P. Amalnerkar

PII: S0032-5910(17)30452-7
DOI: doi:[10.1016/j.powtec.2017.05.044](https://doi.org/10.1016/j.powtec.2017.05.044)
Reference: PTEC 12570

To appear in: *Powder Technology*

Received date: 15 December 2016
Revised date: 25 April 2017
Accepted date: 25 May 2017



Please cite this article as: Satish P. Meshram, Parag V. Adhyapak, Satish K. Pardeshi, Imtiaz S. Mulla, Dinesh P. Amalnerkar, Sonochemically generated Cerium doped ZnO nanorods for highly efficient photocatalytic dye degradation, *Powder Technology* (2017), doi:[10.1016/j.powtec.2017.05.044](https://doi.org/10.1016/j.powtec.2017.05.044)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Sonochemically generated Cerium doped ZnO nanorods for highly efficient photocatalytic dye degradation

Satish P. Meshram¹, Parag V. Adhyapak^{1*}, Satish K. Pardeshi², Imtiaz S. Mulla¹,
Dinesh P. Amalnerkar³

¹Centre for Materials for Electronics Technology, Panchawati, Pashan Road, Pune-411008, India

²Department of Chemistry, University of Pune, Pune -411007, India

³School of Mechanical Engineering, Sungkyunkwan University, Suwon- 16419, South Korea.

Abstract:

Herein, we report a facile succinate mediated sonochemical method for the synthesis of ZnO nanorod photocatalysts doped with cerium. The as-prepared samples were characterized by X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), diffuse reflectance UV-visible (UV-Vis DRS) spectroscopy, photoluminescence (PL) spectroscopy, Raman spectroscopy, Fourier transform infrared (FT-IR) spectroscopy, particle size distribution analysis and BET surface area analysis. The X-ray diffraction analysis revealed that as-synthesized nanostructures correspond to various planes of a single hexagonal ZnO phase. The pristine ZnO phase was retained up till 4 *at. %* Ce-doping, however, on further increase in Ce concentration (6 and 8 *at. %*) a separate cubic CeO₂ phase appears. The photocatalytic activity was evaluated by photodegradation of hazardous crystal violet (CV) dye under sunlight irradiation. Among the tested samples, the sample with optimal doping concentration of 4 *at. %* Ce exhibits highest photocatalytic activity and achieved 99% degradation of CV dye within 100 mins of sun-light irradiation. This photocatalytic activity was found to be 3-fold excess as compared to that of commercial ZnO at identical experimental conditions.

Keywords: Ce doped ZnO, nanorods, sonochemical, photoluminescence, Raman, photocatalysts

Corresponding Authors: Phone: +91-020-25899273, Fax: +91-020-25898180

Email: adhyapakp@yahoo.com, adhyapak@cmet.gov.in (Dr. P. V. Adhyapak)

Download English Version:

<https://daneshyari.com/en/article/4914911>

Download Persian Version:

<https://daneshyari.com/article/4914911>

[Daneshyari.com](https://daneshyari.com)