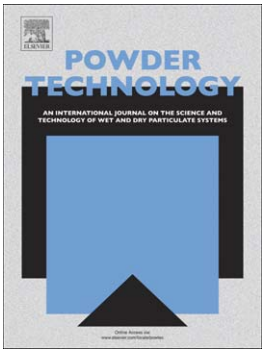

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Sonochemically generated Cerium doped ZnO nanorods for highly efficient photocatalytic dye degradation

Satish P. Meshram[1], Parag V. Adhyapak[1]*, Satish K. Pardeshi[2], Imtiaz S. Mulla[1], Dinesh P. Amalnerkar[3]

[1]Centre for Materials for Electronics Technology, Panchawati, Pashan Road, Pune-411008, India
[2]Department of Chemistry, University of Pune, Pune -411007, India
[3]School 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 CeO_2 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)