Title: Visible light driven photocatalytic degradation of ofloxacin and malachite green dye using cadmium sulphide nanoparticles

Authors: Manjot Kaur, Surinder K Mehta, Sushil Kumar Kansal

PII: S2213-3437(17)30142-2
DOI: http://dx.doi.org/doi:10.1016/j.jece.2017.04.006
Reference: JECE 1555

To appear in:

Received date: 28-1-2017
Revised date: 27-3-2017
Accepted date: 2-4-2017

Please cite this article as: Manjot Kaur, Surinder K Mehta, Sushil Kumar Kansal, Visible light driven photocatalytic degradation of ofloxacin and malachite green dye using cadmium sulphide nanoparticles, Journal of Environmental Chemical Engineeringhttp://dx.doi.org/10.1016/j.jece.2017.04.006

Visible light driven photocatalytic degradation of ofloxacin and malachite green dye using cadmium sulphide nanoparticles

Manjot Kaur[1], Surinder K Mehta[1], Sushil Kumar Kansal[2*]

[1]Department of Chemistry, Panjab University, Chandigarh, 160014, India

[2]Dr. S.S.B. University Institute of Chemical Engineering and Technology, Panjab University, Chandigarh, 160014, India

***Corresponding Author:**

S. K. Kansal:sushilkk1@yahoo.co.in; sushilkk1@pu.ac.in

Highlights

1. Facile synthesis of spherical CdS nanoparticles by hydrothermal method.

2. The obtained CdS nanoparticles exhibited high crystallinity and good optical properties.

3. Visible light active photocatalyst for the degradation of drug and dye.

Abstract

This work demonstrates an effective approach for the degradation of persistent and mutagenic water pollutants under visible light illumination. Cadmium sulphide (CdS) was synthesized using a facile hydrothermal approach and its structural, morphological and optical properties were evaluated by various techniques such as XRD, FTIR, UV-DRS, TGA/DSC, HRTEM and EDX. The XRD spectrum indicated that the synthesized CdS was a crystal mixture of cubic and hexagonal phases. HRTEM images displayed the formation of well crystalline CdS nanoparticles, grown in high density. Further, the synthesized CdS nanoparticles were effectively used as photocatalyst for the degradation of fluoroquinolone antibiotic (ofloxacin) and mutagenic water pollutant (malachite green) under visible light irradiation. Role of $^{\bullet}OH$ radicals in the photocatalytic process was confirmed by terephthalic acid photoluminescence (TA-PL) technique. Degradation efficiency of about 79.5% and 96% was obtained for ofloxacin and malachite green in the reaction time of 80 and 60 minutes, respectively. It was