Parisa Shadabipour et al., J Nanomed Nanotechnol 2015, 6:6
http://dx.doi.org/10.4172/2157-7439.C1.026

OMICS International
conferenceseries.com

5th International Conference on
Nanotek & Expo
November 16-18, 2015 San Antonio, USA

Chemometrics investigation of the light-free degradation of methyl green and malachite green by starch-coated CdSe quantum dots

Parisa Shadabipour and **Bahram Hemmateenejad**
Shiraz University, Iran

Decomposition of synthetic organic dyes induced by photogenerated carries in semiconductors is a highly evolved environmental enterprise. In the present study, starch-coated CdSe quantum dots (average particles size of about 3.1 nm) was synthesized and utilized as a photocatalyst for degradation of two triphenylmethane dyes, including Methyl Green (MG) and Malachite Green (MaG) in ambient condition. Very low quantities of photocatalyst found to be capable of significantly decolorizing large amount of MG (ratio of MG to photocatalyst 1000:1) within a few minutes in neutral pH. Increasing pH and amount of photocatalyst significantly boosted degradation kinetics. The calculated kinetic constants showed pseudo-first order kinetics for photocatalytic degradation of MG. As an alternative to sophisticated techniques such as HPLC-MS and GC-MS that has been commonly used to provide mechanistic studies for photocatalytic degradation process, we herein coupled simple UV/Vis spectroscopy with multivariate curve resolution-alternative least-squares (MCR-ALS) to present a new paradigm in employing MCR-ALS technique for studying reaction kinetics. The absorption spectrum of MG in the course of the degradation reaction was monitored in several pH. Five chemical factors (components) were detected using factor analysis (FA) and concentration profiles and pure spectra of detected components were resolved using MCR-ALS. The obtained results suggested three groups of species including two reactants, one intermediate and two products.

Biography

Parisa Shadabipour obtained her BS in Pure Chemistry from Isfahan University of Technology in 2009 and her MS in Analytical Chemistry from Shiraz University in 2012. Her research interests are chemometrics, nanotechnology and environmental chemistry. So far, she published two papers including modeling of organic reactions by spectrophotometric and chemometrics methods and light-free degradation of synthetic dyes by starch-coated CdSe quantum dots. Her proposal titled as “Application of magnetic nanoparticles and quantum dots in elimination of environmental pollutants and investigating the mechanism of the reactions by chemometrics methods” is supported by Iran National Science Foundation (INSF).

parisa.shadabi231@gmail.com

Notes: