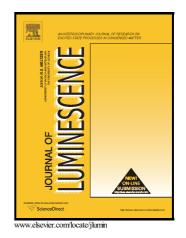
## Author's Accepted Manuscript

Green synthesis of ZnSe and core-shell ZnSe@ZnS nanocrystals (NCs) using a new, rapid and room temperature photochemical approach

M. Molaei, A.R. Bahador, M. Karimipour



 PII:
 S0022-2313(15)00266-5

 DOI:
 http://dx.doi.org/10.1016/j.jlumin.2015.05.019

 Reference:
 LUMIN13350

To appear in: Journal of Luminescence

Received date: 11 March 2015 Revised date: 10 May 2015 Accepted date: 12 May 2015

Cite this article as: M. Molaei, A.R. Bahador and M. Karimipour, Green synthesis of ZnSe and core-shell ZnSe@ZnS nanocrystals (NCs) using a new, rapid and room temperature photochemical approach, *Journal of Luminescence*, http://dx.doi.org/10.1016/j.jlumin.2015.05.019

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 galley proof before it is published in its final citable 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.

## Green synthesis of ZnSe and core-shell ZnSe@ZnS nanocrystals (NCs) using a new, rapid and room temperature photochemical approach

M. Molaei<sup>\*</sup>, A. R. Bahador and M. Karimipour

Department of Physics, Faculty of Science, Vali-e-Asr University, Rafsanjan, Iran

Corresponding author email: m.molaei@vru.ac.ir, Fax:+983431312429

## Abstract

In this work, ZnSe and core-shell ZnSe@ZnS nanocrystals (NCs) were synthesized using a one pot, rapid and room temperature photochemical method. UV illumination provided the required energy for the chemical reactions. Synthesized NCs were characterized using X-ray diffraction spectroscopy (XRD), transmission electron microscopy (TEM), UV-Vis and photoluminescence (PL) spectroscopy. XRD pattern indicated cubic zinc blende structure for ZnSe NCs and the TEM image indicated round-shaped particles, most of which had the diameter of about 3 nm. Band gap of ZnSe NCs was obtained as about 3.6 eV, which was decreased by increasing the illumination time. Synthesized NCs indicated intensive and narrow emission in the UV-blue area (370 nm) related to the excitonic recombination and a broad band emission with a peak located at about 490 nm originated from the DAP (donor-acceptor pairs) recombination. ZnS shell was grown on ZnSe cores using a reaction based on the photo sensitivity of Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>. For ZnSe@ZnS coreshell NCs, XRD diffraction peaks shifted to higher angles. TEM image indicated a shell around cores and most of the ZnSe@ZnS NCs have a diameter of about 5 nm. After the ZnS growth, ZnSe excitonic emission shifted to the longer wavelength and PL intensity was increased considerably. PL QY was obtained about 11% and 17% for ZnSe and ZnSe@ZnS core-shell QDs respectively.

Download English Version:

## https://daneshyari.com/en/article/5398725

Download Persian Version:

https://daneshyari.com/article/5398725

Daneshyari.com