11th International Conference
on Advanced Materials
Rio de Janeiro Brazil
September 20 - 25
ICAM2009

A New And Straightforward Synthesis Route To Prepare Cds Quantum Dots

W.M. de Azevedo*, A.C.V. de Araújo and F. D. Menezes

Laboratório de Química do Estado Sólido, Departamento de Química Fundamental,

Universidade Federal de Pernambuco, 50970-901, Recife, PE, Brazil, wma@ufpe.br

* Corresponding author.

Abstract – In this work highly stable and luminescent CdS quantum dots (QDots) with a narrow size distribution have been synthesized in ethylene glycol using a hydrothermal technique, In this case instead of conventional highly toxic sulfur source like H_2S, we have used elemental sulfur dissolved in organic solvent to carrier on the reaction. The spectroscopic analysis shown that monodispersed CdS QDots were synthesized and exhibited highly photoluminescence (PL) in the blue green spectral region when exited with 355 nm

The synthesis and properties of II–VI semiconductor quantum dots (QDots) have been extensively investigated, and several reviews and books on current progress in this field have been recently published. Due to the high potential of application of this semiconductor materials a wide range of synthetic routes have been developed in order to obtain more efficient quantum dots. These methodologies allow one to control the size, morphology, size distribution and nanoparticles stabilization. The major consequence of these efforts was the high number of quantum dots application in several research areas such as solar photovoltaics cells, nano bar codes in vivo biomedical detection fluorescent tags in biology and development of chemical and biological sensors. Among these methodologies, the most common route to prepare CdX QDots are the colloidal chemical route by rapid injection of pyrophoric organometallic reagents into hot coordinating solvents at high temperatures (180–350 ºC), However, the starting reagents used in these routes is extremely toxic, pyrophoric, explosive, and expensive. These drawbacks motivated several groups to use alternate route to overcome this problem. In this work luminescent CdS quantum dots (QDots) with a narrow size distribution have been synthesized in ethylene glycol using a hydrothermal technique, where instead to use conventional highly toxic sulfur source like H_2S, we have used elemental sulfur dissolved in organic solvent and added to the reaction hydrothermal apparatus. The UV-visible absorption spectra and the photoluminescence measurement shown that monodispersed CdS QDots were synthesized at 150◦C in the time period of 24 h, and exhibited highly photoluminescence (PL) in the blue green spectral region with a narrow spectral distribution when exited at 355nm as shown in figure 1. Also it was observed that the colloidal solution remained stable for several month and the fluorescence intensity do not decrease.

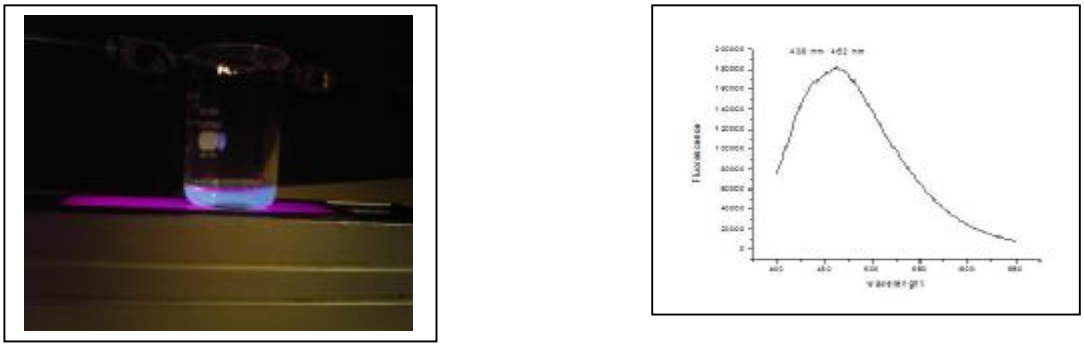

Figure 1: CdS Qdots luminescence excited with 355 nm

11th International Conference
on Advanced Materials

Rio de Janeiro Brazil
September 20 - 25