

Accepted Manuscript

Microfluidic synthesis of monodispersed CdSe quantum dots nanocrystals by using mixed fatty amines as ligands

Zhen-Hao Tian, Jian-Hong Xu, Yu-Jun Wang, Guang-Sheng Luo

PII: S1385-8947(15)01375-3
DOI: <http://dx.doi.org/10.1016/j.cej.2015.09.104>
Reference: CEJ 14260

To appear in: *Chemical Engineering Journal*

Received Date: 17 July 2015
Revised Date: 24 September 2015
Accepted Date: 30 September 2015



Please cite this article as: Z-H. Tian, J-H. Xu, Y-J. Wang, G-S. Luo, Microfluidic synthesis of monodispersed CdSe quantum dots nanocrystals by using mixed fatty amines as ligands, *Chemical Engineering Journal* (2015), doi: <http://dx.doi.org/10.1016/j.cej.2015.09.104>

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 proof before it is published in its final 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.

Microfluidic synthesis of monodispersed CdSe quantum dots nanocrystals by using mixed fatty amines as ligands

Zhen-Hao Tian, Jian-Hong Xu*, Yu-Jun Wang, and Guang-Sheng Luo

The State Key Lab of Chemical Engineering, Department of Chemical Engineering,
Tsinghua University, Beijing 100084, China

Abstract

We developed a novel microfluidic method to synthesize full-color emitting CdSe semiconductor nanocrystals with good monodispersity and less amount of Cd by using mixed amines of oleylamine (OLA) and dodecyl amine (DDA) as ligands. By the control of mixed DDA and OLA, the stage of nucleation and growth were separated, leading to narrow size distribution of CdSe semiconductor nanocrystals. The full width at half-maximum (FWHM) of fluorescence spectrum of CdSe nanocrystals could be reduced to 27.6 nm as optimizing the ratio of DDA to OLA and reaction temperature. Besides, through mixed amines as ligands, CdSe semiconductor nanocrystals which emitting fluorescence ranged from 530 nm to 615 nm could be synthesized by using less amount of Cd. So an environmental friendly method to synthesize full-color emitting CdSe semiconductor nanocrystals would be possible.

Key words: CdSe Quantum dots nanocrystals; Microfluidic devices; Ligands; Reaction kinetics; Size control.

Introduction

In the last three decades, semiconductor quantum dots nanocrystals, especially CdSe semiconductor nanocrystals, have attracted great interest both in fundamental researches and potential applications [1-3], because their optical properties are size tunable due to quantum confinement effect [4, 5]. Therefore, it is necessary to develop controlled synthesis methods to make better use of their size-tunable properties.

Download English Version:

<https://daneshyari.com/en/article/6583386>

Download Persian Version:

<https://daneshyari.com/article/6583386>

[Daneshyari.com](https://daneshyari.com)