

研究论文

## 水溶性ZnO量子点制备及其光学性质

庄稼<sup>1</sup>, 迟燕华<sup>2</sup>, 刘猛<sup>2</sup>

1. 西南石油大学材料科学与工程学院, 成都 610500;
2. 西南科技大学化学系, 绵阳 621002

收稿日期 2007-2-12 修回日期 网络版发布日期 2007-12-1 接受日期

**摘要** 利用3-巯丙基三乙氧基硅烷对ZnO进行表面修饰后沉积SiO<sub>2</sub>, 制备出水溶性SiO<sub>2</sub>包覆ZnO的量子点. 与直接采用正硅酸乙酯沉积包覆SiO<sub>2</sub>的ZnO量子点相比, 362 nm处的激子荧光发射峰的强度提高了将近4倍. 由于表面引入了巯基官能团, 量子点的水溶性明显提高, 稳定性增强, 即使在较高的盐浓度下也不会团聚. 通过改变条件, 制备出了发光波长在420 nm的蓝色荧光量子点.

**关键词** [氧化锌](#) [水溶性量子点](#) [表面包覆](#) [光学性质](#)

**分类号** [0611.62](#) [0635.1](#)

## Preparation and Optic Properties of Water-Soluble ZnO Quantum Dots

ZHUANG Jia<sup>1\*</sup>, CHI Yan-Hua<sup>2</sup>, LIU Meng<sup>2</sup>

1. Department of Material Science and Engineering, Southwest Petroleum University, Chengdu 610500, China;
2. Department of Chemistry, Southwest University of Science and Technology, Mianyang 621002, China

**Abstract** SiO<sub>2</sub>/ZnO water-soluble quantum dots were prepared by modification of (3-mercaptopropyl)tri-ethoxysilicane. The emission spectral peak of exciton fluorescence was raised by about 4 times in comparison with that of the quantum dots obtained by direct SiO<sub>2</sub> deposit on ZnO without modification. The introduction of hydrosulfide group(HS—) on ZnO, renders the quantum dots good water solubility, unique fluorescent stability and anti-congregation even at higher NaCl concentration. The water soluble blue SiO<sub>2</sub>/ZnO quantum dots were also prepared by this method with some modification of the reaction conditions. The photogenic wavelength of this blue quantum dots was found to be 420 nm. The emission spectra were very symmetrical without obvious red tail. The full widths half maximum were only 46 nm.

**Key words** [ZnO](#) [Water-soluble quantum dot](#) [Surface coating](#) [Optic property](#)

DOI:

通讯作者 庄稼 [zhuangjia@swpu.edu.cn](mailto:zhuangjia@swpu.edu.cn)

### 扩展功能

#### 本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(616KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

#### 服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

#### 相关信息

- ▶ [本刊中 包含“氧化锌”的 相关文章](#)
- ▶ 本文作者相关文章

- [庄稼](#)
- [迟燕华](#)
- [刘猛](#)