

## 碲化锌修饰掺铜硒化锌量子点的合成

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## Synthesis of ZnTe Modified Cu Ion Doped ZnSe Quantum Dots

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**摘要** 以巯基丙酸(mercaptopropionic acid,MPA)作为稳定剂,在水相中合成Cu离子掺杂的ZnSe量子点(quantum dots,QDs),并以ZnTe修饰其表面(ZnSe:Cu/ZnTe QDs).采用X射线衍射(X-ray diffraction,XRD)、高分辨透射电子显微镜(high resolution transmission electronic microscopy,HRTEM)、紫外可见吸收光谱(ultraviolet-visible spectroscopy,UV-VIS)和光致发光(photoluminescence,PL)荧光光度计对其结构、相貌和光学特性进行表征.结果表明,合成所得荧光量子点的大小为4~6 nm;当激发波长325 nm时,荧光发射峰约为510 nm;经160 °C热处理后,荧光发射峰红移至 540 nm 左右,初步说明ZnTe的修饰会改变ZnSe:Cu量子点荧光发射峰的位置.

关键词: ZnSe:Cu 光致发光 表面修饰 热处理

**Abstract:** This paper studies synthesis of ZnSe quantum dots (QDs) doped with Cu ion in an aqueous solution by using 3-mercaptopropionic acid (MPA) as ligand, and then modified its surface by ZnTe (ZnSe:Cu/ZnTe). The structure, morphology and optical properties of QDs are characterized with X-ray diffraction (XRD), high resolution transmission electronic microscopy (HRTEM), ultraviolet-visible spectroscopy (UV-VIS) and photoluminescence (PL) spectroscopy. The sizes of QDs obtained were 4~6 nm. Under an excitation wavelength of 325 nm, peaks of ZnSe:Cu/ZnTe at 510 nm were observed. Especially, the peaks moved to 540 nm after a heat processing at 160 °C. The facts indicate that the fluorescence emission peak's positions of ZnSe:Cu QDs capped by ZnTe surface modification can be changed.

Keywords: ZnSe:Cu, photoluminescence (PL), surface modification, heat processing

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[1] XU S H, WANG C L, XU Q Y, et al. Key roles of solution pH and ligands in the synthesis of aqueous ZnTe nanoparticles [J]. Chem Mater, 2010, 22: 5838-5844.

[2] KANIYANKANDY S, RAWALEKAR S, VERMA S, et al. Ultrafast hole transfer in CdSe/ZnTe type II core-shell nanostructure [J]. Phys Chem C, 2011, 115: 1428-1435.

[3] GAO X, WANG C, SU X G, et al. Aqueous synthesis of Cu-doped ZnSe quantum dots [J]. Journal of Luminescence, 2011, 131: 1300-1304.

[4] ABOULAICH A, GESZKE M, BALAN L, et al. Water-based route to colloidal Mn-doped ZnSe and core/shell ZnSe/ZnS quantum dots [J]. Inorganic Chemistry, 2010, 49(23): 10940-10948.

[5] JANA S, SRIVASTAVA B B, ACHARYA S, et al. Prevention of photooxidation in blue-green emitting Cu doped ZnSe nanocrystals [J]. Chem

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[6] NORRIS D J, EFROS A L, ERWIN S C. Doped nanocrystals [J]. Science, 2008, 319(5871):1776-1779.



[7] CHEN D, VISWANATHA R, ONG G L, et al. Temperature dependence of “elementary processes” in doping semiconductor nanocrystals [J]. Am Chem Soc, 2009, 131(26):9333-9339.



[8] 陈丽霞, 张建成, 宋振伟, 等. CdTe量子点荧光量子产率及生物标记[J]. 上海大学学报:自然科学版, 2009, 15(2):142-146.

[1] 李鹏荣, 吴伟, 马忠权, 王义飞. 扩散方阻对多晶硅太阳能电池效率的影响[J]. 上海大学学报(自然科学版), 2012, 18(3): 277-281

[2] 高瑞娟, 杭建忠, 施利毅, 舒畅, 芦火根. 氧化硅溶胶对石墨表面的亲水改性[J]. 上海大学学报(自然科学版), 2011, 17(6): 762-767

[3] 周邦新, 姚美意, 李强, 夏爽, 刘文庆. Zr-4合金薄板的织构与耐疔状腐蚀性能的关系[J]. 上海大学学报(自然科学版), 2008, 14(5): 441-445

[4] 朱娟娟, 王伟, 林民东, 刘文庆, 王均安, 周邦新. 用三维原子探针研究压力容器模拟钢中富铜原子团簇的析出[J]. 上海大学学报(自然科学版), 2008, 14(5): 525-530