



器件制备及器件物理

CdSe/CdS/ZnS量子点光纤的增益研究

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摘要：采用油相法合成了CdSe/CdS/ZnS量子点,相对于CdSe量子点,其吸收光谱、发射光谱均发生了红移。利用COMSOL Multiphysics软件模拟CdSe/CdS/ZnS量子点光纤和甲苯光纤的电场分布,结果表明CdSe/CdS/ZnS量子点光纤的电场强度高于甲苯光纤。采用中心波长为532 nm的稳态半导体激光器作为光源,对甲苯光纤、CdSe/ZnS量子点光纤、CdSe/CdS/ZnS量子点光纤进行电压信号测试,发现CdSe/ZnS量子点光纤和CdSe/CdS/ZnS量子点光纤的电压信号值相对于甲苯光纤电压信号值分别增强了6.28 mV和18.43 mV,表明双壳型量子点光纤的增益高于单壳型量子点。

关键词：光纤光学 量子点 红移 光谱分析 增益

Gain Study of CdSe/CdS/ZnS Quantum Dots Doped Fiber

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Abstract: CdSe/CdS/ZnS quantum dots were synthesized in oil phase. Comparing with the CdSe quantum dots, the absorption-peaks and PL-peaks wavelengths of the CdSe/CdS/ZnS quantum dots had a red shifted. By using the COMSOL software, the electric field distribution of the CdSe/CdS/ZnS doped fiber and toluene doped fiber were simulated. The results show that the electric field intensity of the CdSe/CdS/ZnS quantum dots doped fiber is higher than that of the toluene one. The signal voltage value of the toluene doped fiber, CdSe/ZnS quantum dots doped fiber, and CdSe/CdS/ZnS quantum dots doped fiber were measured by 532 nm CW laser. The results demonstrate that the signal voltage value of the CdSe/ZnS and the CdSe/CdS/ZnS quantum dots doped fibers are enhanced to 6.28 mV and 18.43 mV, respectively. It shows that the gain of CdSe/CdS/ZnS quantum dots doped fiber is higher than that of the CdSe/ZnS one. So, the CdSe/CdS/ZnS quantum dots are more suitable for fiber signal transmission as gain medium in the future.

Keywords: fiber optics quantum dots red shift spectroscopic analysis gain

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