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Light Emitting Devices Based on CdSe Nanoparticles Capped With Mercaptoacetic Acid

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Abstract

CdSe nanocrystallites capped with mercaptoacetic acid with a high intensity band edge emission were synthesized, and double layered hybrid light emitting devices with various structures were fabricated. The double layers are a blend of polyvinyl carbazole (PVK) mixed with CdSe nanoparticles and Alq3 layer, which are encapsulated between ITO as anode and LiF/Al as cathode. Different devices were fabricated by varying the CdSe concentration as well as thickness of Alq3 layer. The device that fabricated without incorporation of nanoparticles revealed an emission nearly at 510 nm, which is related to Alq3 layer with diffusion of Li ions during the deposition of Al electrode. Increasing CdSe nanoparticles concentration and decreasing Alq3 layer thickness leads to a decrease in the intensity of emission originated from CdSe nanoparticles. Mixing PVK with CdSe nanoparticles that produce emission mainly arises from trapping states, causing the shifting of emission zone to Alq3 layer. Interestingly, the device shows that the most favorable emission is the one that consists of relatively as low concentration as 20% of CdSe nanoparticles of the blend layer and has a thickness of Alq3 layer of 18 nm.

Keywords

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