

论文

基于Zn(Q-Ph)<sub>2</sub>与DCJTB非掺杂型OLED的制备及其电致发光性能研究

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摘要:

合成了有机发光材料2-苯基-8-羟基喹啉锌Zn(Q-Ph)<sub>2</sub>, 通过<sup>1</sup>H NMR, UV-Vis及MS等手段对配合物进行了结构表征. 利用该材料与高效的红光染料DCJTB复合制备出全新结构的非掺杂型OLED器件, 其结构为ITO/NPB/DCJTB/Zn(Q-Ph)<sub>2</sub>/AlQ<sub>3</sub>/Al. 将DCJTB超薄层的厚度调节到0—2.0 nm范围内, OLED器件的发光色调经历了黄光、红光和橙光的转变, 并且探讨了DCJTB厚度对OLED发光机理以及发光复合区域的影响. 当DCJTB的厚度为0.5 nm时, 获得了稳定的红光发射, 该器件在5.5 V电压下启亮, 在25 V外加电压下发光亮度达到420 cd/m<sup>2</sup>, 对应的电流密度为250 mA/cm<sup>2</sup>.

关键词: 有机电致发光器件 非掺杂型 复合位置 DCJTB

Preparation and Electroluminescence Property of a Non-doping OLED Based on Zn(Q-Ph)<sub>2</sub> and DCJTB

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Abstract:

As electroluminescent material zinc bis(2-phenyl-8-hydroxyquinolato)[Zn(Q-Ph)<sub>2</sub>] was synthesized and characterized by <sup>1</sup>H NMR, UV-Vis and MS measurements. DCJTB[4-(dicyanomethylene)-2-*t*-butyl-6(1,1,7,7-tetramethyljulolidyl-9-enyl)-4H-pyran], a highly efficient fluorescent dye, and Zn(Q-Ph)<sub>2</sub> were used to fabricate a kind of novel non-doping organic light-emitting diode with a structure of ITO/NPB {*N,N'*-Di[(1-naphthalenyl)-*N,N'*-diphenyl]-(1,1'-biphenyl)-4,4'-diamine}/DCJTB/Zn(Q-Ph)<sub>2</sub>/AlQ<sub>3</sub>(8-hydroxyquinoline aluminum)/Al. By changing the thickness of ultra-thin layer DCJTB, yellow-light, red-light and orange-light emission from OLEDs were studied. Their luminescent color, electroluminescent mechanism and recombination zone were optimized in this paper. When a 0.5 nm-thick DCJTB was used, a stable red emission was obtained. With a lower turn-on voltage at about 5.5 V, the non-doping OLED showed a maximum brightness of 420 cd/m<sup>2</sup> and current density of 250 mA/cm<sup>2</sup> at 25 V.

Keywords: Organic light-emitting diode Non-doping Recombination zone DCJTB

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