

论文

掺杂材料对蓝光OLED器件性能的影响

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摘要 采用ADN作为主体材料, 并且对其使用NPB、BAIq3和TBP等材料进行掺杂, 制备了一系列蓝光OLED, 研究了掺杂对器件性能的影响。实验结果表明, 掺杂NPB的器件由于载流子注入和传输趋向平衡, 其光电性能明显优于未掺杂的器件; 掺杂BAIq3的器件则具有最佳的色纯度, CIE坐标为(0.15, 0.18); 而掺杂TBP的器件则具有高效的能量传递, 其流明效率和电流效率分别达到了1.43 lm/W和3.86 cd/A, 发光寿命最长, 并具有较窄的发光光谱, 其色纯度为(0.18, 0.19)。这些结果说明掺杂不仅改善了器件的发光亮度和色纯度, 而且提高了器件的发光效率和寿命。

关键词 [电致发光](#) [蓝光OLED](#) [掺杂](#) [能量传递](#)

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Influence of doped materials on the performance of blue organic electroluminescent devices

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Abstract The blue OLEDs were fabricated using 9,10-di-(2-naphthyl) anthracene (ADN) as blue host emitting material, N,N'-Di-[(1-naphthalenyl)-N,N'-diphenyl]-(1,1'-biphenyl)-4,4'-diamine (NPB), aluminum (III) bis(2-methyl-8-quinolinato)4-phenylphenolato (BAIq3) and 2,5,8,11-tetra-t-butylperylene (TBP) as doped materials, respectively. The experimental results show that the peak emission of the device doped with NPB is centered at 439 nm and the current efficiency of which is 3.12 cd/A, and the optical and electrical performance is better than that of the undoped device due to the balanced carrier injection and transport. The purity of the device doped with BAIq3 is the best, the CIE coordinates of which is (0.15, 0.18). Because of the high energy transport, the luminance efficiency and the EL efficiency of the device doped with TBP are 1.43 lm/W and 3.86 cd/A, respectively, and the EL emission spectra is very narrow, the peak is at 460 nm, the CIE coordinate is (0.18, 0.19) and the half lifetime of the unsealed device is 280h starting at the luminance of 450 cd/m². The results demonstrate that the luminous efficiency, lifetime and purity of the blue OLEDs doped with NPB, BAIq3 and TBP are all improved.

Key words [electroluminescence](#) [blue organic electroluminescent device \(OLED\)](#) [doped](#) [energy transport](#)

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