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器件制备及器件物理

超薄插入法实现的理想白色有机电致发光器件

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摘要：以典型发光材料——联苯乙炔衍生物(4,4'-bis(2,2'-diphenylvinyl)-1,1'-biphenyl,DPVBI)和红荧烯(5,6,11,12-tetraphenyl-naphthalene,Rubrene)分别为蓝色、橙色发射体,通过在DPVBI中插入一层超薄Rubrene制备了结构简单的非掺杂型白色有机电致发光器件,得到了低压启动、效率和色度俱佳的白色发光器件。器件点亮电压为3.1 V,最高电流效率为6.7 cd/A(流明效率5.5 lm/W或外量子效率2.8%),器件色坐标达到理想的白平衡点(0.33,0.33)。理想白光的获得归因于通过调整NPB/DPVBI界面到Rubrene的距离,实现了从DPVBI到Rubrene能量传递的最佳比例。

关键词：发光学 有机电致发光 白色 联苯乙炔衍生物DPVBI 红荧烯

Ideal White Organic Electroluminescent Device Realized by Inserting An Ultra Thin Layer

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Abstract: By using typical luminescent materials, 4,4'-bis(2,2'-diphenylvinyl)-1,1'-biphenyl (DPVBI) and 5,6,11,12-tetraphenyl-naphthalene (Rubrene) as a blue and orange emitter, respectively, a highly efficient bright non-doped white electroluminescent device with low driving voltage and ideal chromaticity is fabricated. The turn-on voltage, maximum current efficiency are 3.1 V, 6.7 cd/A (luminous efficacy of 5.5 lm/W, external quantum efficiency of 2.8%), respectively. Commission Internationale de l'Eclairage (CIE) co-ordinates are at ideal equal-energy white point (0.33, 0.33). The achievement of excellent white emission is attributed to realizing perfect ratio of energy transfer from DPVBI to Rubrene by tuning distance from NPB/DPVBI interface to Rubrene.

Keywords: luminescence organic electroluminescence white distyrylarylene derivative DPVBI Rubrene

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