Single-layer white OLEDs: blended polymers and copolymers as emitting films

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White organic light emitting diodes (WOLEDs), processed from solution, have attracted significant research interest in recent years for lighting applications. WOLEDs with a single emissive layer, either using fluorescent or phosphorescent compounds in blends, or copolymers that bearing different chromophores have been proposed as promising methodologies for the easy fabrication of high-performance devices. However, precise control of the dopant concentration in the guest–host system, for the case of blends, or of the chromophore ratio, for the case of copolymers, are essential for achieving the required color coordinates of the emitting light (Fig. 1). In this work, were utilized commercial blue Poly(9,9-di-n-octylfluorenyl-2,7-diyl) (PFO), green Poly(9,9-dioctylfluorene-alt-benzothiadiazole) (F8BT) and red spiro-copolymer (SPR) ligh t-emitting materials to develop blends, and Distyrylanthracene, dis-tyrylcarbazole and distyrylbenzothiadiazole chromophores as yellow, blue and orange-red emitters, respectively, to synthesize novel copolymers. Single layer solution processed WOLED devices of two- and three-phase blends and copolymers bearing two and three chromophores were fabricated. The comparative optical, photophysical and electrooptical characterization of the produced films and devices demonstrated the predominant emission mechanism for each case.

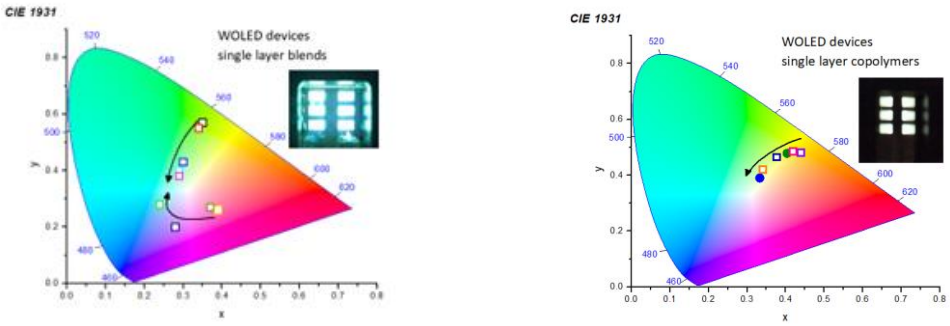

Figure 1: The EL CIE color coordinates of the OLED devices with single layer blends and copolymers

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