Interface Research Work on White OLED

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White OLED has acquired great attention due to unique properties, e.g. thin, light, flexible, energy saving, which had been utilized as backlight of LCD display and indoor illumination. But, the device performance of white OLEDs is rather poorer relative to LED, especially in device lifetime and color stability, which hold back utilization progress of white OLED. In our early work[1-5], it has been identified that the existence of plenty of interface in white OLED induce in degradation of device performance. The interface is usually unstable in chemical and physical properties, owing to different material structure or molecular structure in both sides of interface. Hence, it is demonstrated by our group that optimization and modification of interface structure can improve device performance. In our work, white-light phosphorescence polymers with hyperbranched structure were designed and synthesized, which can be utilized in white OLED with single emission layer for decreasing multilayers interface; homogeneous interface of AlQ_3 were modified by SiO_2 coating for avoiding invasion of moisture and oxygen, resulting in prolonging device lifetime; ultra-high color stable three color fluorescent-phosphorescent hybrid white OLED was designed and fabricated by lowering heterogeneous interface number in emitting layers, which exhibit ideal CCTs around 3810 K and stable CIE coordinates of (0.40, 0.41) with high CRI of 85-86 upon variation in brightness from 100 to 5000 cd/m^2 (as shown in the Fig.1). In one word, it is suggested that interface research is very important for enhancing performance of white OLED.

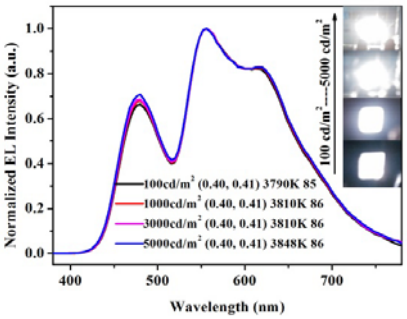

Fig. 1 The EL spectra of the hybrid WOLED at different luminance

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