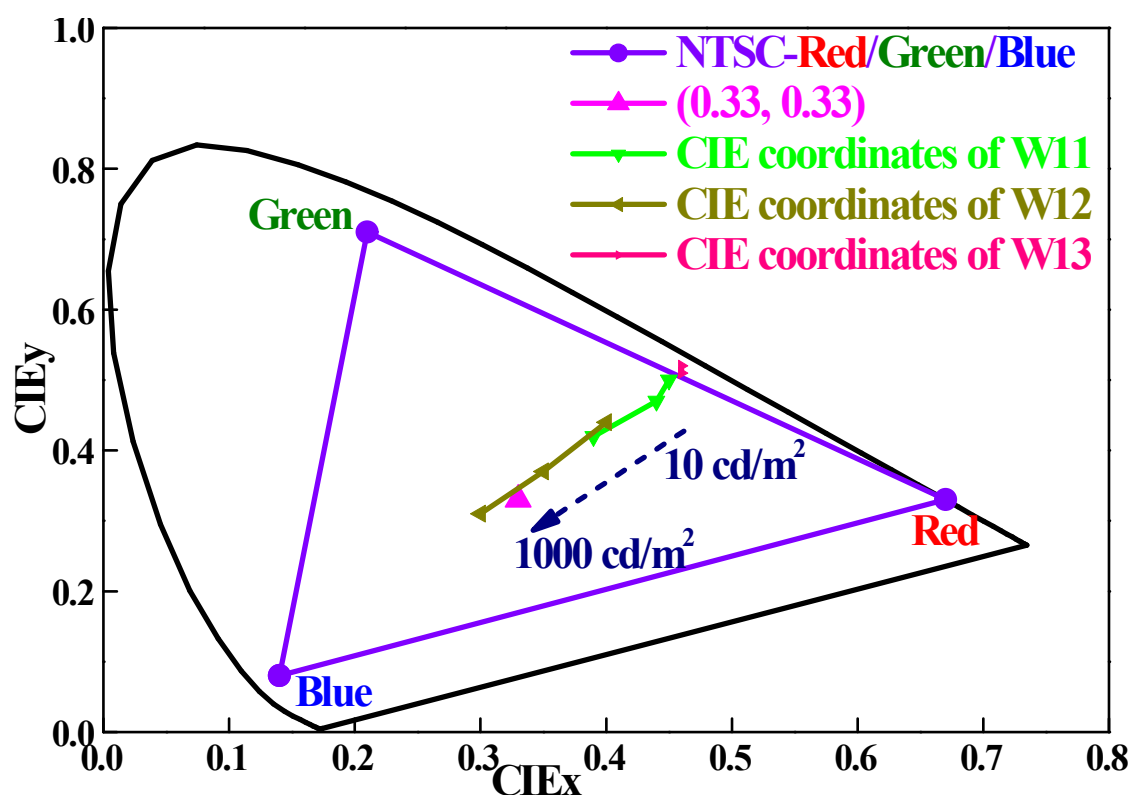
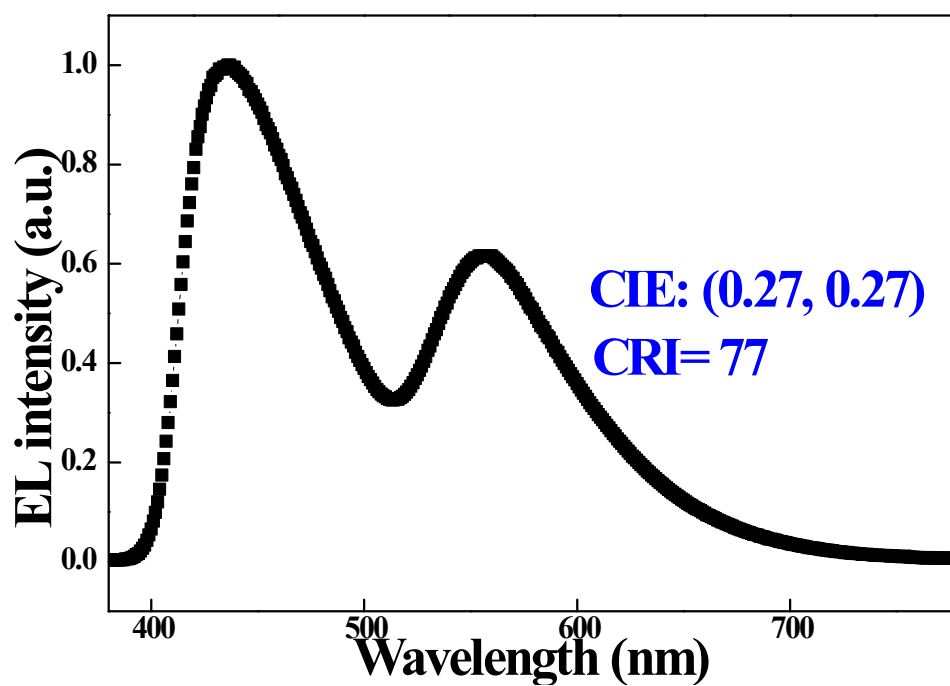


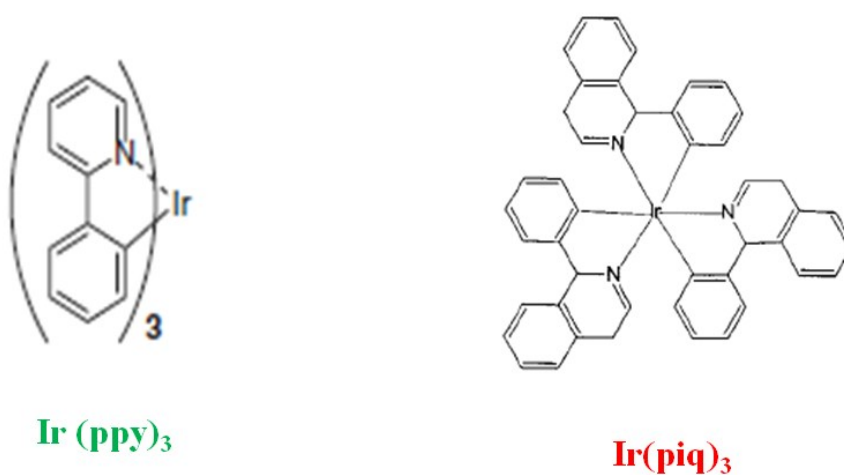
## Supplementary Information



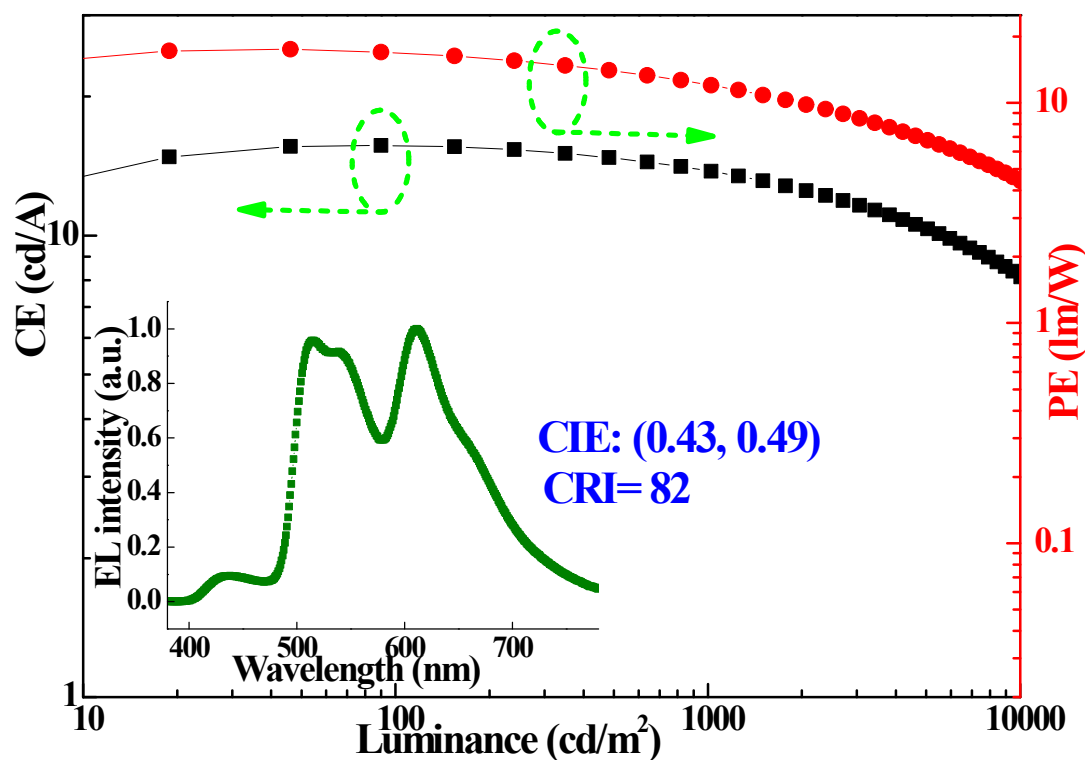
**Fig. S1.** The CIE coordinates of the primary red/green/blue color system adopted by National Television System Committee (NTSC) for color TV are (0.67, 0.33) (Red), (0.21, 0.71) (Green) and (0.14, 0.08) (Blue). The CIE coordinates of (0.33, 0.33) is the white equivalent-energy point. The CIE coordinates of W11 at 10 cd/m<sup>2</sup>, 100 cd/m<sup>2</sup> and 1000 cd/m<sup>2</sup> are (0.45, 0.50), (0.44, 0.47) and (0.39, 0.42), respectively. The CIE coordinates of W12 at 10 cd/m<sup>2</sup>, 100 cd/m<sup>2</sup> and 1000 cd/m<sup>2</sup> are (0.40, 0.44), (0.35, 0.37) and (0.30, 0.31), respectively. The CIE coordinates of W12 at 10 cd/m<sup>2</sup>, 100 cd/m<sup>2</sup> and 1000 cd/m<sup>2</sup> are (0.46, 0.52), (0.46, 0.51) and (0.46, 0.51), respectively. The color variations of W12, W11 and W13 are (0.10, 0.13), (0.06, 0.08) and (0.00, 0.01), respectively.



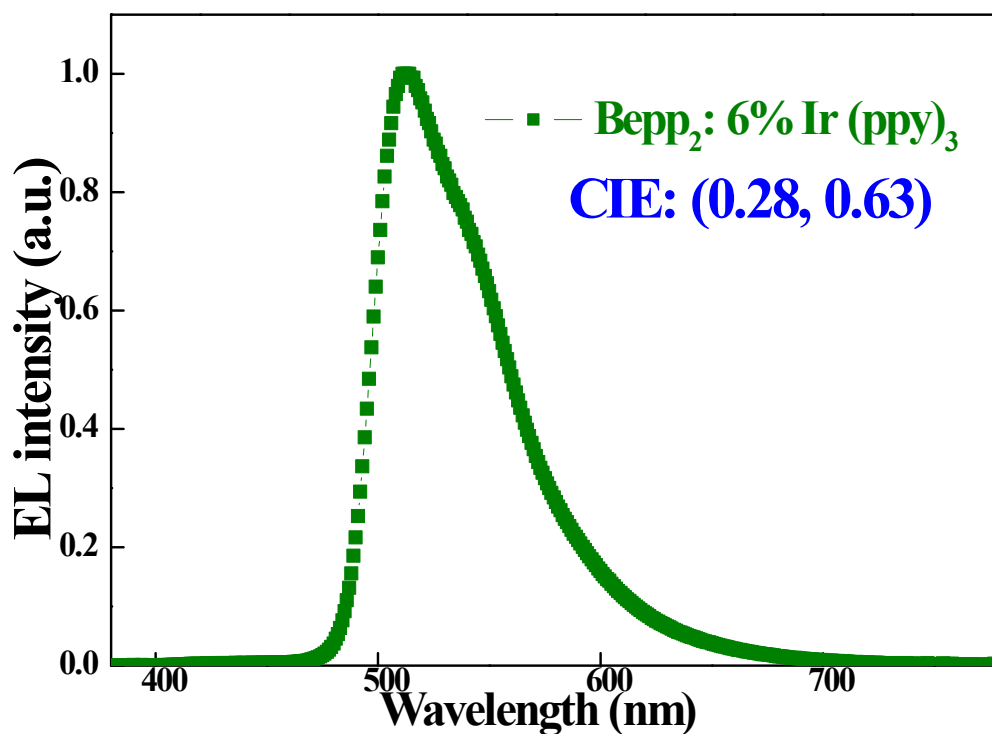
**Fig. S2.** The EL spectrum of W11 at a luminance of 10000 cd/m<sup>2</sup>. A high CRI of 77 can be obtained by the two-color system.



**Fig. S3.** The chemical structure of Ir(ppy)<sub>3</sub> and Ir(piq)<sub>3</sub>.



**Fig. S4.** Forward-viewing current and power efficiencies as a function of luminance for the device using the TCTA: Bepp<sub>2</sub> as the IL. Inset: EL spectrum at 1000 cd/m<sup>2</sup>. The configuration is ITO/HAT-CN (100 nm)/NPB (20 nm)/ NPB: Ir(dmp<sub>2</sub>py)<sub>2</sub>(dpp) (20 nm, 1.5%)/ TCTA: Bepp<sub>2</sub>(3.5 nm, 1:1)/ Bepp<sub>2</sub>: Ir(pp<sub>2</sub>y)<sub>3</sub>: Ir(piq)<sub>3</sub> (15 nm,1: 6%: 1.3%)/ Bepp<sub>2</sub> (35 nm)/LiF (1 nm)/Al (200 nm).



**Fig. S5.** EL spectrum at 1000 cd/m<sup>2</sup>. The device configuration is ITO/HAT-CN (100 nm)/NPB (15 nm)/ TCTA (5 nm)/ Bepp<sub>2</sub>: Ir(ppy)<sub>3</sub> (25 nm, 6%)/ Bepp<sub>2</sub> (35 nm)/LiF (1 nm)/Al (200 nm). It can be easily seen that only a peak emission of 512 nm originating from Ir(ppy)<sub>3</sub> and no emission from Bepp<sub>2</sub> is observed, indicating that excitons are harvested by the dopants.