Supporting Information

High-Quality Warm White Organic Electroluminescence from Efficient Phosphor-Only Emitting Systems Based on Bipolar Iridium (III) Complexes

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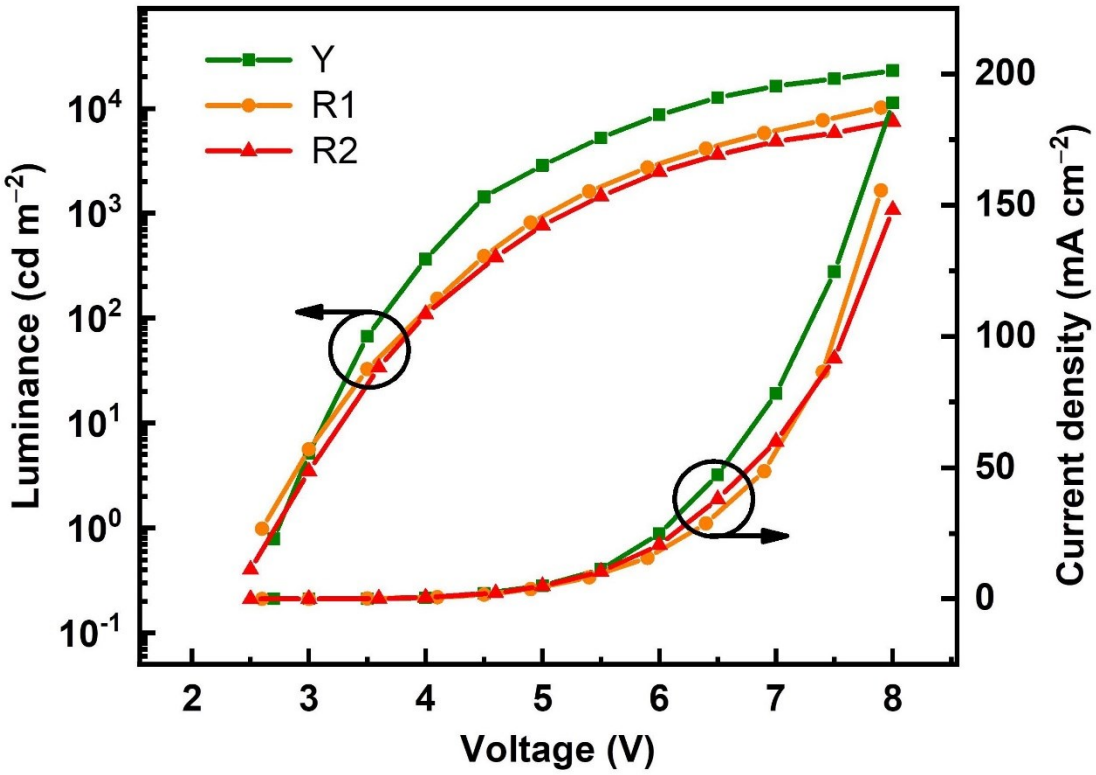
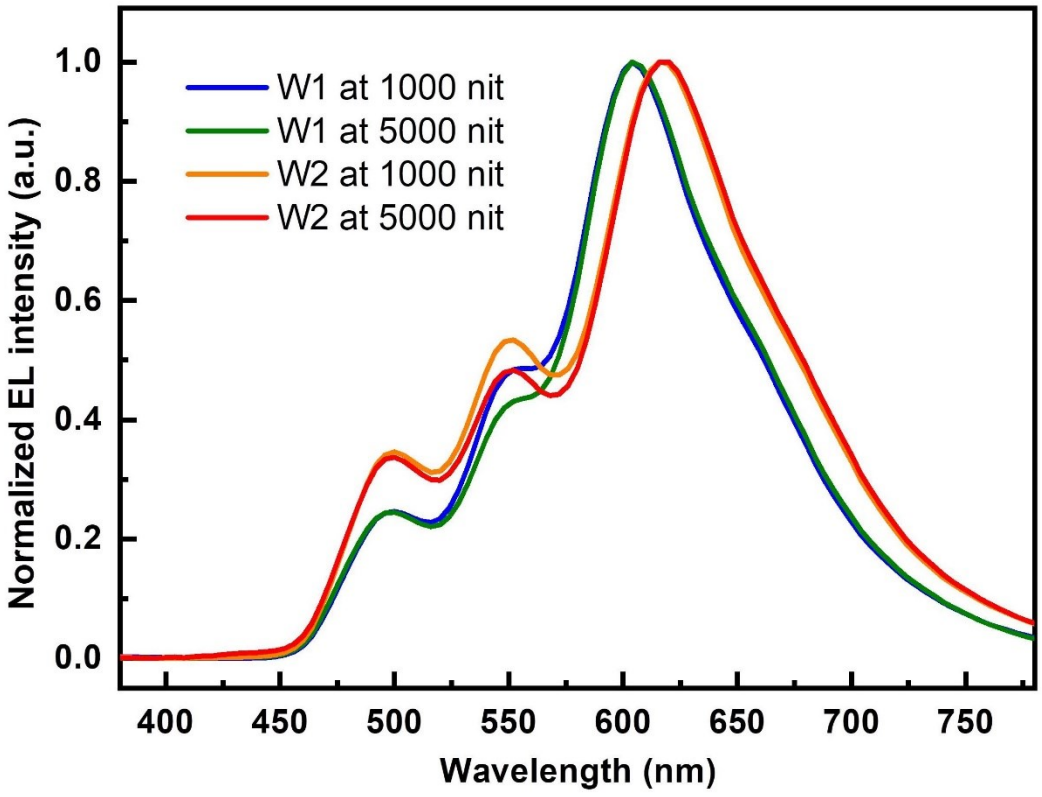
***General Information*:** Raw materials for the synthesis of phosphorescent complexes were obtained from commercial suppliers and they were used without further purification. Five phosphors were synthesized following the precedents in corresponding literatures (Ref. 19, 20 and 21). Tetrahydrofuran was distilled with sodium benzophenone ketyl under nitrogen atmosphere and degassed by the freeze-pump-thaw method. All glassware, syringes, magnetic stirring bars and needles were dried in a convection oven for 2 hours. Reactions were monitored with thin layer chromatography (TLC). Commercial TLC plates (Silica gel 60 F254, Merck Co.) were developed and the spots were seen under UV light at 254nm and 365nm. Silica column chromatography was done with silica gel 60G (particle size 5-40 μm. Merck Co.). Absorption spectra were obtained using a Shimadzu UV-2550 UV-vis spectrometer. PL spectra were recorded on a Perkin-Elmer LS-55 fluorescence spectrometer with a Xe arc lamp excitation source. All solvents were degassed via three freeze-pump-thaw cycles. Solid state PL quantum yields (PLQYs) were measured using an integrating sphere (C-701, Labsphere Inc.), with a 365 nm Ocean Optics LLS-LED as the excitation source, and the light was introduced into the integrating sphere through an optical fiber.

***Fabrication of the OLEDs and EL Measurements*:** The general architecture of the multilayer diodes is as follows. The ITO (indium-tin oxide) coated glass substrates (20 Ω/square, correspond to the thickness of 100 nm±2 nm) were first cleaned in ethanol, acetone, and soap ultrasonic baths. All organics were purified by gradient sublimation and thermally evaporated at a rate of 1.0 Å s^{-1} at a pressure of ca. 3.5 x 10^{-4} Pa. A LiF layer (0.5 nm) was deposited at a rate of 0.2 Å s^{-1}. The Al cathode was deposited at a rate of 10 Å s^{-1} and the active area of the diode segments was 2 x 3 mm^2. EL spectra and brightness-current density-voltage characteristics were measured by combining a Spectrascan PR-650 spectrophotometer with a

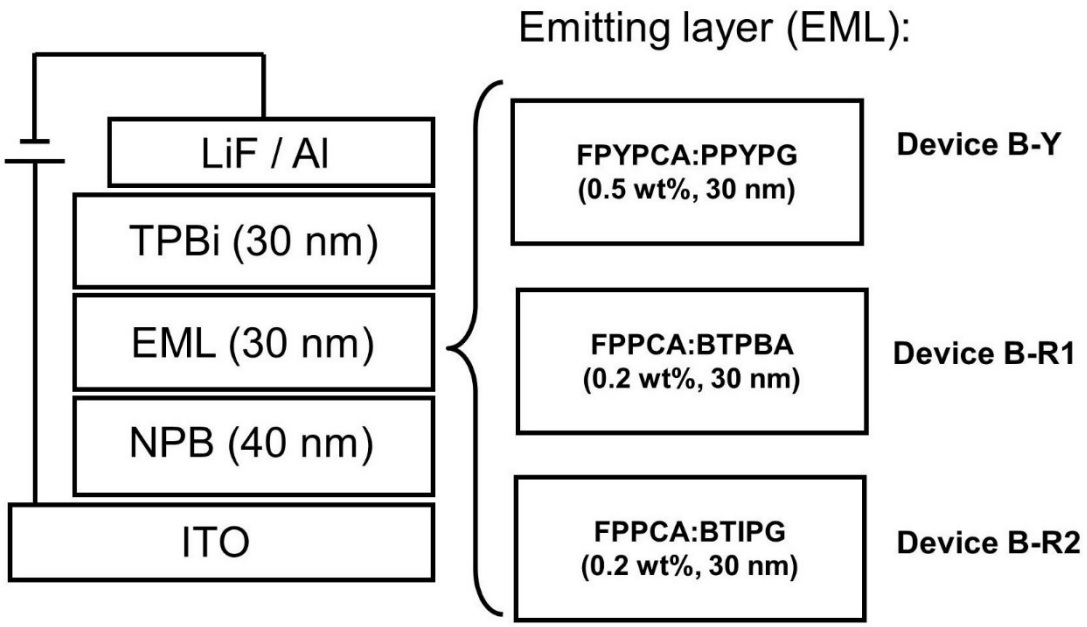
computer-controlled direct-current power supply Keithley model 2400 voltage-current source under ambient conditions at room temperature.



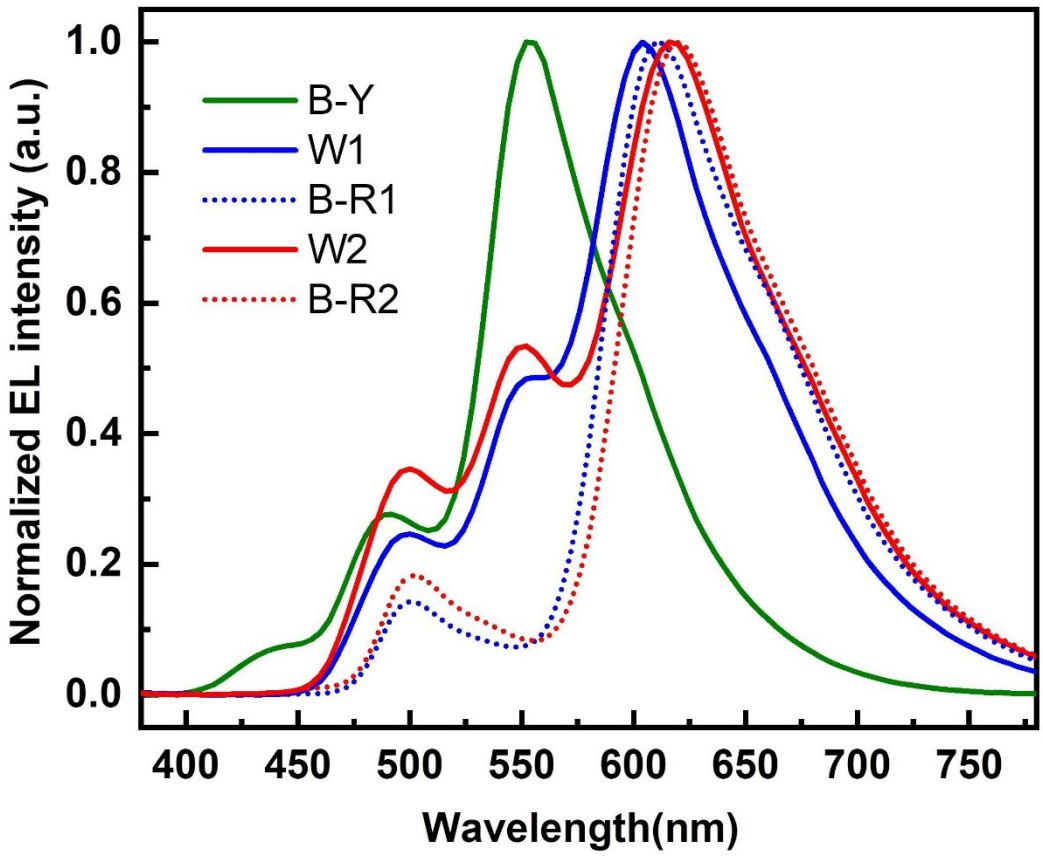
S-Fig. 1 Current density-voltage-luminance (*J-V-L*) of devices **Y**, **R1** and **R2**.



S-Fig. 2 EL spectra of devices **W1** and **W2** at the luminance of 1000 and 5000cd m^{-2} (nit)



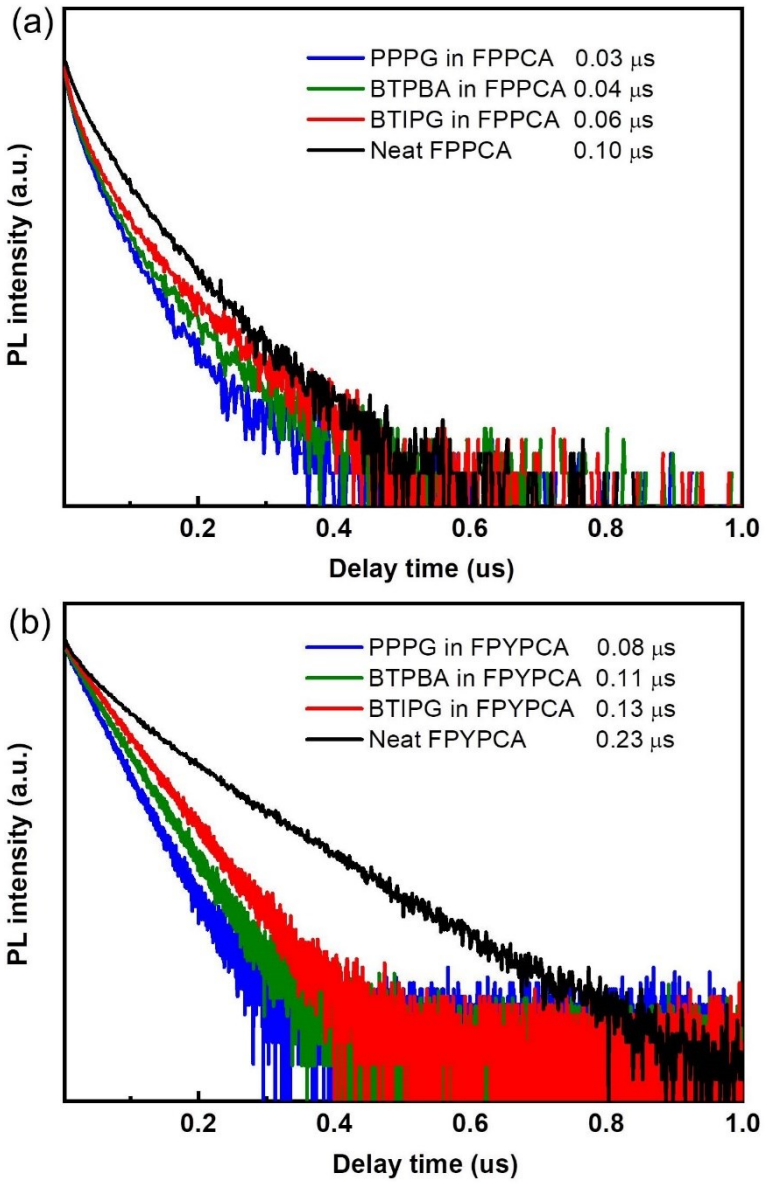
S-Fig. 3 Configurations for devices **B-Y**, **B-R1** and **B-R2**.



S-Fig. 4 EL spectra of devices **W1** and **W2**, and three reference devices **B-Y**, **B-R1** and **B-R2** at 1000 cd m^{-2}.

S-Table 1. FWHMs of both PL and EL spectra for blue, yellow, and red emitters.

	Complex	FWHM (nm)
PL spectra in Fig. 1(b)	PPPG	76
	BTPBA	76
	BTIPG	74
EL spectra in Fig. 2(a)	PPPG	74
	BTPBA	86
	BTIPG	88



S-Fig. 5 Transient PL spectra of neat FPYPCA and FPPCA films and the doping films based on PPPG, BTPBA and BTIPG in FPYPCA and FPPCA with the concentration of 7 wt%.