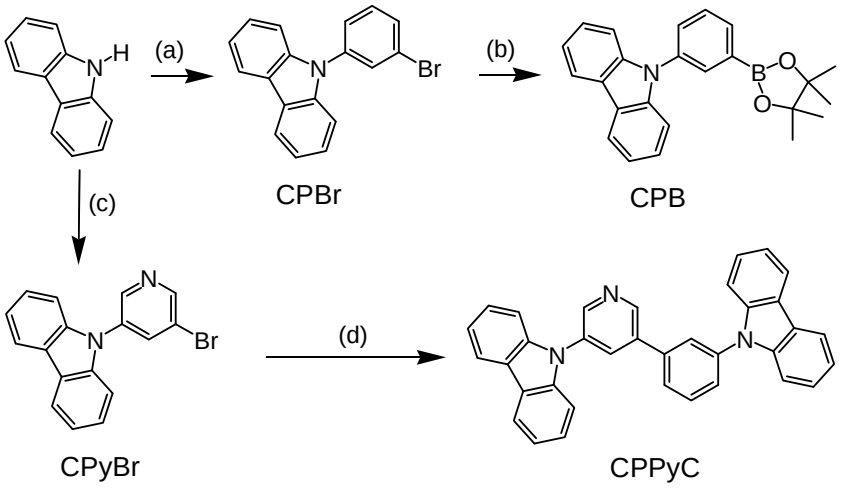
Supporting Information

Simple and high efficiency phosphorescence organic light-emitting diodes with codeposited copper(I) emitter

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Scheme S1 Synthetic procedure for CPPyC. Reaction conditions a) 1-bromo-3-iodobenzene, K_2CO_3, Cu, DMF. b) bis(pinacolato)diboron, KOAc, $Pd_2(dba)_3$, PCy_3, 1,4-dioxane. c) 3, 5-dibromopyridine, K_2CO_3, Cu, $PhNO_2$. d). CPB, 2 M K_2CO_3, $Pd(PPh_3)_4$, EtOH/toluene.

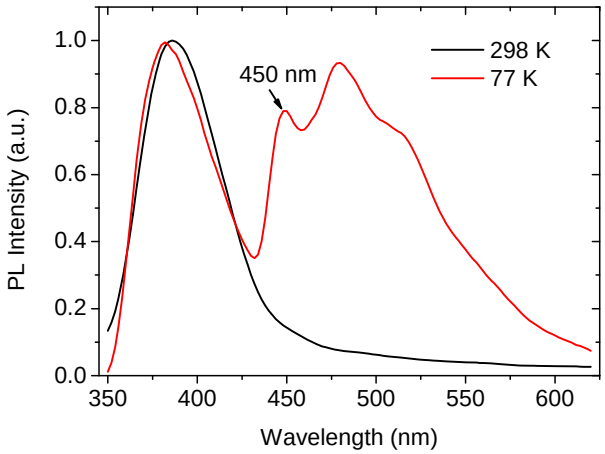


Figure S1 Photoluminescence spectra of neat CPPyC film at 298 and 77 K.

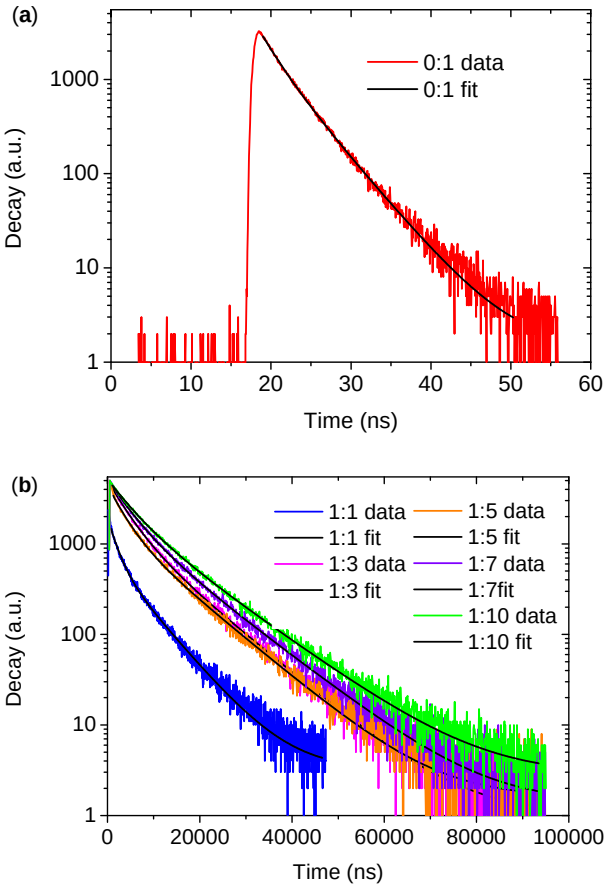


Figure S2 Time-resolved measurement of a) 390 nm emission from neat CPPyC film, and b) ~ 520 nm emission from codeposited CuI:CPPyC films with different CuI:CPPyC molar ratios.

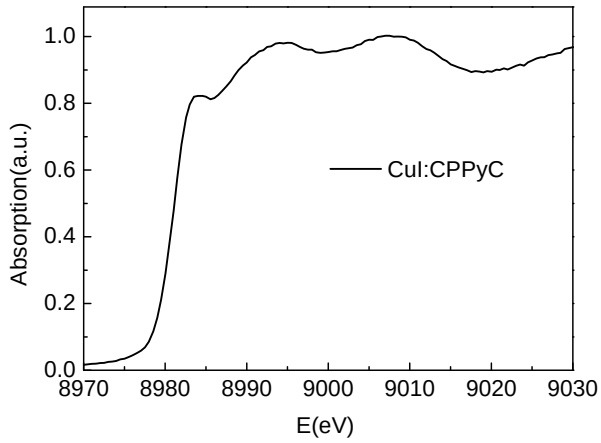


Figure S3 Cu K-edge of codeposited CuI:CPPyC film (CuI:CPPyC = 1:5).

Table S1 EXAFS least-squares fitting results for the codeposited CuI:CPPyC film (CuI:CPPyC = 1:5).

Sample	Path	CN(SET)	S_0^2	R(Å)	σ^2 (Å^2)	*R*-factor
CuI:CPPyC	Cu-N	2.0	0.920(SET)	2.00±0.02	0.019	0.0057
	Cu-I	2.0	0.916	2.55±0.03	0.011	
	Cu-Cu	1	0.908(SET)	2.58±0.03	0.015	

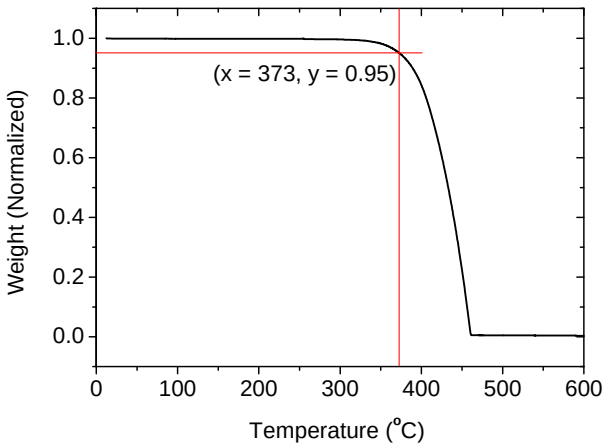


Figure S4 Thermogravimetric analysis (TGA) of CPPyC. The temperature corresponding to 5 wt% loss is 373 °C.

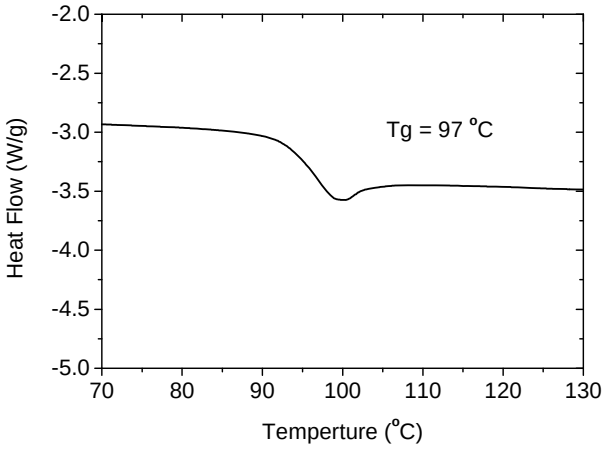


Figure S5 Differential scanning calorimetry (DSC) of CPPyC.

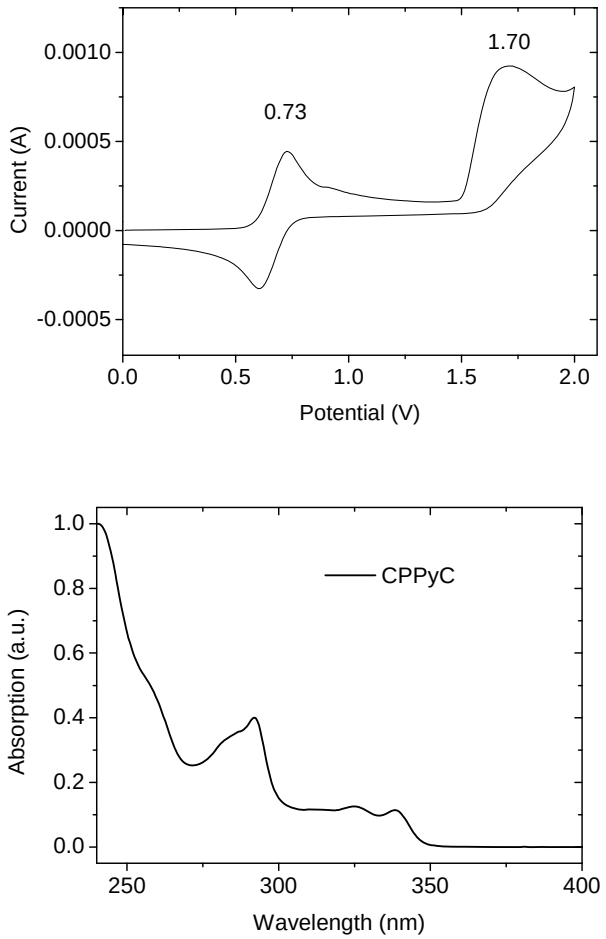


Figure S6 Cyclic voltammogram (CV, upper) and UV absorption spectrum (bottom) of CPPyC, where FeCp was used as the internal reference in CV measurement.

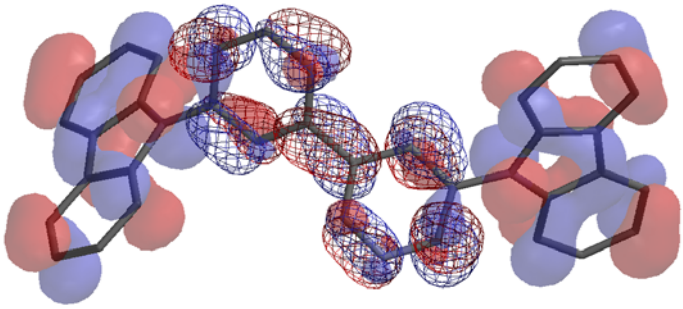


Figure S7 HOMO (transparent) and LUMO (mesh) frontier orbital plots for CPPyC.

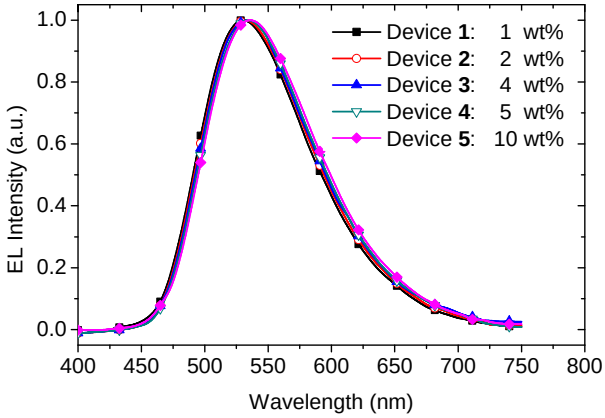


Figure S8 Electroluminescence spectra of OLEDs **1**-**5**. The device structure is ITO/ MoO_3 (1 nm)/ CBP (35 nm)/ CuI:CPPyC (*x* wt%, 18.5 nm)/TPBi (65 nm)/ LiF (1 nm)/ Al, where *x* is CuI mass doping concentrations and *x* = 1, 2, 4, 5, and 10 for device **1**, **2**, **3**, **4**, and **5**, respectively

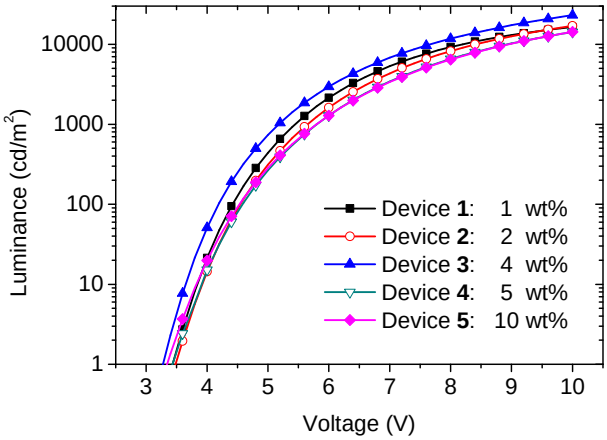


Figure S9 Luminance-applied voltage curves of OLEDs **1**-**5**.

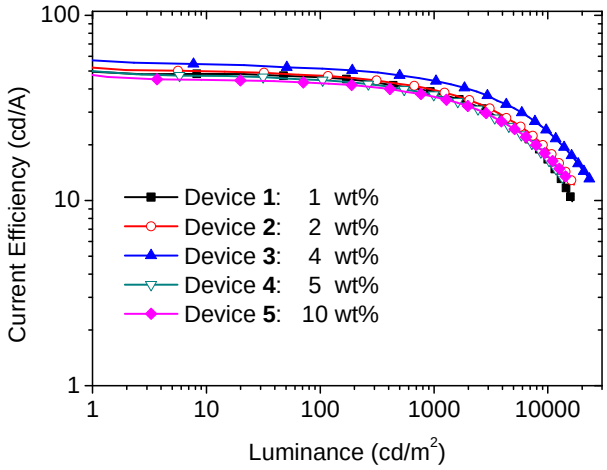


Figure S10 Current efficiency-luminance curves of OLEDs **1**-**5**.

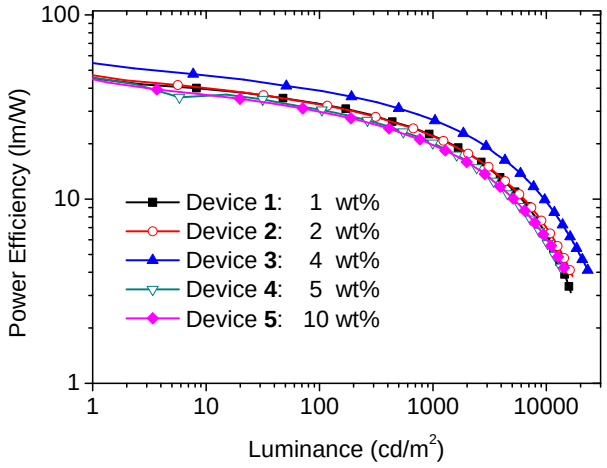


Figure S11 Power efficiency-luminance curves of OLEDs **1**-**5**.

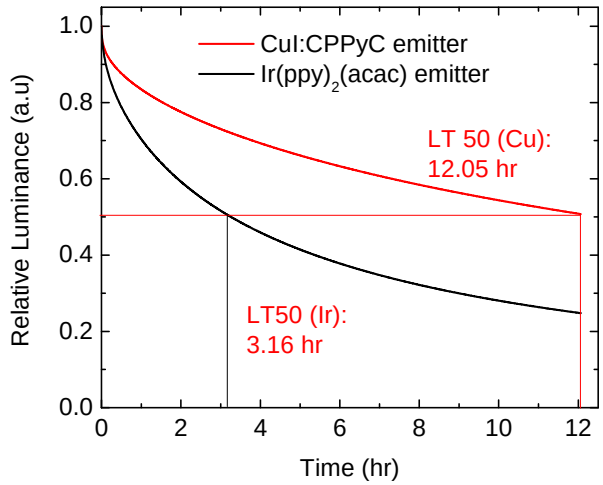


Figure S12 Lifetime tends of two devices with $Cu_2I_2(CPPyC)_4$ or $Ir(ppy)_2(acac)$ as the emitter. The devices have structure of ITO/MoO_3 (1 nm)/CBP (35 nm)/ EML/ TPBi (65 nm)/ LiF (1 nm)/ Al (100 nm), where the EML is $Ir(ppy)_2(acac)$:CBP (8 wt%, 15 nm) or CuI:CPPyC (4 wt%, 18.5 nm), respectively. The two devices were encapsulated under nitrogen and tested in air with a constant current density of 20 mA/cm^2.

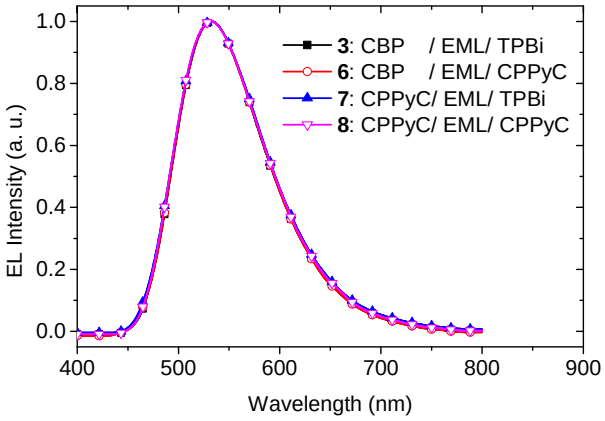


Figure S13 Electroluminescence spectra of OLEDs **6-8** and **3**. The device structures are ITO/ MoO_3 (1 nm)/ CBP (35 nm)/ CuI:CPPyC (4 wt%, 18.5 nm)/CPPyC (58.5 nm)/ LiF (1 nm)/ Al, ITO/ MoO_3 (1 nm)/ CPPyC (33.5 nm)/ CuI:CPPyC (4 wt%, 18.5 nm)/TPBi (65 nm)/ LiF (1 nm)/ Al, and ITO/ MoO_3 (1 nm)/ CPPyC (33.5 nm)/ CuI:CPPyC (4 wt%, 18.5 nm)/CPPyC (58.5 nm)/ LiF (1 nm)/ Al for device **6**, **7**, and **8**, respectively

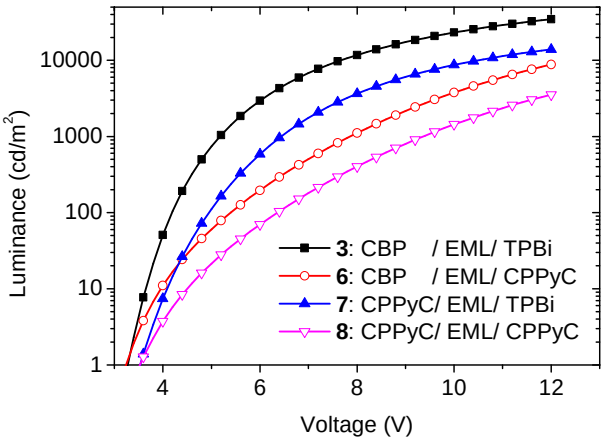


Figure S14 Luminance-applied voltage curves of OLEDs **6-8** and **3**.

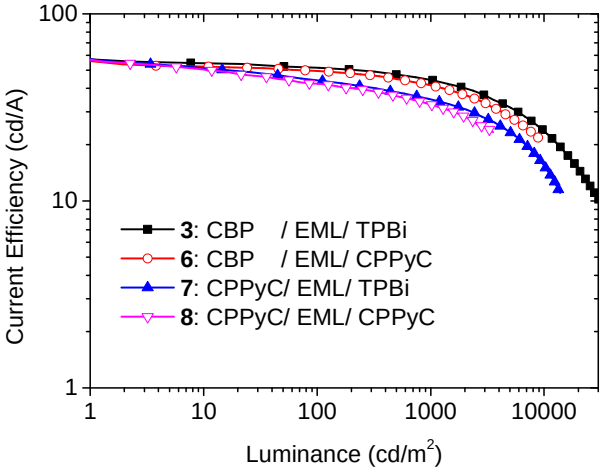


Figure S15 Current efficiency-luminance curves of OLEDs **6-8** and **3**.

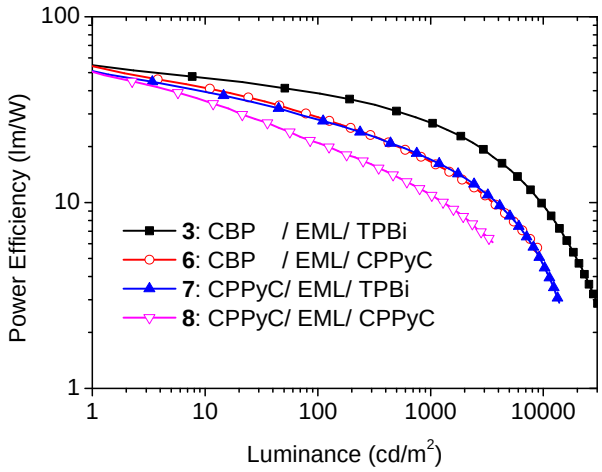


Figure S16 Power efficiency-luminance curves of OLEDs **6**-**8** and **3**.