Supporting Information

Phosphine Oxide Jointed Electron Transporters for Reducing Interfacial Quenching in Highly Efficient Blue PHOLEDs

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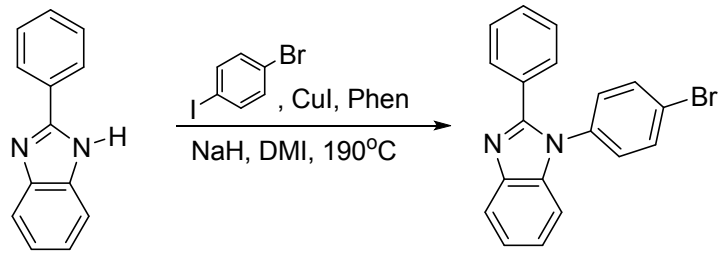
Content

Synthesis of 1-(4-Bromophenyl)-2-phenylbenzimidazole (PBIBr)



PBI **PBIBr**

A mixture of PBI (9.7 g, 50 mmol), 60% sodium hydride (3.4 g, 100 mmol), 1-bromo-4-iodobenzene (42.4 g, 150 mmol), copper(I) iodide (1.9 g, 10 mmol) and 1.10-phenanthroline (2.0 g, 10 mmol) in 1,3-dimethyl-2-imidazolidinone (100 mL) was heated to 190 °C and stirred for 48 h under argon. Then, the mixture was poured into water and extracted with CH_2Cl_2 (3 × 20 mL). The organic layer was dried with anhydride Na_2SO_4. The solvent was removed in *vacuo* and the residue was purified by column chromatography on silica gel with petroleum ether/ethyl acetate (3:1) as the eluent to afford the product as a white powder (7.3 g, 42%). ^{1}H NMR (TMS, $CDCl_3$, 400 MHz): δ = 7.82-7.89 (d, J = 8.0 Hz, 1H), 7.81-7.83 (d, J = 8.8 Hz, 1H), 7.61-7.64 (d, J = 8.8 Hz, 1H), 7.54-7.56 (t, J = 4.0 Hz, 2H), 7.28-7.40(m, 5H), 7.18-7.24 (dd, J_1 = 16.4 Hz, J_2 = 8.4 Hz, 2H), 7.04-7.07 ppm (d, J = 8.8 Hz, 1H); LDI-TOF: m/z (%): 348 (100) [M^+]; elemental analysis (%) for $C_{19}H_{13}BrN_2$: C 65.35, H 3.75, N 8.02; found: C 65.32, H 3.77, N 8.09.

Thermal Properties of *x*PBIPO

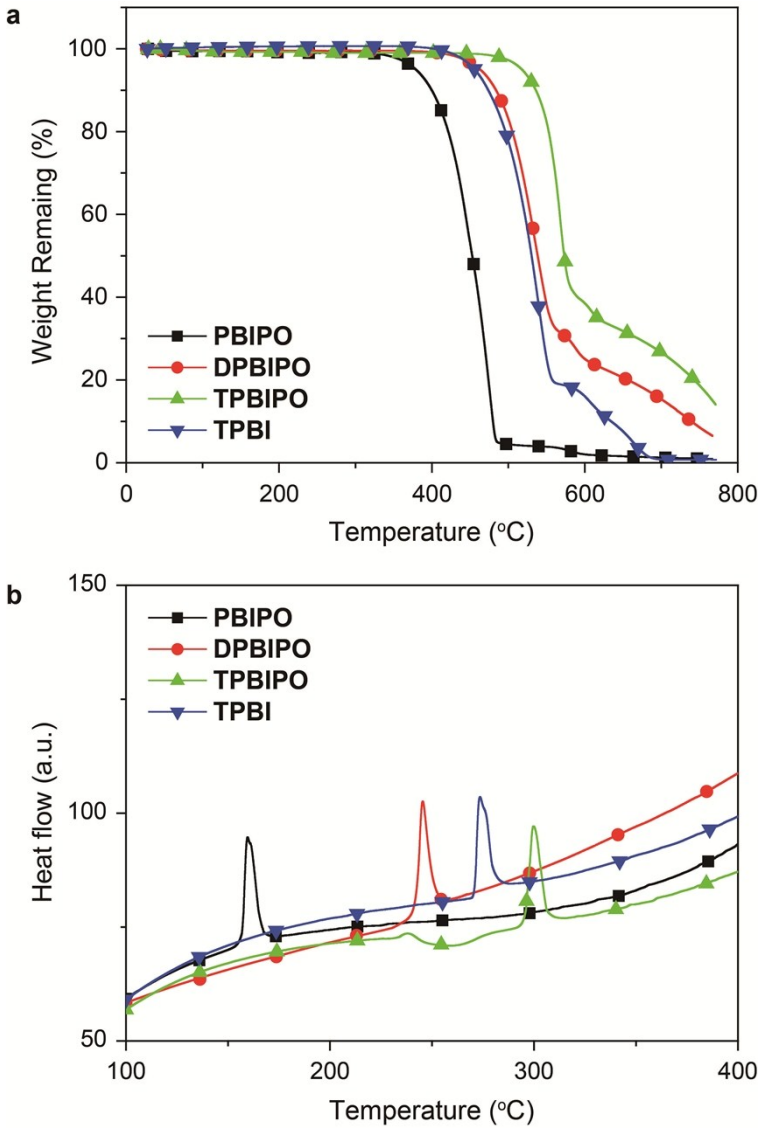


Figure S1. TGA (a) and DSC (b) curves of **xPBIPO** and **TPBI**.

Solid-State Optical Properties

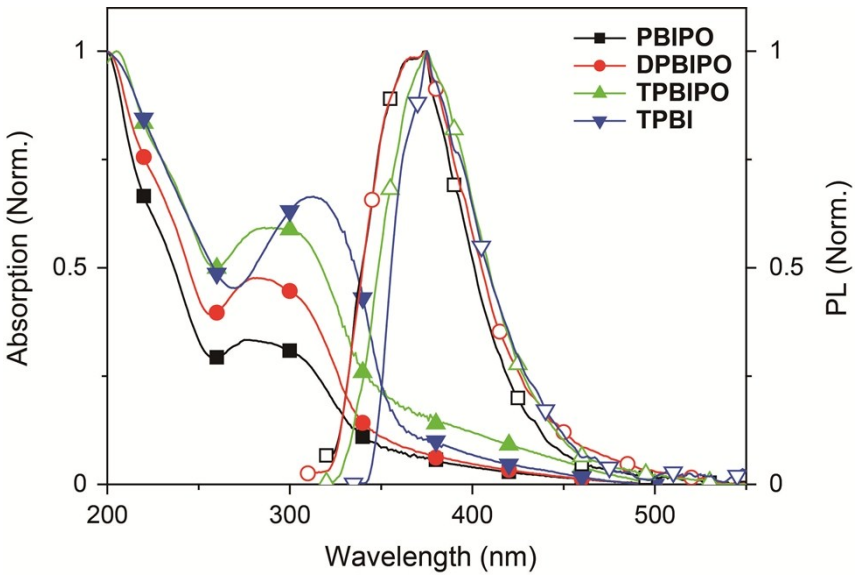


Figure S2. Absorption and fluorescent spectra of spin-coated films of ***x*PBIPO**.

CV Curves

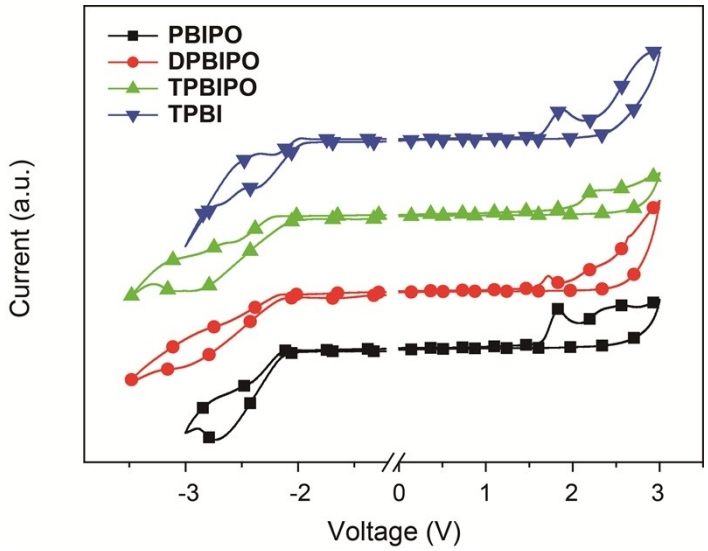


Figure S3. Cyclic voltammograms of ***x*PBIPO** and **TPBI**. The measurement was performed in tetrahydrofuran and dichloromethane, respectively, with tetrabutylammonium hexafluorophosphate as electrolyte at room temperature and a rate of 100 mV s^{-1}.

DFT Calculation

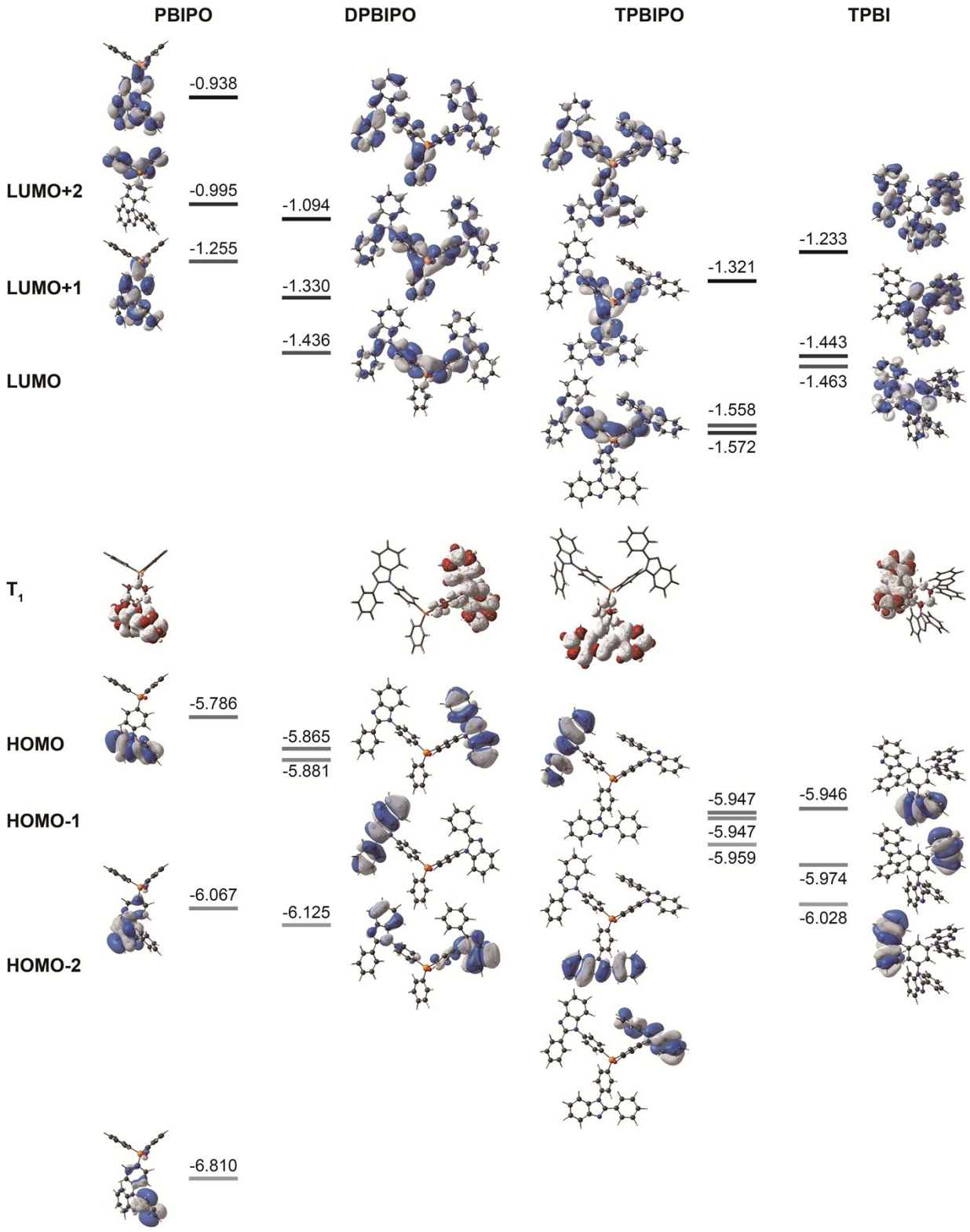
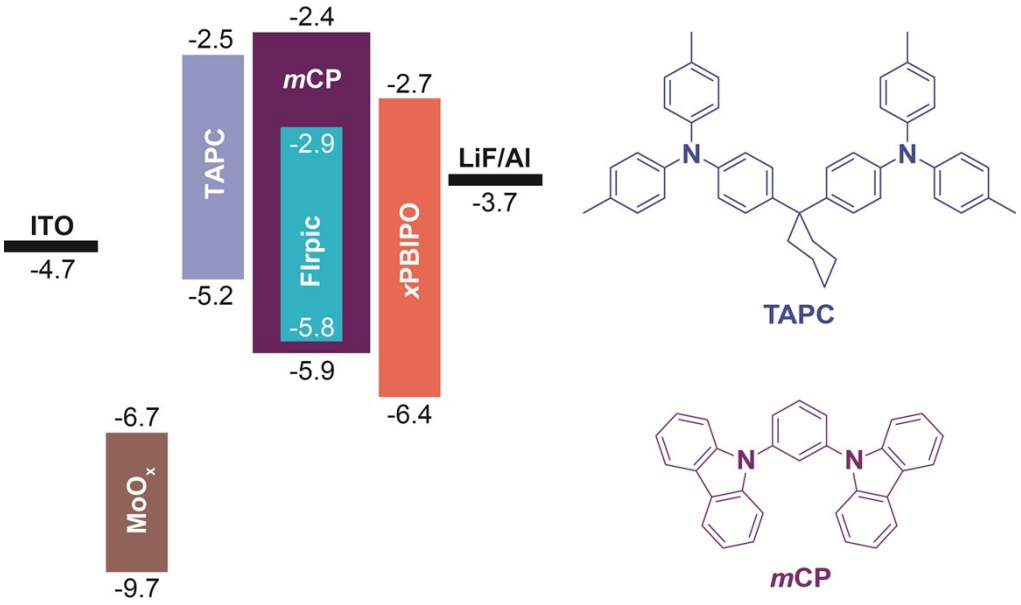


Figure S4. Contours and energy levels of the FMOs and spin density distributions of triplet states of ***x*PBIPO** and **TPBI**.

Device Structure and Energy Level of Blue PHOLEDs



Scheme S1. Energy level diagram of blue-emitting FIrpic-based devices and chemical structures of TAPC and *m*CP.

Device Efficiency Repeatability

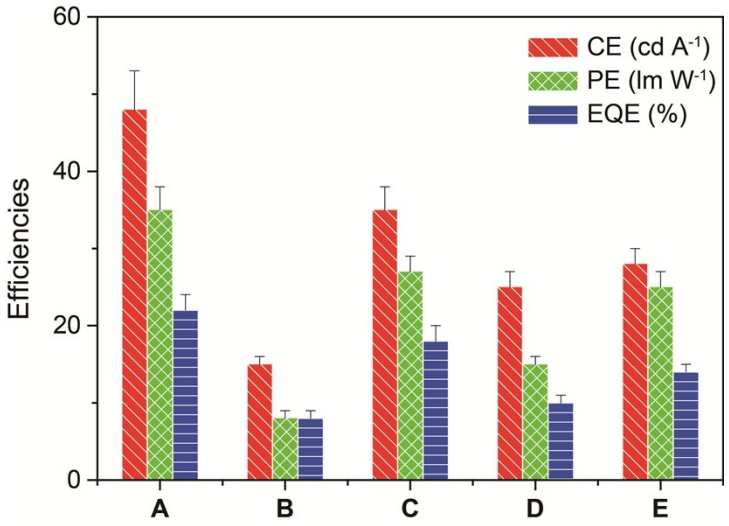


Figure S5. Efficiency range of five blue PHOLEDs with the error bars for ***x*PBIPO**, **TPBI** and **TmPyPB**.

References

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