



Supporting Information

for

Thienothiophene-based organic light-emitting diode: synthesis, photophysical properties and application

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**General experimental device methods, life time spectra,
theoretical computation data, ^1H and ^{13}C NMR spectra**

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1. Fluorescence lifetime

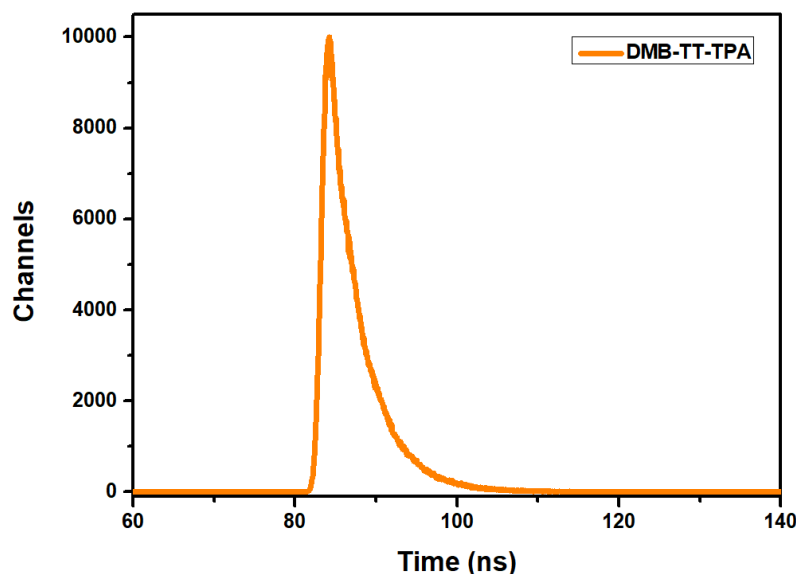


Figure S1: Fluorescence lifetime decay pattern of the DMB-TT-TPA (8).

2. General experimental device methods

TFB (Cambridge Display Technology Ltd.) solution was prepared by dissolving TFB in toluene in 2 mg/mL concentration. The active layer solution was prepared by controlling the host material concentration fixed at 15 mg/mL and blending the emitter at 10 wt % in chlorobenzene. Prepatterned ITO substrates were rinsed in an ultrasonic bath with acetone, isopropyl alcohol, Hellmanex III, and deionized water before deposition of top layers. PEDOT:PSS and TFB were deposited on ITO sequentially via spin-coating at 2500 and 1000 rpms, respectively. Then, the prepared active layer was spin-coated on annealed TFB (180 °C for 1 h in a nitrogen glovebox) at 2000 rpms to form a 50 nm film. Afterwards, TPBi, LiF, and Ca/Ag were thermally evaporated onto the organic layer under vacuum level of $\approx 5 \times 10^{-7}$ mbar. J–V–L characterization (pixel area = 0.045 cm²) was performed using a Keithley 2400 and Konica Minolta LS-110 Luminance Meter. OLED emission profile was assumed to be Lambertian. The EL

spectrum was measured using an Ocean Optics USB 2000 charge-coupled device spectrophotometer.

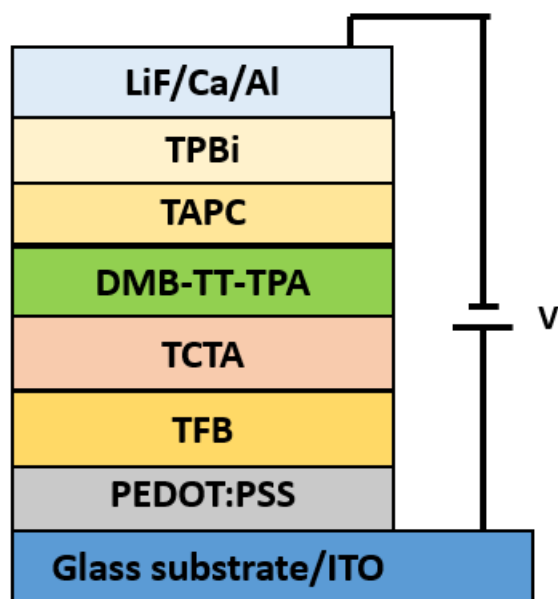


Figure S2: Schematic illustration of the device configuration.

3. Computational data

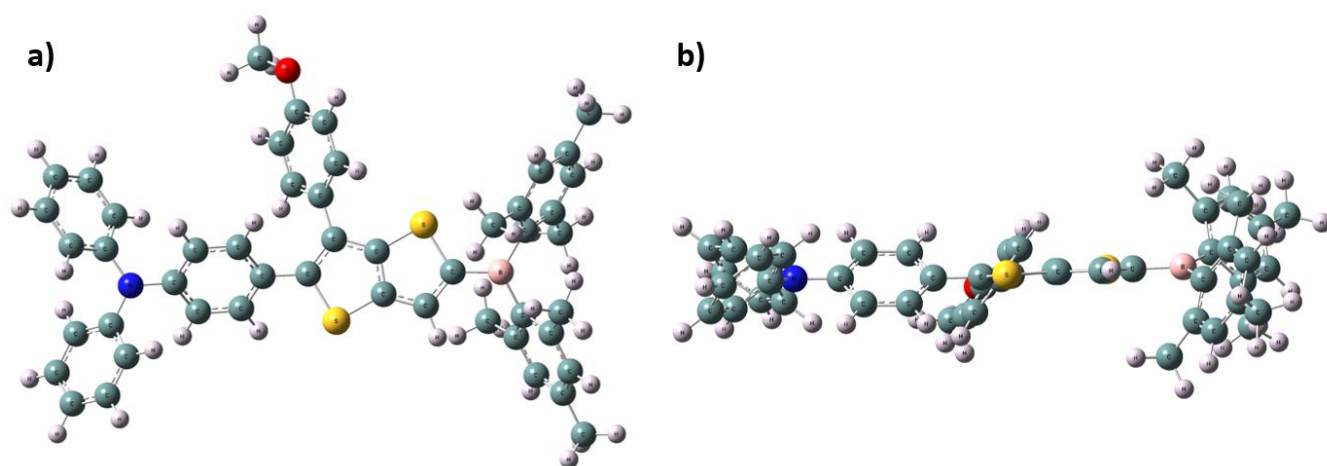


Figure S3: Optimized geometry of DMB-TT-TPA (**8**) of a) top view and b) side view.

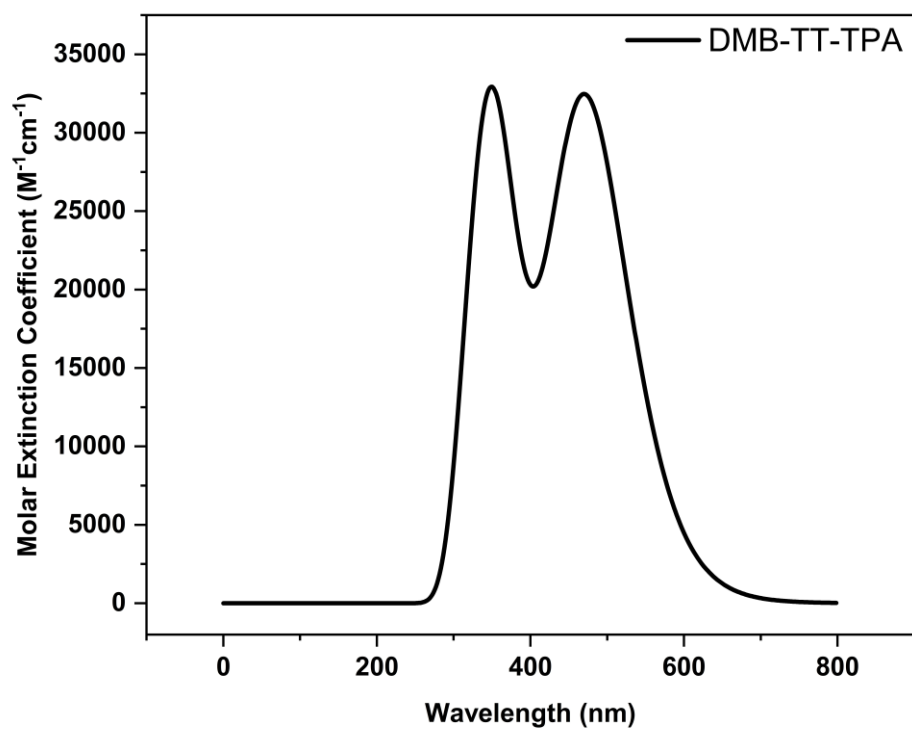


Figure S4: Theoretical UV-vis spectrum of DMB-TT-TPA (8).

4. NMR spectra

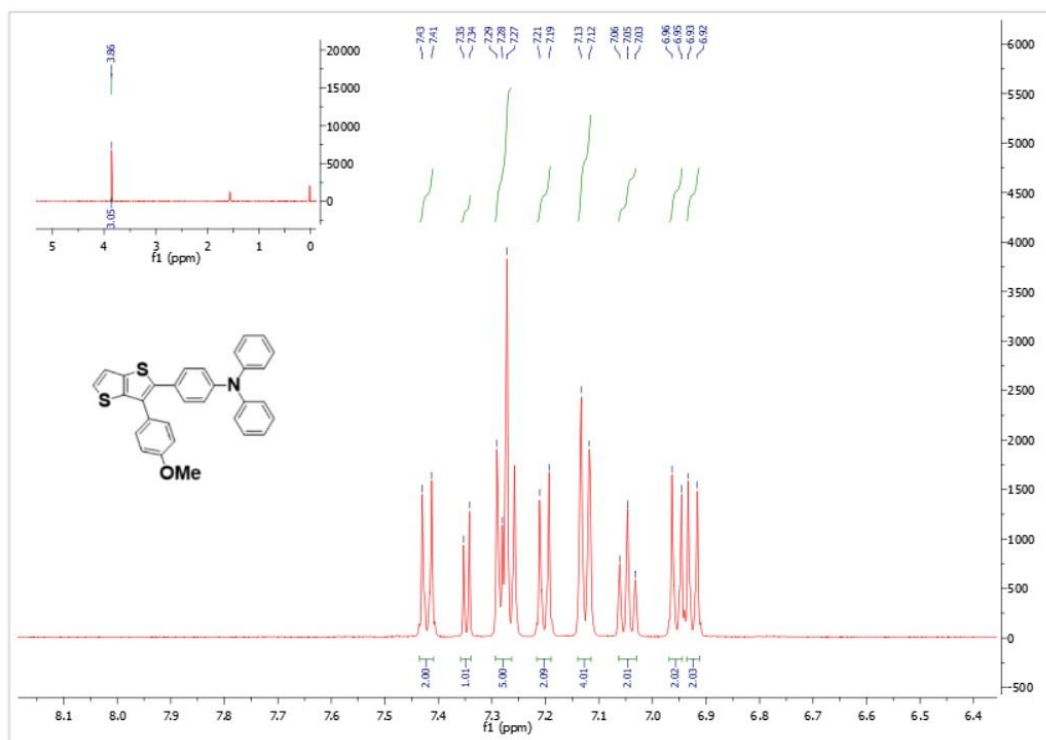


Figure S5: ¹H NMR spectrum of 7.

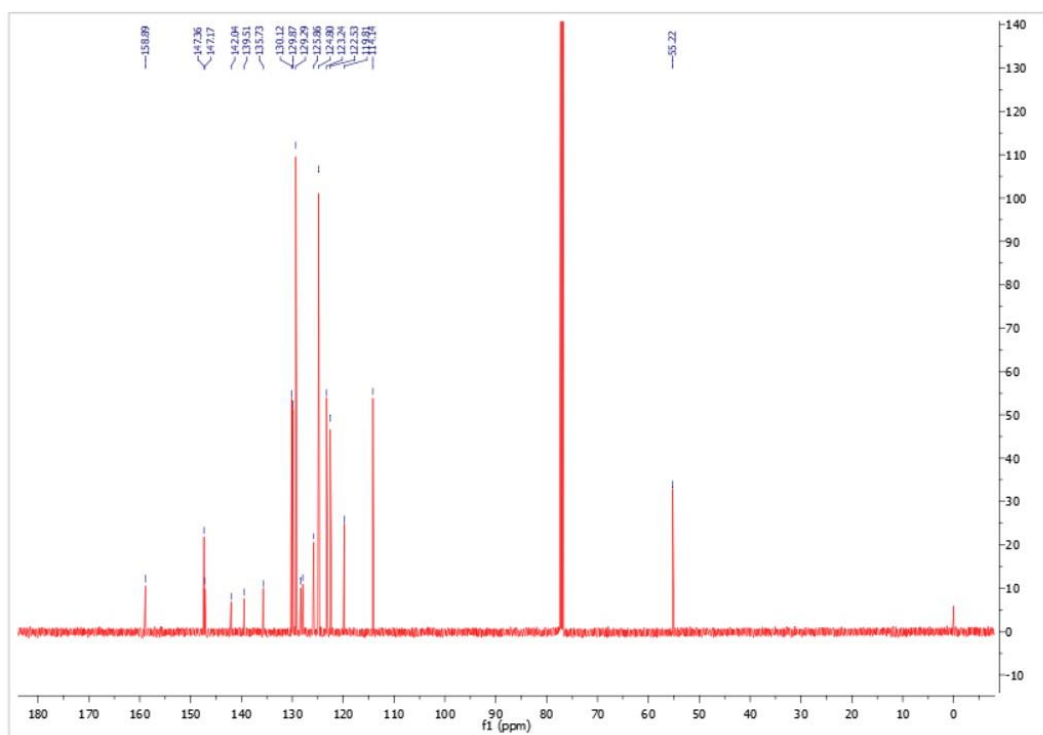


Figure S6: ¹³C NMR spectrum of 7.

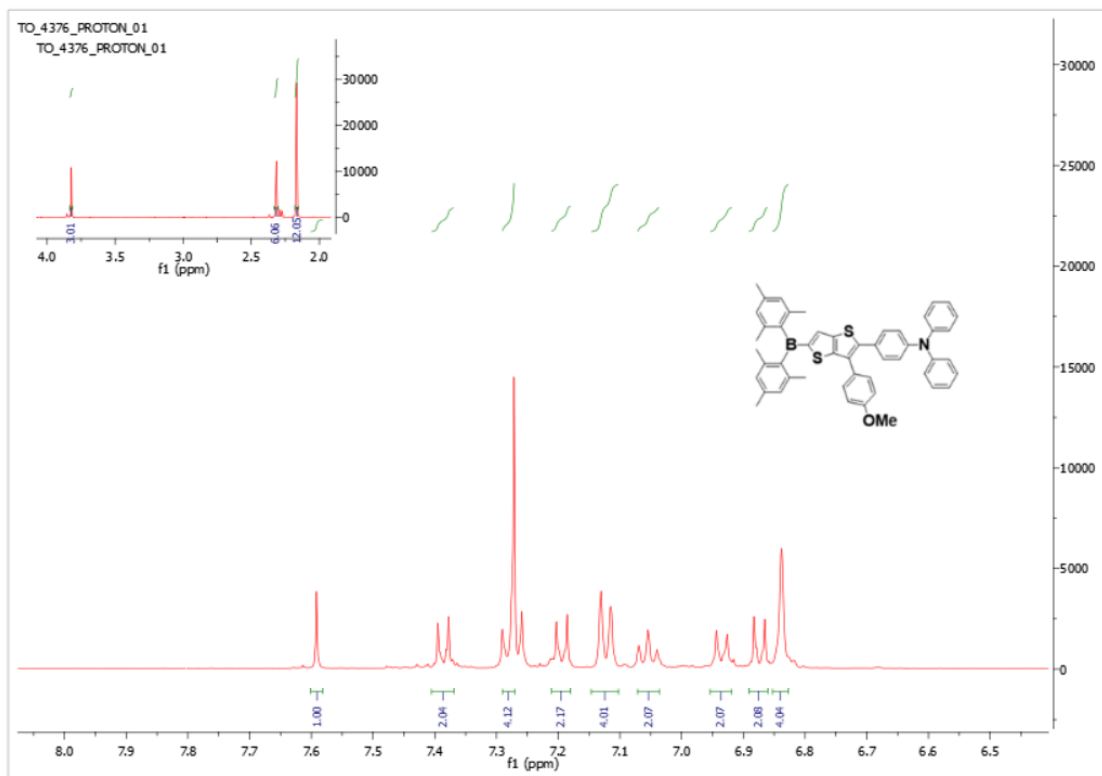


Figure S7: ¹H-NMR spectrum of DMB-TT-TPA (**8**).

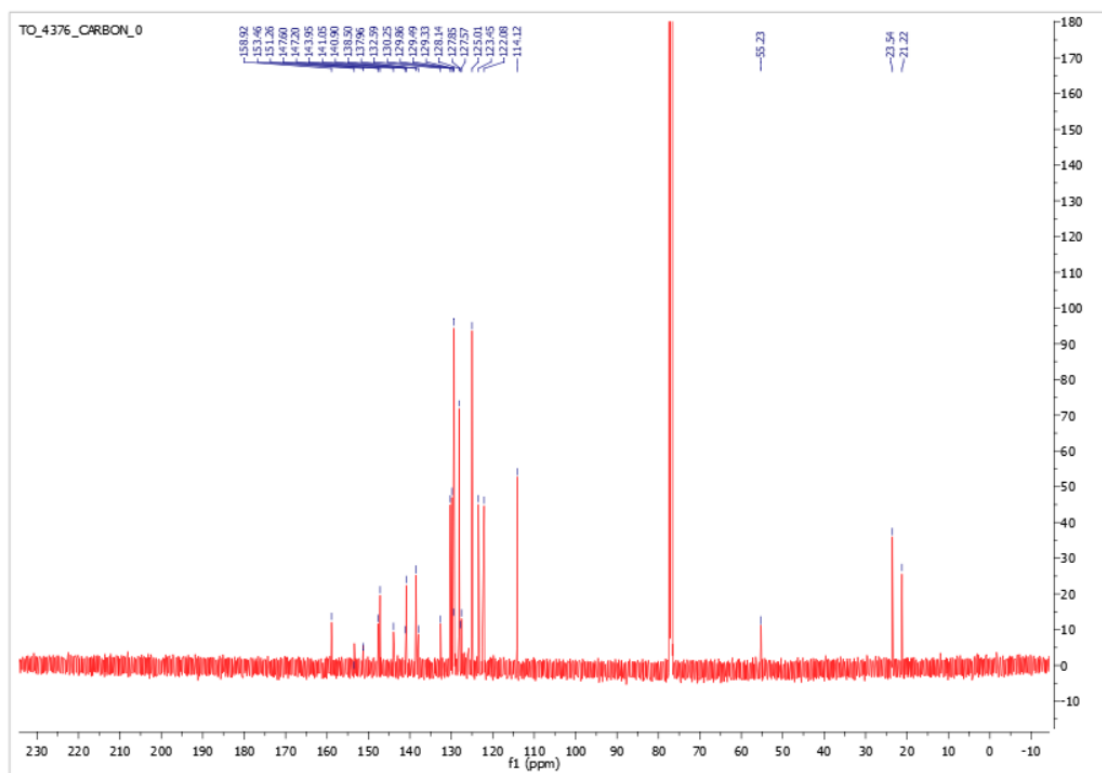


Figure S8: ¹³C NMR spectrum of DMB-TT-TPA (**8**).