Constructing New n-Type, Ambipolar and p-Type Aggregation-Induced Blue Luminogens Through Gradually Tuning the Proportion of Tetrahphenylethene and Diphenylphophine Oxide

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Instruments and characterization methods

¹H NMR and ¹³C NMR spectra were recorded on a Bruker-AF301 AT 400 MHz and 600 MHz spectrometer. Mass spectra were carried out on an Agilent (1100 LC/MSD Trap) using ACPI ionization. UV-Vis absorption spectra were recorded on a Shimadzu UV-VIS-NIR Spectrophotometer (UV-3600). PL spectra were recorded on Edinburgh instruments (FLSP920 spectrometers). Differential scanning calorimetry (DSC) was performed on a PE Instruments DSC 2920 unit at a heating rate of 10 °C/min from 30 to 200 °C under nitrogen. The glass transition temperature (*T*g) was determined from the second heating scan. Thermogravimetric analysis (TGA) was undertaken with a

PerkinElmer Instruments (Pyris1 TGA). The thermal stability of the samples under a nitrogen atmosphere was determined by measuring their weight loss while heating at a rate of 10 °C/min from 30 to 700 °C. Cyclic voltammetry measurements were carried out in a conventional three electrode cell using a Pt button working electrode of 2 mm in diameter, a platinum wire counter electrode, and a $Ag/AgNO_3$ (0.1 M) reference electrode on a computer-controlled EG&G Potentiostat/Galvanostat model 283 at room temperature. Reductions CV of all compounds were performed in dichloromethane containing 0.1 M tetrabutylammonium hexafluorophosphate (Bu_4NPF_6) as the supporting electrolyte. The onset potential was determined from the intersection of two tangents drawn at the rising and background current of the cyclic voltammogram. In TOF mobility measurement, the TOF device was prepared by vacuum deposition using the following structure: ITO/TPEPO derivatives (x μ m)/Al (200 nm). The UV-FQ q-switched DPSS laser (355 nm, 4 ns) is used as the excitation light source, which passes through the ITO electrode and photogenerates a thin sheet of excess carriers. By switching the polarity of the applied dc bias, the transit time ($T_{\rm t}$, the time that the carriers pass through the organic film to reach the counter electrode) is measured by a digital storage oscilloscope. With the applied bias V and the thickness, D, of the organic layer which is much greater than the optical absorption depth of the excitation, the carrier mobilities could be calculated according to the formula $\mu = D / (T_t E) = D^2 / (VT_t)$.

1-(4-Bromophenyl)-1,2,2-triphenylethene (1BrTPE) ¹H NMR (400 MHz, CDCl₃ δ ppm) ¹³C NMR (400 MHz, CDCl₃ δ).

(E, Z)-1,2-Bis(4-bromophenyl)-1,2-diphenylethene (2BrTPE) ¹H NMR (400 MHz, CDCl₃ δ ppm). ¹³C NMR (400 MHz, CDCl₃ δ)

Figure S1. ¹H NMR spectra of BrTPE (CDCl₃) at 298K.

Figure S2. ¹³C NMR spectra of BrTPE (CDCl₃) at 298K.

- Figure S3. ¹H NMR spectra of 2BrTPE (CDCl₃) at 298K.
- Figure S4. ¹H NMR spectra of TPEDPO (CDCl₃) at 298K.
- Figure S5. ¹³C NMR spectra of TPEDPO (CDCl₃) at 298K.
- Figure S6. ¹H NMR spectra of TPEPO (CDCl₃) at 298K.
- Figure S7. ¹³C NMR spectra of TPEPO (CDCl₃) at 298K.
- Figure S8. Mass spectra of TPEPO (CDCl₃) at 298K.
- Figure S9. ¹H NMR spectra of DTPEPO (CDCl₃) at 298K.
- Figure S10. ¹³C NMR spectra of DTPEPO (CDCl₃) at 298K.
- Figure S11. Mass spectra of DTPEPO (CDCl₃) at 298K.
- Figure S12. ¹H NMR spectra of TTPEPO (CDCl₃) at 298K.
- Figure S13. ¹³C NMR spectra of TTPEPO (CDCl₃) at 298K.
- Figure S14. Mass spectra of TTPEPO (CDCl₃) at 298K.



Figure S1. ¹H NMR spectra of BrTPE (CDCl₃) at 298K.



Figure S2. ¹³C NMR spectra of BrTPE (CDCl₃) at 298K.



Figure S3. ¹H NMR spectra of 2BrTPE (CDCl₃) at 298K.



Figure S4. ¹H NMR spectra of TPEDPO (CDCl₃) at 298K.



Figure S5. ¹³C NMR spectra of TPEDPO (CDCl₃) at 298K



Figure S6. ¹H NMR spectra of TPEPO (DMSO) at 298K



Figure S7. ¹³C NMR spectra of TPEPO (CDCl₃) at 298K



Figure S8. Mass spectra of TPEPO (CHCl₃) at 298K



Figure S9. ¹H NMR spectra of DTPEPO (CDCl₃) at 298K



Figure S10. ¹³C NMR spectra of DTPEPO (CDCl₃) at 298K



Figure S11. Mass spectra of DTPEPO (CHCl₃) at 298K



Figure S12. ¹H NMR spectra of TTPEPO (CDCl₃) at 298K



Figure S13. ¹³C NMR spectra of TTPEPO (CDCl₃) at 298K



Figure S14. Mass spectra of TTPEPO (CDCl₃) at 298K

1. The PL properties of TPE/PO derivatives in film state



Figure. S15 The Abs and PL of TPEDPO, TPEPO, DTPEPO and TTPEPO in

film state



Figure. S16 Transient fluorescence decay Lifetime of **TPEDPO**, **TPEPO**, **DTPEPO** and **TTPEPO** in fim state.



2. Mobility measurement (TOF) of TPE/PO derivatives.

Figure. S17 Representative TOF transients for TPEDPO: (a) electron and (b) hole.



Figure. S18 Representative TOF transients for TPEPO: (a) electron and (b) hole.



Figure. S19 Representative TOF transients for DTPEPO: (a) electron and (b) hole.



Figure.S20 Representative TOF transients for TTPEPO: (a) electron and (b) hole.