Supporting Information

High-Efficiency Exciplex-Based White Organic Light-Emitting Diodes with a New Tripodal Material as a Co-Host

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Experimental Section:

All the materials used in this work were purchased from Lumtec Company without further purification. $^1$H NMR and $^{13}$C NMR spectra were recorded on a Bruker 400 spectrometer and Agilent DD2-600MHz NMR spectrometer at room temperature. Matrix-Assisted Laser Desorption/ Ionization Time of Flight Mass Spectrometry (MALDI-TOF-MS) was acquired with a BRUKER ultrafleXtreme MALDI-TOF spectrometer. Ultraviolet-visible (UV-Vis) absorption spectra were obtained on a Hitachi U-3900 UV–Vis spectrophotometer. PL spectra and phosphorescent spectra were recorded on a Hitachi F-4600 fluorescence spectrophotometer. PL lifetime spectra was obtained on HAMAMATSU compact fluorescence lifetime spectrometer C11637. Thermogravimetric analysis (TGA) was performed on a TA SDT 2960 instrument at a heating rate of 10 ℃/min under nitrogen. Differential scanning calorimetry (DSC) was performed on a TA DSC 2010 unit at a heating rate of 10 ℃/min under nitrogen. Cyclic voltammetry (CV) was carried out on a CHI600 voltammetric analyzer at room temperature with ferrocenium-ferrocene (Fc+/Fc) as the internal standard. A conventional three-electrode configuration consisting of a Pt-wire counter electrode, an Ag/AgCl reference electrode, and a platinum working electrode was used. The oxidative scans were performed at a scan rate of 0.05 V/s. Degassed DCM was used as solvent for oxidation scan with tetrabutylammonium hexafluorophosphate (TBAPF6) (0.1 M) as the supporting electrolyte.
Fig. S1 $^1$H NMR spectrum of 4-(phenylamino)benzonitrile (400 MHz, CDCl$_3$)

Fig. S2 $^1$H NMR spectrum of 5-chloro-N1,N1,N3,N3-tetraphenylbenzene-1,3-diamine (400 MHz, CDCl$_3$)
Fig. S3 $^1$H NMR spectrum of 4-((3,5-bis(diphenylamino)phenyl)(phenyl)amino)benzonitrile (400 MHz, DMSO)

Fig. S4 $^{13}$C NMR spectrum of 4-((3,5-bis(diphenylamino)phenyl)(phenyl)amino)benzonitrile (400 MHz, CDCl$_3$)
Fig. S5 Cyclic voltammogram of CNTPA-DPA

Fig. S6 DSC traces and TGA curves of CNTPA-DPA recorded at a heating rate of 10 °C min⁻¹.
Fig. S7 Current density versus voltage curves of hole-only devices for CNTPA-DPA and mCP. (ITO/HAT-CN (10 nm)/CNTPA-DPA or mCP (100 nm)/HAT-CN (10 nm)/Al (120 nm)).

Table S1 Physical properties of CNTPA-DPA.

<table>
<thead>
<tr>
<th>Compounds</th>
<th>$T_g$</th>
<th>$T_d$</th>
<th>$S_1$</th>
<th>$T_1$</th>
<th>$\Delta E_{ST}$</th>
<th>HOMO</th>
<th>LUMO</th>
<th>$E_g$</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNTPA-DPA</td>
<td>72</td>
<td>358</td>
<td>3.01</td>
<td>2.74</td>
<td>0.27</td>
<td>-5.76</td>
<td>-2.49</td>
<td>3.27</td>
</tr>
</tbody>
</table>

($E_g$ = energy gap calculated from the onset absorption wavelength; HOMO estimated by cyclic voltammetry, LUMO deduced from $E_g$ and HOMO; $T_d$ = temperature for 5% weight loss; $T_g$ = glass-transition temperature.)
Fig. S8 EL characteristics of Device W3. (a) Schematic diagram of W3 structure. (b) PE-Luminance-EQE (PE-L-EQE) curves of W3. (c) CE-Voltage-Luminance (CE-V-L) curves of W3. (d) Normalized EL spectra at various luminance of 1000, 2000, 4000 and 8000 cd m$^{-2}$ and the corresponding CIE values of W3.
Fig. S9 EL characteristics of Device W4. (a) Schematic diagram of W3 structure. (b) PE-Luminance-EQE (PE-L-EQE) curves of W4. (c) CE-Voltage-Luminance (CE-V-L) curves of W4. (d) Normalized EL spectra at various luminance of 1000, 2000, 4000 and 8000 cd m$^{-2}$ and the corresponding CIE values of W4.
**Fig. S10** Schematic diagram of the exciton energy transfer or loss process of MEHs system.

**Fig. S11** Phosphorescence (77 K) spectra of CNTPA-DPA: PO-T2T solid film.