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### **Electronic Supplementary Material (ESI) for**

# Fluorine Induced Self-doping and Spatial Conformation in Alcohol-soluble Interlayer for Highly-efficient Polymer Solar Cells

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#### **Experimental Section**

#### 1. Materials.

3,6-Di-thiophen-2-yl-2,5-dihydro-pyrrolo[3,4-c]pyrrole-1,4-dione (DPP), herrmann's catalyst and 1,6-dibromohexane were purchased from J&K Chemical Technology. 1,4-diiodobenzene, 1,4-dibromo-2,5-difluorobenzene, 1,4-diiodotetrafluorobenzene, tris(2-methoxyphenyl)phosphine, trimethylacetic acid (PivOH), trimethylamine were purchased from Alfa Aesar. THF, toluene, chlorobenzene and other chemicals were obtained from Aldrich Chemical Co and Shanghai Reagent Co. Toluene and THF were distilled before use. P3HT, PTB7, PBDB-T, PC<sub>61</sub>BM, PC<sub>71</sub>BM, ITIC and molybdenum oxide (MoO<sub>3</sub>) were purchased from Rieke Metals, Inc. and Nano-C, and indium tin oxide (ITO) was obtained from Delta Technologies Limited. The synthetic routes toward the target n-CPEs were shown in **Scheme S1**.

### 2. Synthesis of the n-CPEs

## (1) Synthesis of 2,5-bis-(6-bromo-hexyl)-3,6-di-thiophen-2-yl-pyrrolo[3,4c]pyrrole-1,4-dione (DPP-Br).

3,6-di-thiophen-2-yl-2,5-dihydro-pyrrolo[3,4-c]pyrrole-1,4-dione (DPP) (1 g, 3.33 mmol), 1,6-dibromohexane (8.12 g, 6.66 mmol) and 4 g Cs<sub>2</sub>CO<sub>3</sub> were added into a dry 100ml flask and sealed under a nitrogen atmosphere. Then a 10 ml DMF was injected into the flask and the reaction mixture was stirred at 110 °C for 1 days. After cooling to room temperature, the reaction mixture was poured into the water. The organic phase was collected and washed with distilled water three times, dried with anhydrous sodium sulfate, and filtered. The solvent was removed by reduced pressure, and the residue was dried by vacuum to give the crude product. Purification was accomplished by column chromatography on silica with dichloromethane to afford the red solid. A red solid was recoverd with 92% yield (3.5 g). <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>):  $\delta$  (ppm) 1.29-1.67 (m, 10H), 1.75-1.82 (m, 4H), 1.89-1.95 (m, 2H), 3.31 (t, 4H), 4.2 (t, 4H), 7.25 (s, 2H), 7.75 (s, 2H), 8.8 (s, 2H). <sup>13</sup>C NMR (400 MHz, CDCl<sub>3</sub>):  $\delta$  (ppm) 135.32, 130.65, 128.63,

77.28, 76.84, 76.54, 41.85, 33.65, 32.68, 29.86, 27.84, 25.99. MS (MALDI): m/z 624.91 (M<sup>+</sup>), Anal Calcd for C<sub>26</sub>H<sub>30</sub>Br<sub>2</sub>N<sub>2</sub>O<sub>0</sub>S<sub>2</sub>: C, 49.85; H, 4.83; Br, 25.52; N, 4.47; O, 5.11; S, 10.24%.

# (2) Synthesis of Poly-2,5-Bis-(6-bromo-hexyl)-3-thiophen-2-yl-pyrrolo[3,4c]pyrrole-1,4-dione-alt-1,4-phenylene (PDPPTPT-Br).

DPPN-Br (0.221 g, 0.244mmol), 1,4-diiodobenzene (0.081 g, 0.244mmol), and 10 mg Herrmann's Catalyst were added into a dry 100ml flask and sealed under a nitrogen atmosphere. Then a 10 ml fresh THF was injected into the flask and the reaction mixture was stirred at 80 °C for 2 days. After the mixture was cooled to room temperature, the solution was poured into 500 ml methanol under vigorous stirring. The precipitate was filtered off and purified by precipitation in methanol followed by Soxhlet extraction using methanol, acetone, hexane and chloroform. Polymers were obtained from chloroform by rotary evaporation. A dark purple solid was recoverd with 70% yield (0.21 g). <sup>1</sup>H NMR (400 MHz, CDCl<sub>3</sub>):  $\delta$  (ppm) 0.9-1.08 (m,4H), 1.25-1.64 (m, 8H), 1.65-1.72 (m, 2H), 1.80-1.93 (m, 2H), 3.31 (t, 4H), 4.2 (t, 4H), 7.4-7.6 (t, 2H), 7.6-7.8 (t, 2H), 8.8-9.0 (t, 2H).

# (3) Synthesis of Poly-2,5-Bis-(6-bromo-hexyl)-3-thiophen-2-yl-pyrrolo[3,4c]pyrrole-1,4-dione-alt-2,5-difluoro-1,4-phenylene (PDPPTPf<sub>2</sub>T-Br).

DPPN-Br (0.221 g, 0.244mmol)), 1,4-dibromo-2,5-difluorobenzene (100 g, 0.273mmol), and 13 mg (PPh<sub>3</sub>)<sub>4</sub>Pd(0) were added into a dry 100ml flask and sealed under a nitrogen atmosphere. Then a 10 ml fresh THF was injected into the flask and the reaction mixture was stirred at 80 °C for 3 days. After the mixture was cooled to room temperature, the solution was poured into 500 ml methanol under vigorous stirring. The precipitate was filtered off and purified by precipitation in methanol followed by Soxhlet extraction using methanol, acetone, hexane and chloroform. Polymers were obtained from chloroform by rotary evaporation. A dark purple solid was recoverd with 64% yield (0.2 g). <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>):  $\delta$ (ppm) 0.92-1.04 (m,4H), 1.1-1.46 (m, 8H), 1.5-1.62 (m, 2H), 1.90-2.01 (m, 2H), 3.5 (t, 4H), 4.3 (t, 4H),

## (4) Synthesis of Poly-2,5-Bis-(6-bromo-hexyl)-3-thiophen-2-yl-pyrrolo[3,4c]pyrrole-1,4-dione-alt-2,3,5,6-tetrafluoro-1,4-phenylene (PDPPTPf4T-Br).

DPPN-Br (0.221 g, 0.244mmol), 1,4-Diiodotetrafluorobenzene (0.081 g, 0.2mmol), 15 mg tris(2-methoxyphenyl)phosphine and 10 mg Herrmann's Catalyst were added into a dry 100ml flask and sealed under a nitrogen atmosphere. Then a 10 ml fresh toluene was injected into the flask and the reaction mixture was stirred at 110 °C for 3 days. After the mixture was cooled to room temperature, the solution was poured into 500 ml methanol under vigorous stirring. The precipitate was filtered off and purified by precipitation in methanol followed by Soxhlet extraction using methanol, acetone, hexane and chloroform. Polymers were obtained from chloroform by rotary evaporation. A dark purple solid was recoverd with 64% yield (0.2 g). <sup>1</sup>H NMR (400 MHz, CD<sub>2</sub>Cl<sub>2</sub>):  $\delta$  0.8-0.97 (m,4H), 1.21-1.46 (m, 8H), 1.5-1.62 (m, 4H), 3.48 (t, 4H), 4.2-4.4 (t, 4H), 7.31-7.7 (t, 2H), 7.8-7.86 (t, 2H), 9.0-9.1 (t, 2H).

#### (5) General Ionization Reaction Procedure.

The target n-CPEs were obtained share the similar synthesis method. A condensed trimethylamine (3 ml) was added dropwise to a solution of the neutral copolymer PDPPTPT-Br (0.20g, 0.175mmol), PDPPTPf<sub>2</sub>T-Br (0.20g, 0.174mmol), and PDPPTPf<sub>4</sub>T-Br (0.20g, 0.173mmol) in chloroform (20 ml) under a low temperature. The react mixture was stirred for 24h. The react mixture was allowed to warm to room temperature, gradually. Then, an extra trimethylamine (2 ml) was added after the mixture was cooled to below zero and the mixture was stirred for 24h at room temperature. Repeat for three days, after evaporating the solvents under reduced pressure, the resulting polymer was dissolved in methanol and precipitated into diethyl ether. The precipitated polymer was filtered and purified by reprecipitation with acetone and diethyl ether several times, a fuscous solid was obtained.

### **3.** Device Fabrication and Characterizations.

All the devices were manufactured with the structure of Glass/ITO/n-CPEs/active layer/MoO<sub>3</sub>/Ag. The conductive ITO substrates were sequentially cleaned with ultrasonication in acetone, detergent, water, and isopropanol. After drying the ITO substrates and treating the surface with UV ozone for 20 min, then the cathode buffer layer of n-CPEs PDPPTPT-N<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup> and PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup> were prepared by spin coating at a spin speed of 4000 rpm for 1 min from solution in MeOH solvent with a concentration of 1 mg/mL onto the cleaned ITO substrates. Then the P3HT/PC<sub>61</sub>BM (1:1 w/w) active layer was prepared by spin-casting o-dichlorobenzene solution with a concentration of 20 mg mL<sup>-1</sup> at 800 rpm and then annealed at 150 °C for 10 min in a nitrogen-filled glovebox. For PTB7- based device, before the deposition of n-CPEs, the AZO film was applied onto the ITO to as the hole-block layer, the PTB7:PC71BM (1:1.5 w/w) were dissolved in chlorobenzene with 3% (vol %) diiodooctane (DIO), mixed solution with a total concentration of 25 mg ml<sup>-1</sup>, and then spin-coated onto the interfacial layer at a speed of 1000 rpm for 2 minutes. For PBDB-T- based device, PBDB-T:ITIC (1:1 w/w) were dissolved in chlorobenzene with 3% (vol %) diiodooctane (DIO), mixed solution with a total concentration of 20 mg ml<sup>-1</sup>, and then spin-coated onto the interfacial layer at a speed of 2500 rpm for 1 minutes. Subsequently, the double-layer structure of MoO<sub>3</sub> (7 nm)/Ag (90 nm) was deposited over the active layer by thermal evaporation under a vacuum chamber to accomplish the device fabrication. The effective area of one cell was 0.04 cm<sup>2</sup>. The current-voltage (J-V) characteristics were measured by a Keithley 2400 Source Meter under simulated solar light (100 mW/cm<sup>2</sup>, AM 1.5 G, Abet Solar Simulator Sun2000). The incident photon-to-electron conversion efficiency (IPCE) spectra were detected on an IPCE measuring system (Oriel Cornerstone 260 1/4 m monochromator equipped with Oriel 70613NS QTH lamp). All the measurements were performed at room temperature under ambient atmosphere.

### Characterizations

#### 1. UV-Vis-NIR Absorptions:

All the measurements were performed using a Perkin Elmer Lambda 750 spectrophotometer at room temperature. All film experiments were run in MeOH for PDPPTPT-N<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup> and PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup>. Thin film samples were deposited by spin casting from solution (1 mg/mL) at 1000 rpm onto glass substrates. The glass substrates were cleaned via sonic oscillation in soap water, DI water, acetone and isopropanol and dried under a stream of N<sub>2</sub>. The band gaps of the polymers were determined from the onset of the absorption spectra.

#### 2. Electrochemical Measurements:

All electrochemical measurements were performed using CHI instrument model 730B in a standard three-electrode, one compartment configuration equipped with a Ag wire quasi reference electrode, Pt wire counter electrode, and glassy carbon (dia. 3 mm) working electrode. Glassy carbon electrodes were polished with alumina. The cyclic voltammetry (CV) experiments were performed in anhydrous acetonitrile (AcCN) solution with 0.1 M tetrabutylammonium hexafluorophosphate (TBAPF<sub>6</sub>) as the supporting electrolyte at scan rate 100 mV/s. All electrochemical solutions were purged with dry N<sub>2</sub> for 5 minutes at least to deoxygenate the system. The HOMO and LUMO levels were obtained by correlating the onsets ( $E_{ox}$ ,  $E_{red}$ ) to the normal hydrogen electrode (NHE). Films for all the polyelectrolytes were formed by casting about 5  $\mu$ L of 1 mg/mL aqueous solution on the glassy carbon working electrode, and dried under vacuum overnight before measurements.

### 3. UPS/XPS measurement:

The UPS measurements were carried out in a Thermo-VG Scientific ESCALAB 250 using a He I (21.22 eV) discharge lamp. A bias of -8.0 V was applied to the samples for separation of the sample and the secondary edge for the analyzer. XPS studies were performed on a Thermo-VG Scientific ESCALAB 250 photoelectron spectrometer using a monochromated AlKa (1,486.6 eV) X-ray source. All recorded peaks were corrected for electrostatic effects by setting the C-C component of the C 1s peak to

284.8eV. The base pressure in the XPS analysis chamber was  $2 \times 10^{-9}$  mbar. Solutions were dissolved at a concentration of 0.1% wt. in methanol for three n-CPEs. The solutions were spun cast on top of pre-cleaned ITO substrateds with a thinkness about 10 nm.

The ionization potential (IP), which is an approximation of the HOMO energy, can be estimated by using the incident photon energy (hv = 21.2 eV for He I) according to the equation,

$$IP = hv - (E_{SE} - E_{HOMO})$$

where  $E_{SE}$  is the high binding energy cutoff. The electron affinity (EA), and therefore the LUMO energy, can be estimated by adding the optical gap (Eg) and the IP values from **Fig. S6.** The uncertainty of the EA values can be caused by a difference between the transport gap and Eg, which may be attributed to the exciton binding energy.

### 4. Space-charge-limited-current (SCLC) mobility measurement:

In order to characterize the carrier mobility of modified device, electron-only devices were fabricated. The electron-only devices used a diode configuration of ITO/n-CPEs/P3HT:PC<sub>61</sub>BM/LiF/Al. The relative carrier mobility was measured using the SCLC model at low voltage which was described by below Equation:

$$J=9\varepsilon_0\varepsilon_r\mu V^2/8L^3$$

Where  $\varepsilon_0$  was the permittivity of free space (8.85 × 10<sup>-12</sup> F·m<sup>-1</sup>),  $\varepsilon_r$  was the dielectric constant of P3HT or PC<sub>61</sub>BM (assumed to 3),  $\mu$  was the mobility of an electron, V was the applied voltage, and L was the film thickness. The thickness of the BHJ blend for SCLC measurement was about 100 nm. By fitting the results to a space-charge-limited form,  $J^{0.5}$  versus V was plotted in **Fig. 6a**.



Scheme S1. Structure and synthesis routes of n-CPEs PDPPTPT-N<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup> and PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup>.



Fig. S1. The <sup>1</sup>H NMR of the intermediate compound DPP-Br.



Fig. S2. The <sup>13</sup>C NMR of the intermediate compound DPP-Br.



**Fig. S3.** The matrix-assisted laser desorption/ionization-time-of flight mass spectrometry (MALDI-TOF MS) spectrogram of small molecule DPP-Br.



**Fig. S4.** The <sup>1</sup>H NMR of the copolymer PDPPTPT-Br.



**Fig. S5.** The <sup>1</sup>H NMR of the copolymer PDPPTPf<sub>2</sub>T-Br.



**Fig. S6.** The <sup>1</sup>H NMR of the copolymer PDPPTPf<sub>4</sub>T-Br.



**Fig. S7.** The Gel Permeation Chromatography (GPC) chromatograms of polymers PDPPTPT-Br, PDPPTPf<sub>2</sub>T-Br and PDPPTPf<sub>4</sub>T-Br.

**Table S1.** The Gel Permeation Chromatography (GPC) parameters of polymersPDPPTPT-Br, PDPPTPf2T-Br and PDPPTPf4T-Br. Determined by GPC usingtetrahydrofuran as eluent under 30 °C. (PDI = Mn/Mw)

n-CPEs	Mn(kg mol⁻¹)	Mw(kg mol⁻¹)	PDI
PDPPTPT-N <sup>+</sup> Br <sup>-</sup>	15.427	33.780	2.18
PDPPTPf2T-N <sup>+</sup> Br <sup>-</sup>	17.744	32.013	1.80
PDPPTPf₄T-N⁺Br⁻	13.294	22.407	1.59



**Fig. S8.** Survey X-ray photoelectron spectra of ITO and ITO coated by PDPPTPT-N<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup> and PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup> three n-CPEs.



**Fig. S9.** Cyclic voltammetry (CV) of the n-CPEs PDPPTPTN<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup> and PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup> in the film measured in a 0.1 M Bu<sub>4</sub>NPF<sub>6</sub>-CH<sub>3</sub>CN solutions with a Pt electrode and an Ag/AgNO<sub>3</sub> reference electrode.

n-CPEs	IP <sup>a</sup> (eV)	EA <sup>b</sup> (eV)	Elumo <sup>c</sup> (eV)	Еномо <sup>с</sup> (eV)	Eg <sup>cv</sup> (eV)	Eg <sup>opt</sup> (eV)
PDPPTPT-N <sup>+</sup> Br <sup>-</sup>	4.95	3.60	-3.60	-4.95	1.35	1.50
PDPPTPf <sub>2</sub> T-N <sup>+</sup> Br <sup>-</sup>	4.98	3.68	-3.68	-4.98	1.30	1.47
PDPPTPf₄T-N⁺Br⁻	5.04	3.79	-3.79	-5.04	1.25	1.41

**Table S2.** Corresponding CV and UV-vis data of the n-CPEs PDPPTPTN<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup> and PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup>.

<sup>*abc*</sup>Obtained from CV measurements, IP =  $|E_{HOME}|$ , EA =  $|E_{LUMO}|$ .  $E_{HOMO}$ =- ( $E_{ox}$ +4.4)

 $eV, E_{LUMO} = -(E_{red} + 4.4) eV.$ 

ITO/n-CPEs	UPS Data		
	Ecutoff(eV) <sup>a</sup>	E <sub>onset</sub> (eV) <sup>b</sup>	WF (eV) <sup>c</sup>
Bare ITO	14.02	0.94	4.70
ITO/PDPPTPT-N <sup>+</sup> Br <sup>-</sup>	14.15	1.03	4.58
ITO/PDPPTPf2T-N <sup>+</sup> Br <sup>-</sup>	14.56	1.51	4.37
ITO/PDPPTPf₄T-N⁺Br⁻	14.87	1.70	4.22

**Table S3.** Summary of electrochemical properties of ITO modified with PDPPTPT- $N^+Br^-$ , PDPPTPf2T-N+Br- and PDPPTPf4T-N+Br- obtained from UPS.

<sup>a</sup>The high binding-energy cutoff. <sup>b</sup>The onset relative to the Fermi level ( $E_F$ ) of Au, where the  $E_F$  was determined from the Au substrate. <sup>c</sup>Work Function (WF) was calculated from the HOMO level (-HOMO =  $hv - (E_{cutoff} - E_{oneset})$ , hv = 21.22 eV) and optical band gap obtained from UV-vis absorption spectra.



**Fig. S10.** The effective work functions (open circle) of the ITO electrodes coated with PDPPTPT-N<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup>.



Fig. S11. The AFM height images of bare ITO.



**Fig. S12.** The contact angles of (a) bare ITO, (b) ITO/PDPPTPT-N<sup>+</sup>Br<sup>-</sup>, (c) ITO/PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup> and (d) ITO/PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup> film to deionized water.



**Fig. S13.** Optical transmittance spectra of the bare ITO and the ITO coated with PDPPTPTN<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup> and PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup> n-CPEs.



**Fig. S14.** (a) *J-V* characteristics of the inverted PSC used in this study for ITO/n-CPEs/P3HT:PC<sub>61</sub>BM/MoO<sub>3</sub>/Ag based solar cells under AM 1.5 G illumination at 100 mWcm<sup>-2</sup> with n-CPEs, (b) the corresponding EQE spectra of the devices, (c) *J-V* characteristics of the devices in the dark.

**Table S4.** Summary of electron mobility and conductivity obtained by devices with AZO, PDPPTPT-N<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup>, and PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup> as ETLs.

ETL	AZO	PDPPTPT-N*Br	PDPPTPf <sub>2</sub> T-N <sup>+</sup> Br <sup>-</sup>	PDPPTPf <sub>4</sub> T-N <sup>+</sup> Br <sup>-</sup>
electron mobility [cm <sup>2</sup> V <sup>-1</sup> s <sup>-1</sup> ]	3.61×10⁻⁴	1.30×10 <sup>-4</sup>	5.07×10 <sup>-4</sup>	1.68×10 <sup>-3</sup>
Conductivity [S cm <sup>-1</sup> ]	3.27×10⁻⁴	2.58×10 <sup>-4</sup>	5.31×10⁻⁴	8.87×10 <sup>-4</sup>



**Fig. S15**. AFM height images of PTB7:PC<sub>71</sub>BM films on top of the (a) AZO, (b) AZO/PDPPTPT-N<sup>+</sup>Br<sup>-</sup>, (c) AZO/PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup>, and (d) AZO/PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup> coated AZO films.



Fig. S16. AFM height images of PBDB-T:ITIC films on top of the (a) AZO, (b) AZO/PDPPTPT-N<sup>+</sup>Br<sup>-</sup>, (c) AZO/PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup>, and (d) AZO/PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup> coated AZO films.

**Table S5.** Device parameters of the PSCs based on ITO/AZO/n-CPEs/PBDB-T:ITIC/MoO<sub>3</sub>/Ag configuration with PDPPTPT-N<sup>+</sup>Br<sup>-</sup>, PDPPTPf<sub>2</sub>T-N<sup>+</sup>Br<sup>-</sup> and PDPPTPf<sub>4</sub>T-N<sup>+</sup>Br<sup>-</sup> as the cathode interlayer with various thicknesses under the illumination of AM 1.5G, 100 mW cm<sup>-2</sup>.

n-CPEs	Thickness(nm)	Voc (V)	Jsc (mA/cm <sup>2</sup> )	FF (%)	PCE (%)
PDPPTPT-N <sup>+</sup> Br <sup>-</sup>	6	$0.858 \pm 0.01$	17.24±0.15	70.0±0.21	10.35(10.27±0.08)
	13	0.858±0.01	17.55±0.17	70.8±0.27	10.66(10.56±0.10)
	20	$0.857 \pm 0.01$	17.01±0.14	69.2±0.18	10.09(9.98±0.11)
	26	$0.857 \pm 0.01$	16.88±0.18	67.8±0.22	9.81(9.72±0.09)
PDPPTPf2T-N+Br-	5	$0.865 \pm 0.01$	17.65±0.20	71.4±0.15	10.90(10.80±0.10)
	14	0.865±0.00	17.86±0.12	72.7±0.31	11.24(11.17±0.07)
	19	$0.864 \pm 0.01$	17.30±0.15	70.03±0.23	10.51(10.40±0.11)
	24	$0.864 \pm 0.01$	16.92±0.14	69.7±0.25	10.20(10.07±0.13)
PDPPTPf4T-N+Br-	7	$0.880 \pm 0.01$	17.70±0.07	72.0±0.15	11.21(11.09±0.12)
	12	0.881±0.02	17.92±0.07	72.9±0.33	11.51(11.43±0.08)
	21	$0.879 \pm 0.01$	17.33±0.07	71.4±0.26	10.88(10.78±0.10)
	28	$0.879 \pm 0.02$	$17.05 \pm 0.07$	70.9±0.41	10.63(10.48±0.15)