

Supporting Information

Highly Emissive Semi-Ladder-Type Copolymers, Aggregation State and Solution-Processed Organic Light-Emitting Transistor

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1. Figures.

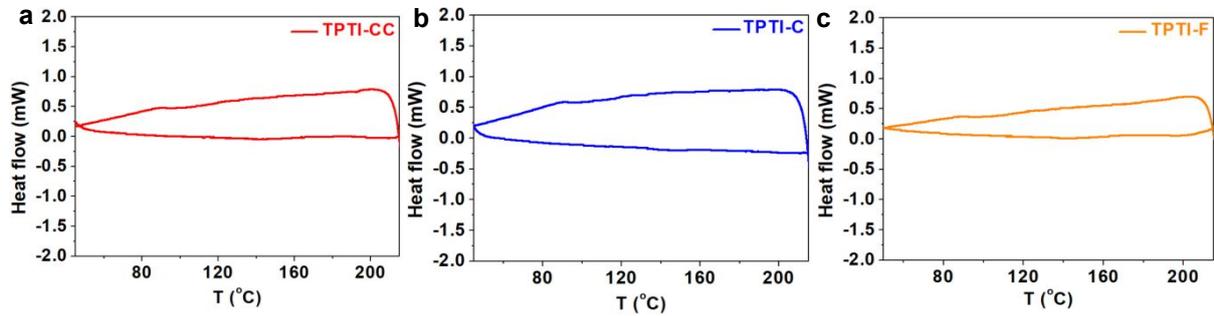


Figure S1. DSC analysis of a) TPTI-CC, b) TPTI-C, and c) TPTI-F.

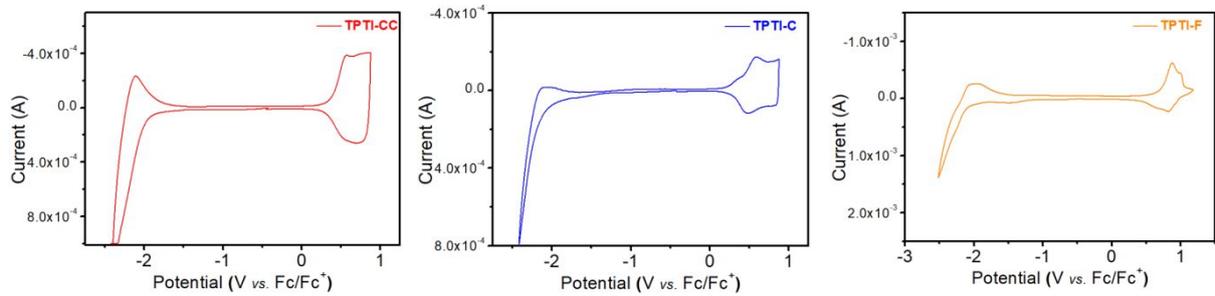


Figure S2. Cyclic voltammetry (CV) curves of TPTI-CC, TPTI-C, and TPTI-F.

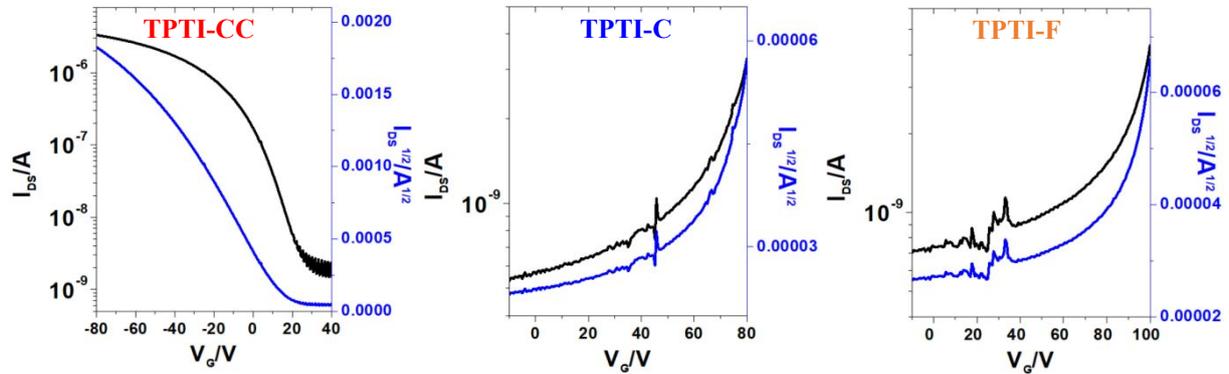


Figure S3. Characteristic transfer curves of a) TPTI-CC, b) TPTI-C, and C) TPTI-F in bottom gate top contact (BGTC) field effect transistor (FET). Channel length, $L = 50 \mu\text{m}$; Channel width, $W = 18 \text{ mm}$.

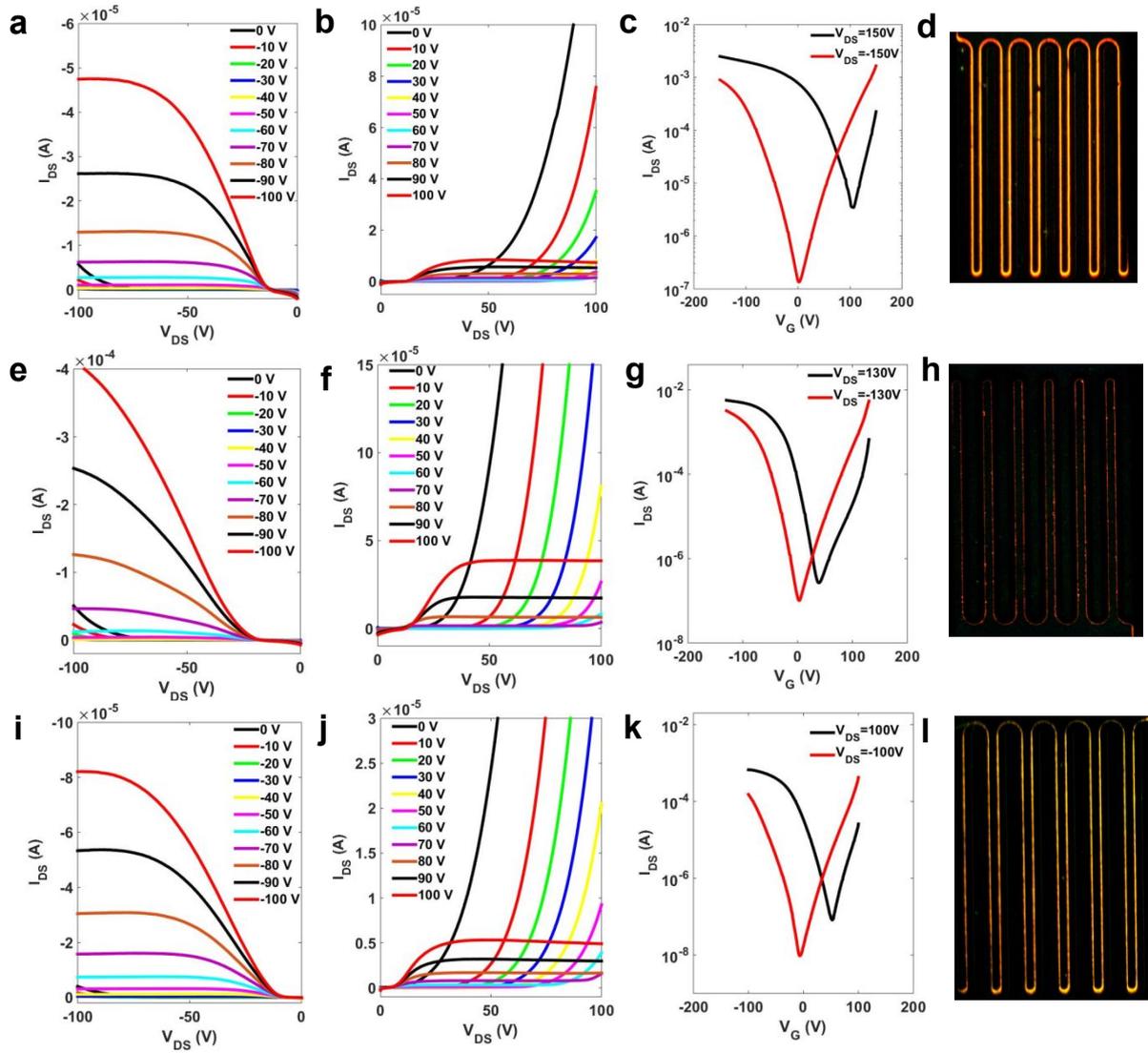


Figure S4. Characteristic transfer, output curves and emission images of (a-d) TPTI-CC, (e-h) TPTI-C and (i-l) TPTI-F in bottom gate top contact (BGTC) organic light-emitting transistor (OLET) with device configuration as shown in **Figure 4a** (PMMA as modification layer). Channel length, $L = 50 \mu\text{m}$; Channel width, $W = 18 \text{ mm}$.

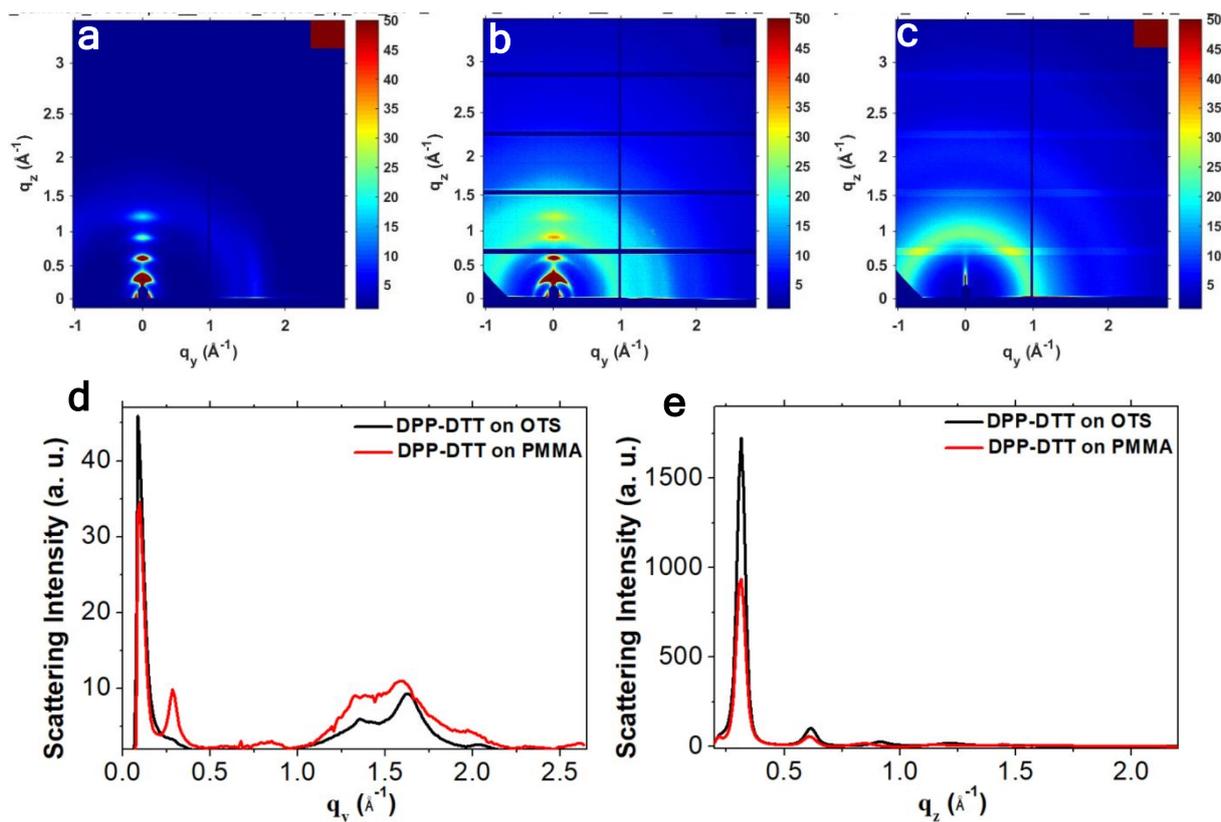


Figure S5. 2D GIWAXS scattering patterns of DPP-DDT on OTS (a) and PMMA (b), and PMMA thin film only (c); GIWAXS linecuts in (d) in-plane and (e) out-of-plane directions.

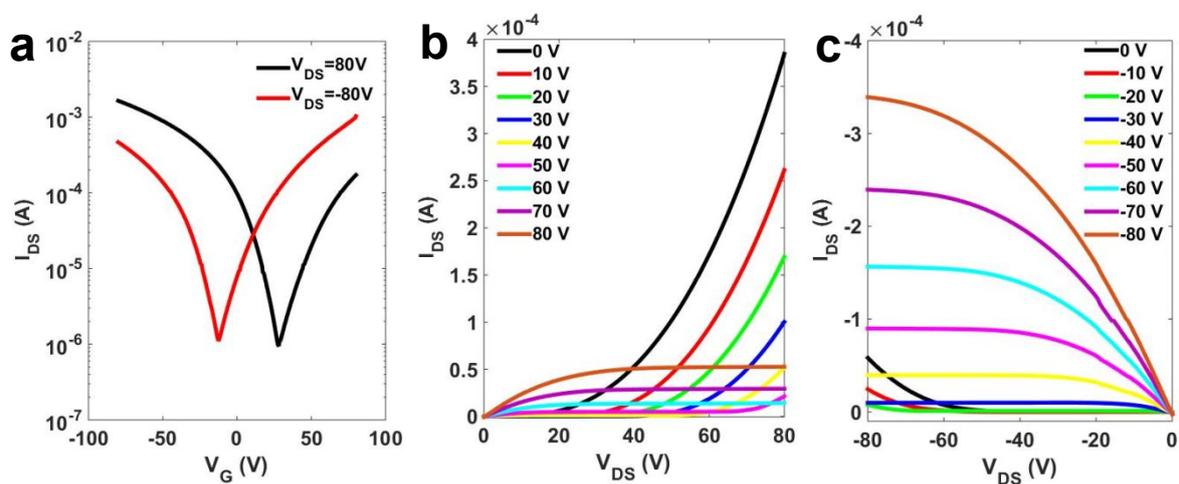


Figure S6. Transfer and output curves of transporting layer, DPP-DDT on PMMA modified OFET devices.

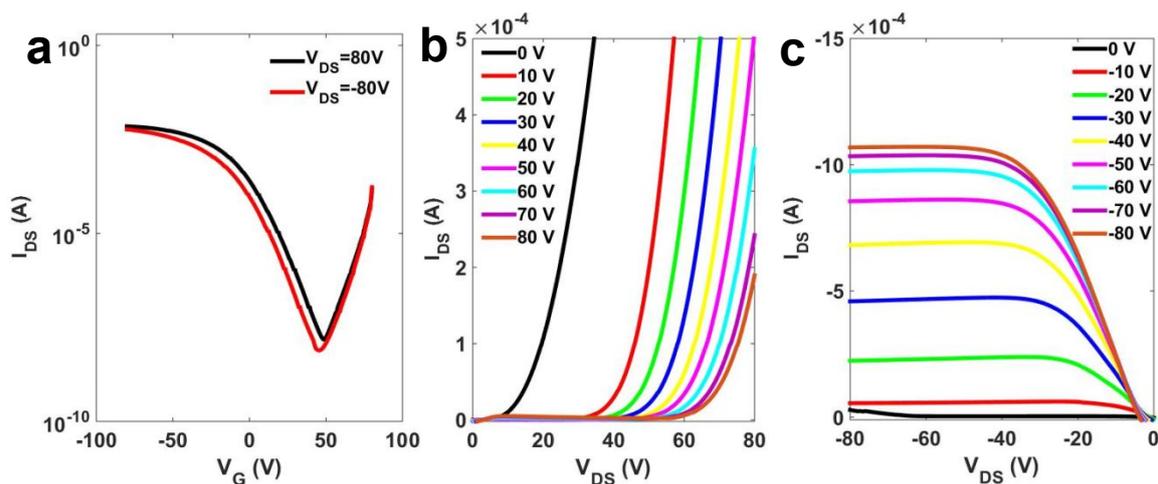


Figure S7. Transfer and output curves of transporting layer, DPP-DTT on OTS modified OFET devices.

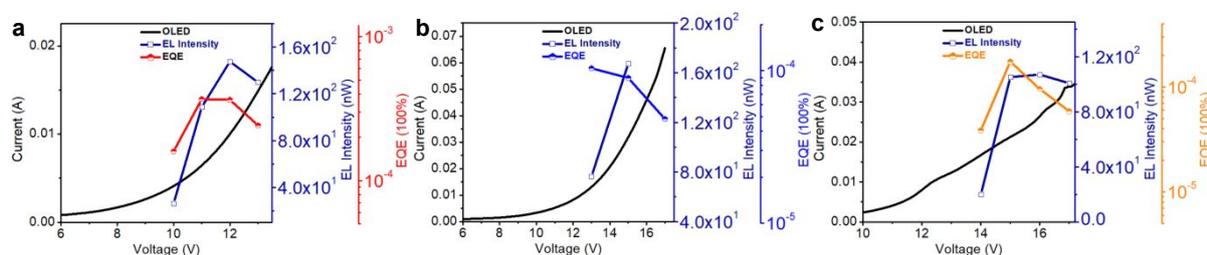


Figure S8. The tri-layer OLED I-V current, electroluminescent output power (EL intensity) and EQE of TPTI-CC (a) TPTI-C (b), and TPTI-F (c) change with voltage.

Table S1. EQE of solution-processed OLETs reported recently and TPTI-F in this work.

	EQE	Ref.
F8BT ^[1]	>8%	<i>Adv. Mater.</i> 2012 , <i>24</i> , 2728-2734.
Super yellow (SY) ^[2]	10 ⁻³ %	<i>Adv. Funct. Mater.</i> 2011 , <i>21</i> , 3667-3672.
SY ^[3]	1%	<i>Sci. Rep.</i> 2015 , <i>5</i> , 8818
PTNT ^[4]	0.25%	<i>Adv. Optical Mater.</i> 2018 , <i>6</i> , 1800768.
SY ^[5]	0.4%	<i>ACS Photonics</i> 2018 , <i>5</i> , 2137–2144
SY ^[6]	0.1%	<i>Adv. Optical Mater.</i> 2019 , <i>7</i> , 1801290.
TPTI-F	2.8%	This work

Table S2. Concentration-dependent fluorescence lifetimes of TPTI-CC, TPTI-C, and TPTI-F in chloroform solutions.

c (mg mL ⁻¹)		TPTI-F		TPTI-C		TPTI-CC	
		Time (ns)	Fraction	Time (ns)	Fraction	Time (ns)	Fraction
0.001	τ_1	0.602		1.4	67.8%	1.33	83%
	τ_2			0.53	32.2%	0.43	17%
0.005	τ_1	0.605		1.41	72%	1.32	85.3%
	τ_2			0.49	28%	0.39	14.7%
0.01	τ_1	0.621		1.42	74%	1.33	86.1%
	τ_2			0.48	26%	0.38	13.9%
0.05	τ_1	0.754		1.47	79%	1.32	88.3%
	τ_2			0.49	21%	0.34	11.7%
0.1	τ_1	1.06		1.56	87%	1.35	89.8%
	τ_2			0.42	13%	0.32	10.2%

2. References

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