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Supporting Information

Diketopyrrolopyrrole-based Copolymers Bearing Highly π-Extended Donating Units and Their Thin-film Transistors and Photovoltaic Cells

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‡ Equally contributed to this work.

KEYWORDS: diketopyrrolopyrrole, conjugated copolymer, organic thin film transistor, organic photovoltaic cell.

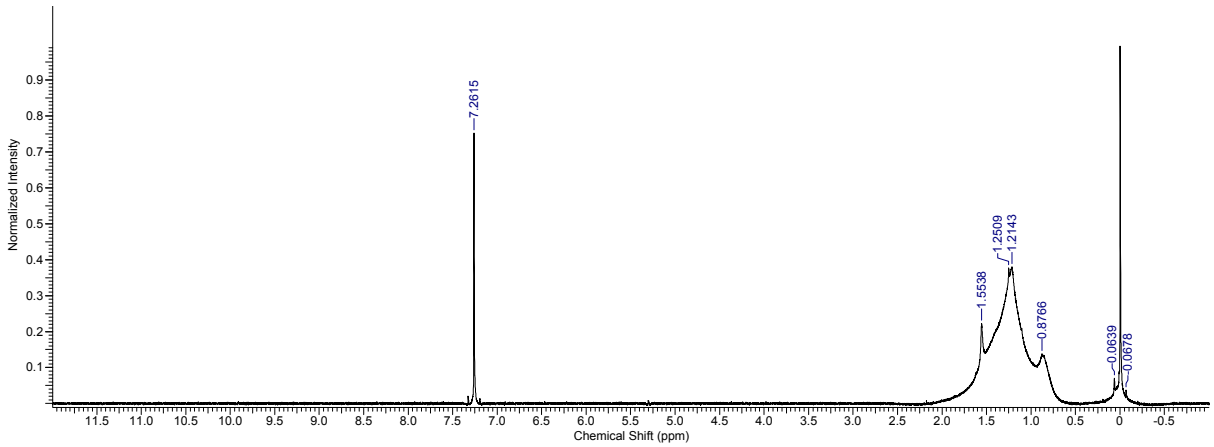

Figure S1. ^{1}H NMR spectrum of P(DPP-TST).

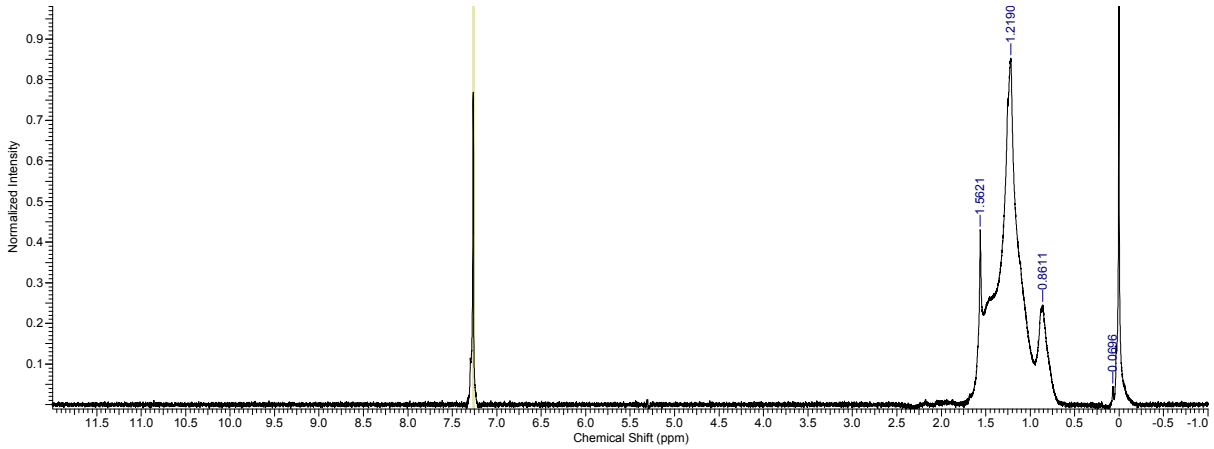

Figure S2. ^{1}H NMR spectrum of P(DPP-TTT).

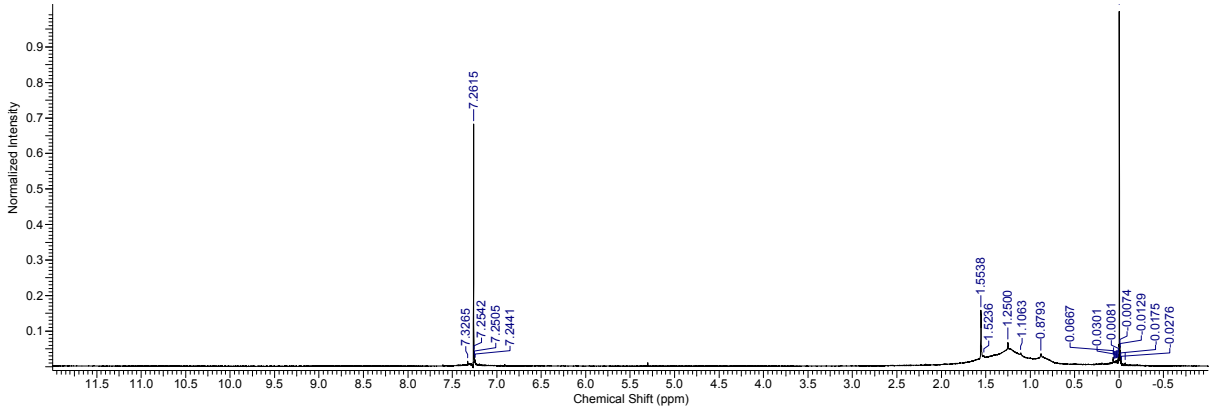

Figure S3. ^{1}H NMR spectrum of P(DPP-TPhT).

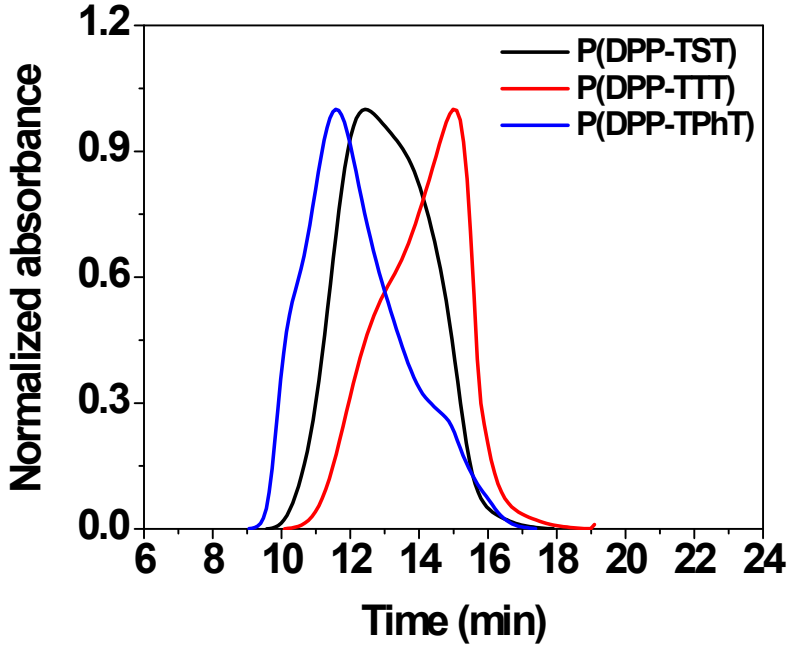

Figure S4. Gel permeation chromatography (GPC) spectra of synthesized DPP-based copolymers with chloroform as the eluent and polystyrene as the standard.

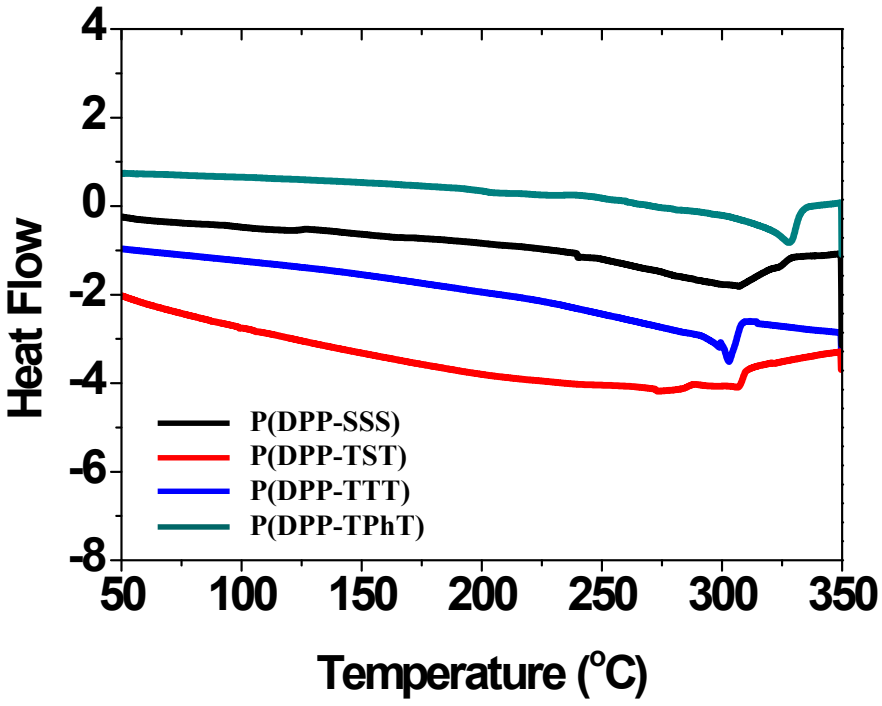

Figure S5. DSC curves of the DPP-based copolymers (scan rate: 10 °C/min)

Figure S6. Optimized molecular geometries (a) and energy levels (b) of DPP-based dimers bearing DPP acceptors and π-extended donating units such as SSS, TST, TTT, and TPhT.

Table S1. GI-XRD peak assignments of DPP-based copolymers after thermal annealing**.**

polymer	(n00)	annealed film	
		2θ (deg)	d(100)-spacing (Å)
P(DPP-SSS) [a]	(100)	3.04	20.76
	(200)	6.09	10.37
	(300)	9.13	6.92
	(400)	12.28	5.14
	(010)	16.87	3.75
P(DPP-TST)	(100)	3.26	20.48
	(200)	6.44	10.37
	(300)	9.68	6.87
	(400)	13.04	5.17
	(010)	18.53	3.62
P(DPP-TTT)	(100)	3.32	20.11
	(200)	6.59	10.14
	(300)	9.87	6.77
	(400)	13.43	4.99
	(010)	18.31	3.66
P(DPP-TPhT)	(100)	3.33	20.05
	(200)	6.59	10.14
	(300)	9.90	6.75
	(400)	13.39	5.00
	(010)	17.91	3.74

[a] In our previous work [S1]

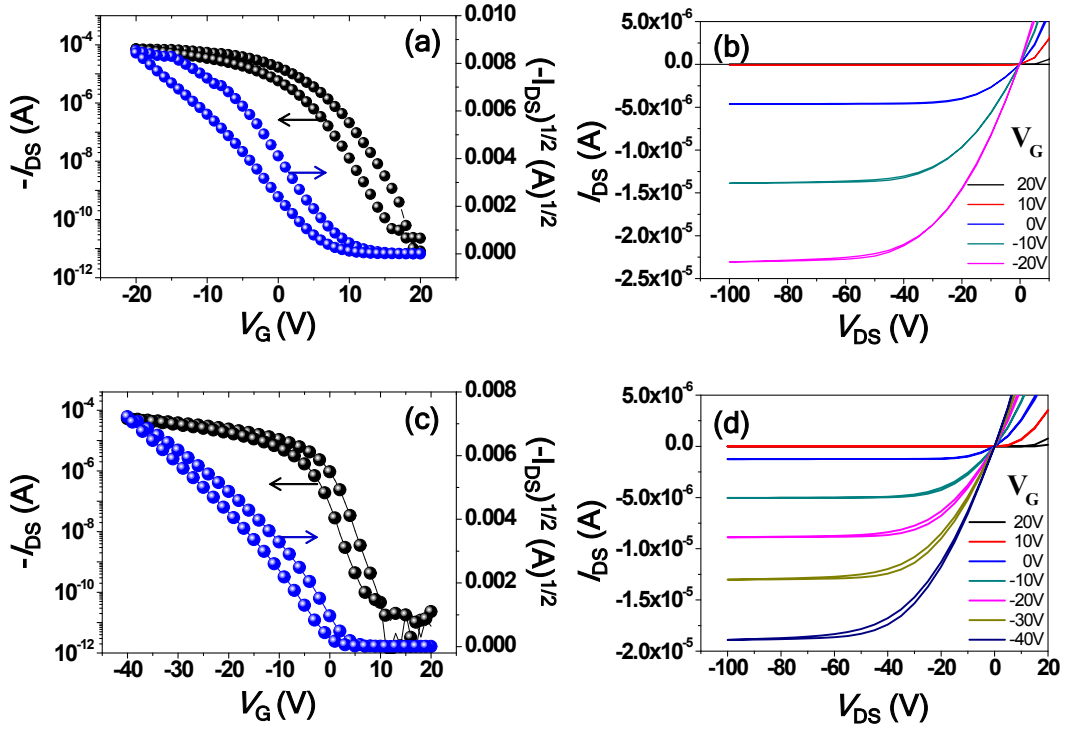

Figure S7. Transfer (a) and output (b) curves of the BCBG-TFT made of unannealed P(DPP-SSS) film; Transfer (c) and output (d) curves of the BCBG-TFT made of unannealed P(DPP-TST) film. *OTS-SiO_2/Si gate insulator; the device performances were measured in air. V_{DS} = -100 V.

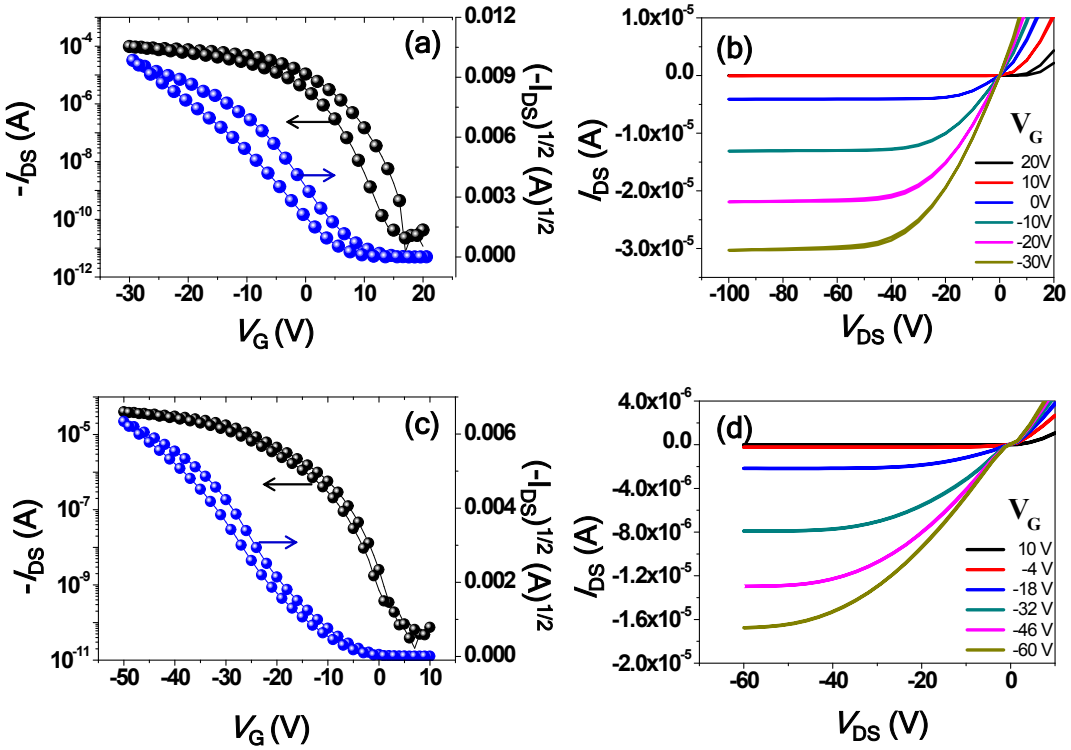

Figure S8. Transfer (a) and output (b) curves of the BCBG-TFT made of unannealed P(DPP-TTT) film; Transfer (c) and output (d) curves of the BCBG-TFT made of unannealed P(DPP-TPhT) film. *OTS-SiO_2/Si gate insulator; the device performances were measured in air. VDS = -100 V.

Reference

(S1) Cho, M. J.; Shin, J.; Yoon, S. H.; Lee, T. W.; Kaur, M.; Choi, D. H. *Chem. Commun.* 2013, *49*, 7132-7134.