Electronic Supplementary Information (ESI)

The Effect of Thieno[3,2-b]thiophene on the Absorption, Charge Mobility and Photovoltaic Performance of Diketopyrrolopyrrole-Based Low Bandgap Conjugated Polymers

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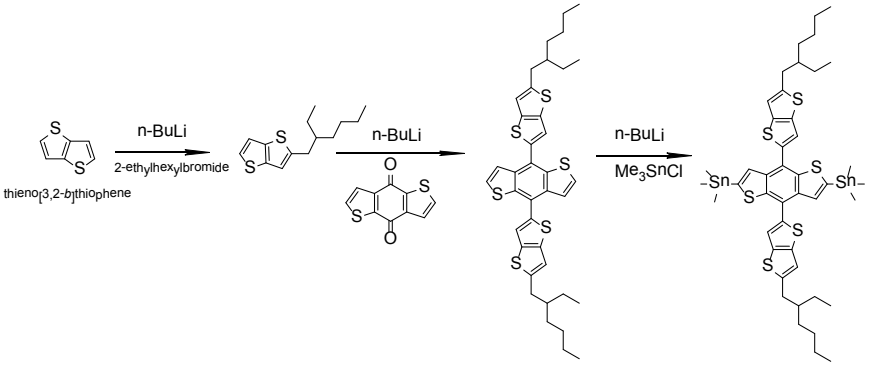
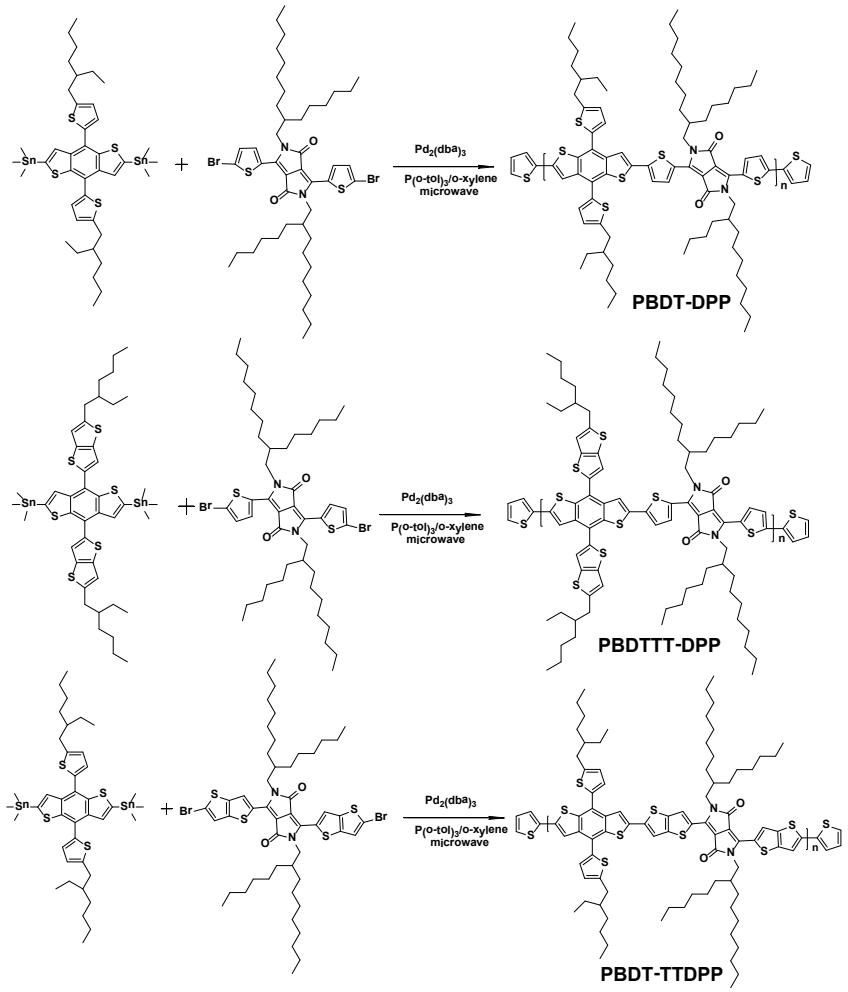


Scheme S1. Chemical structures and synthetic routes of BDT-TT-di-Tin



Scheme S2. Chemical structures and synthetic routes of polymers PBDT-DPP, PBDTTT-DPP and PBDT-TTDPP

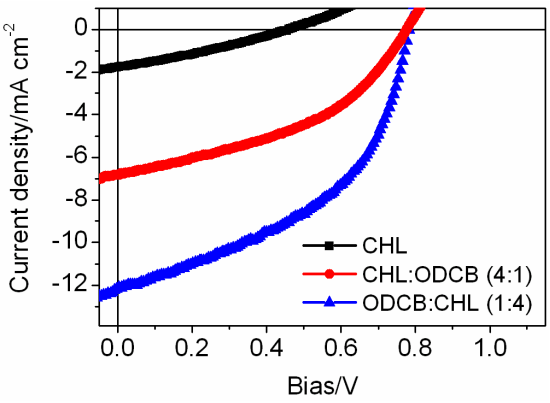


Figure S1. Characteristic J-V curves for the BHJ solar cells derived from PBDTTT-DPP with different solvent.

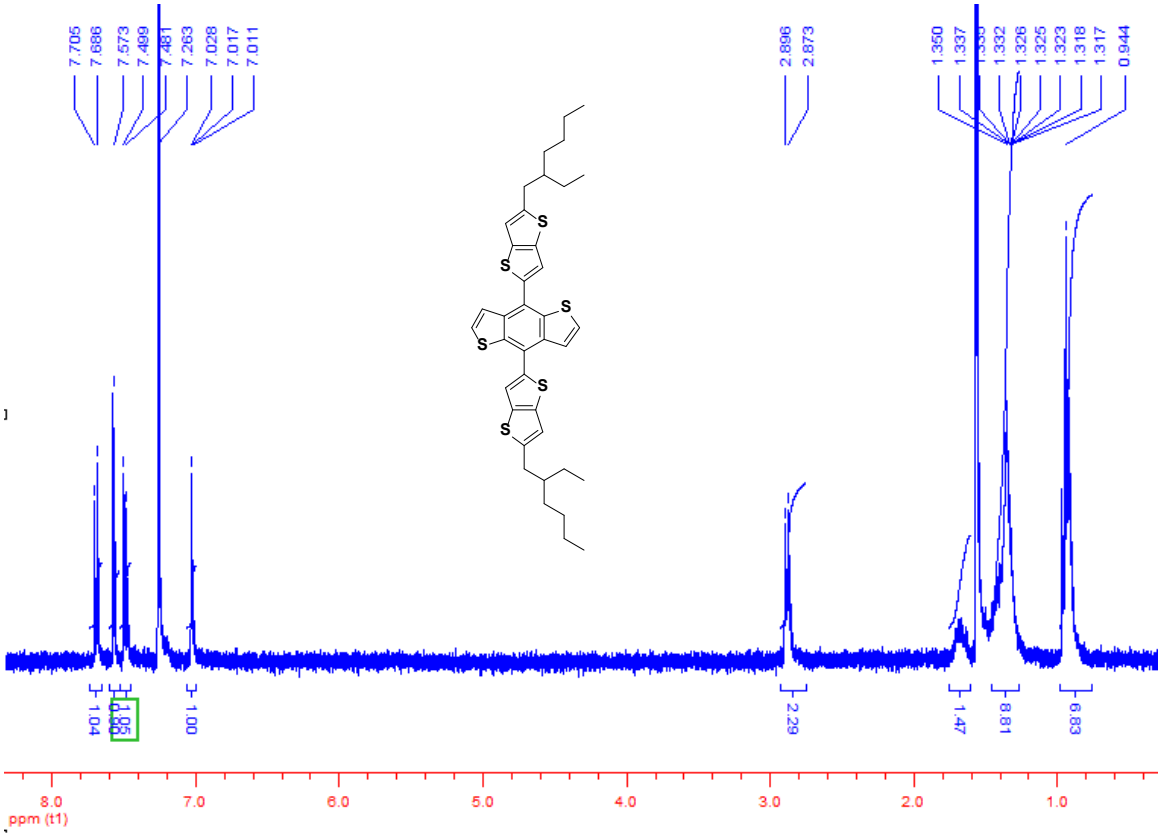


Figure S2. ^{1}H NMR spectrum of BDTTT in $CDCl_3$

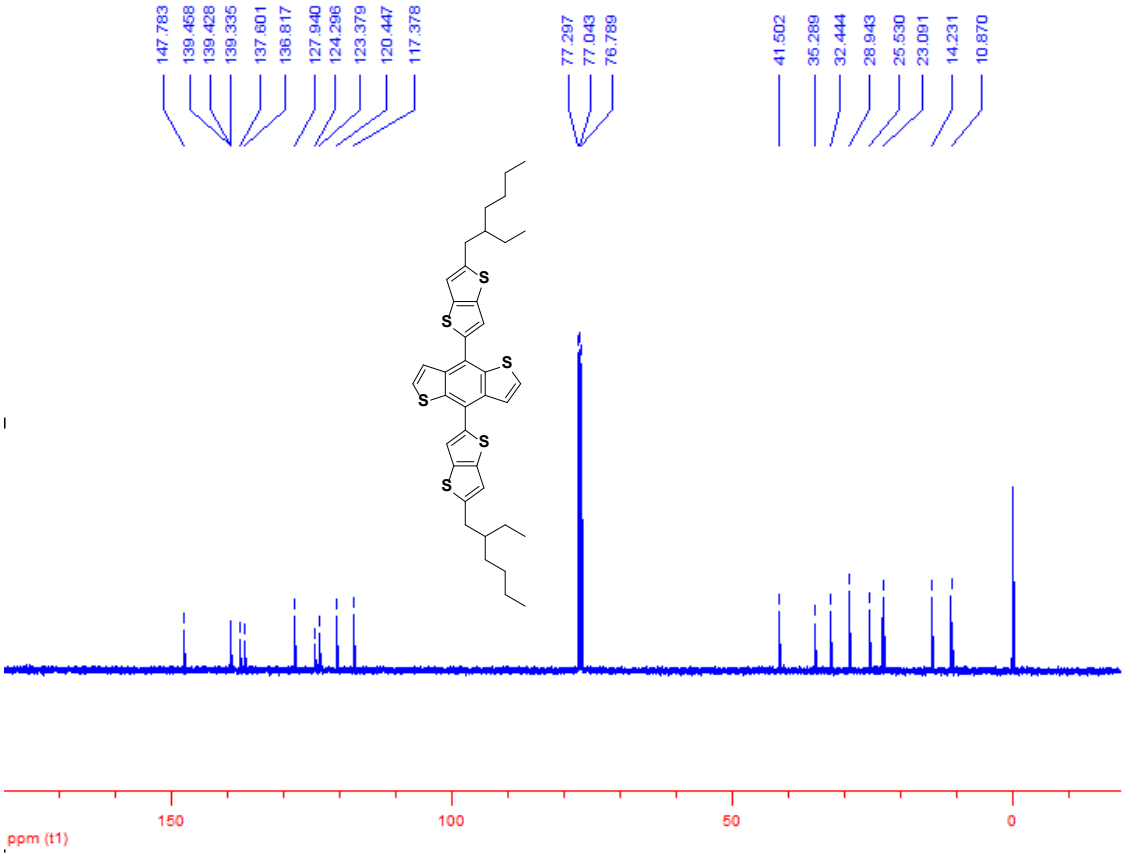


Figure S3. ^{13}C NMR spectrum of BDTTT in $CDCl_3$

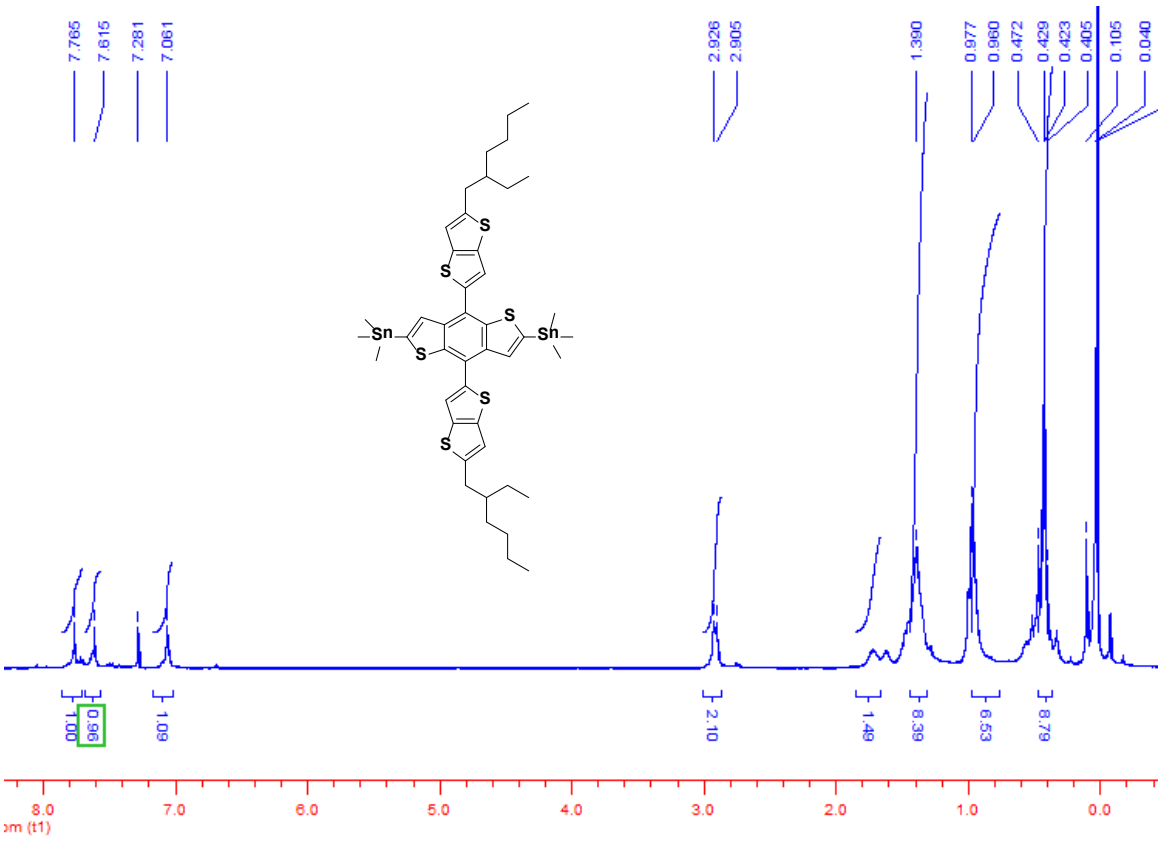


Figure S4. ^{1}H NMR spectrum of BDT-TT-di-Tin in $CDCl_3$

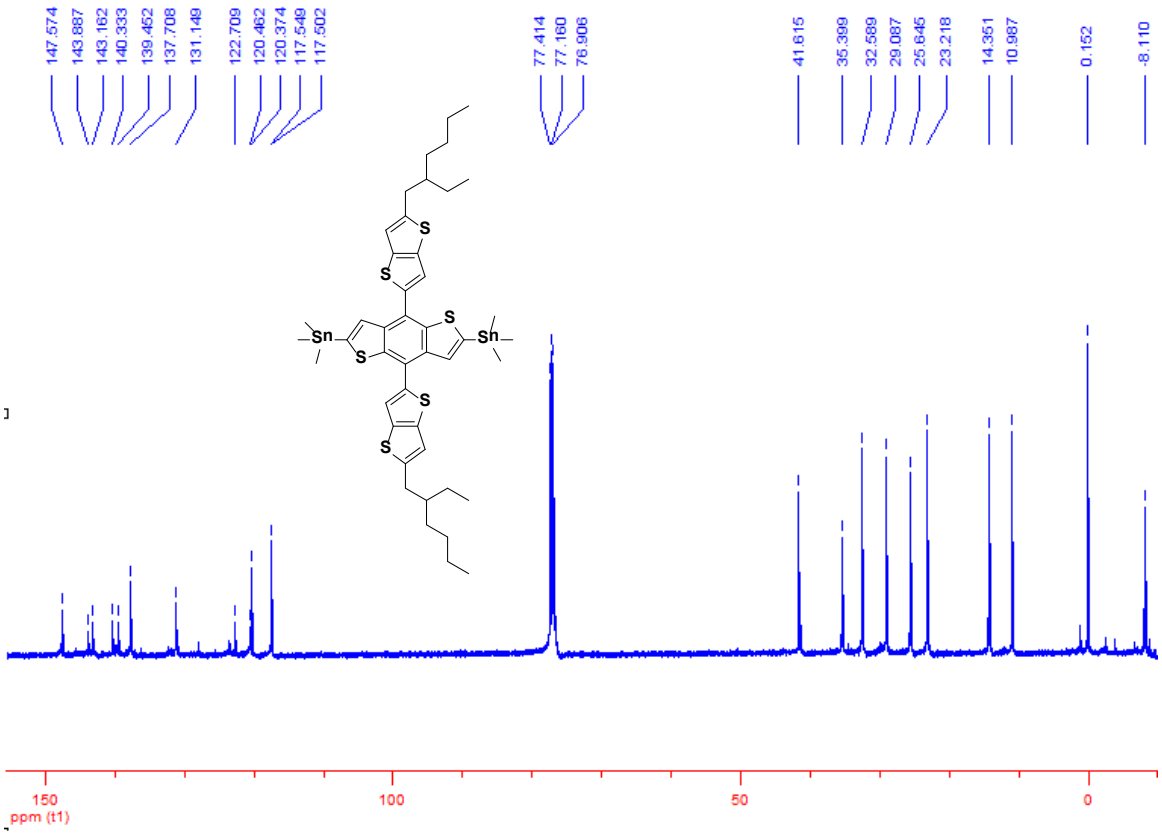


Figure S5. ^{13}C NMR spectrum of BDT-TT-di-Tin in $CDCl_3$

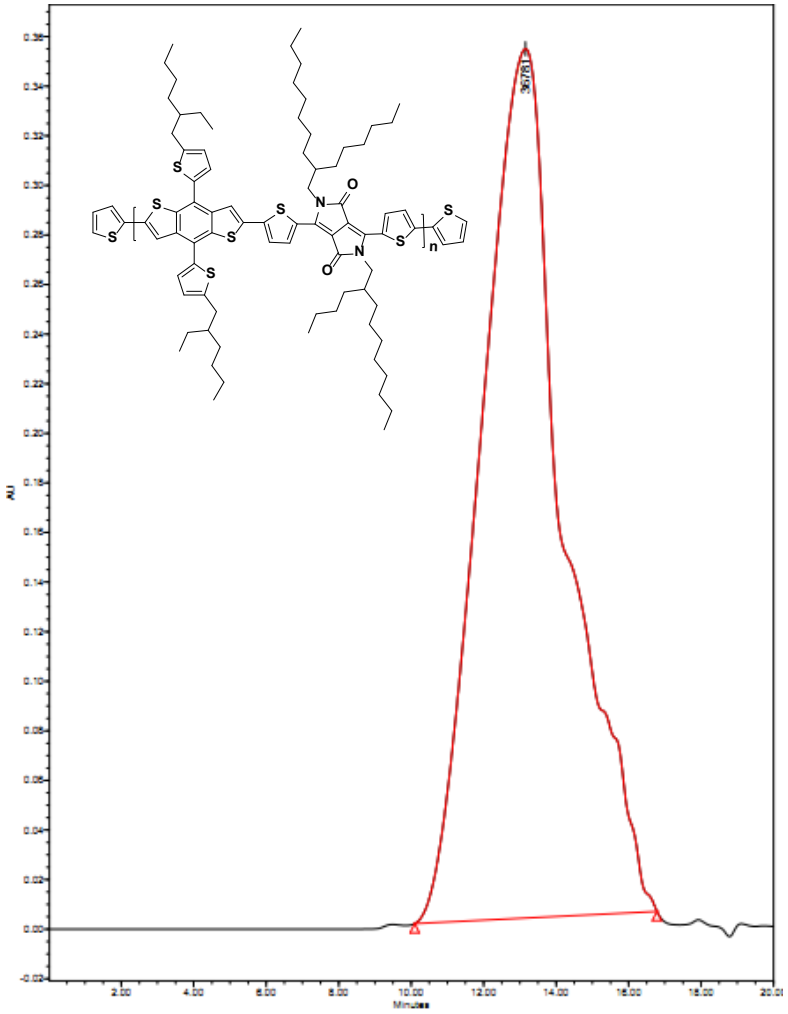


Figure S6. GPC spectrum of PBDT-DPP in THF

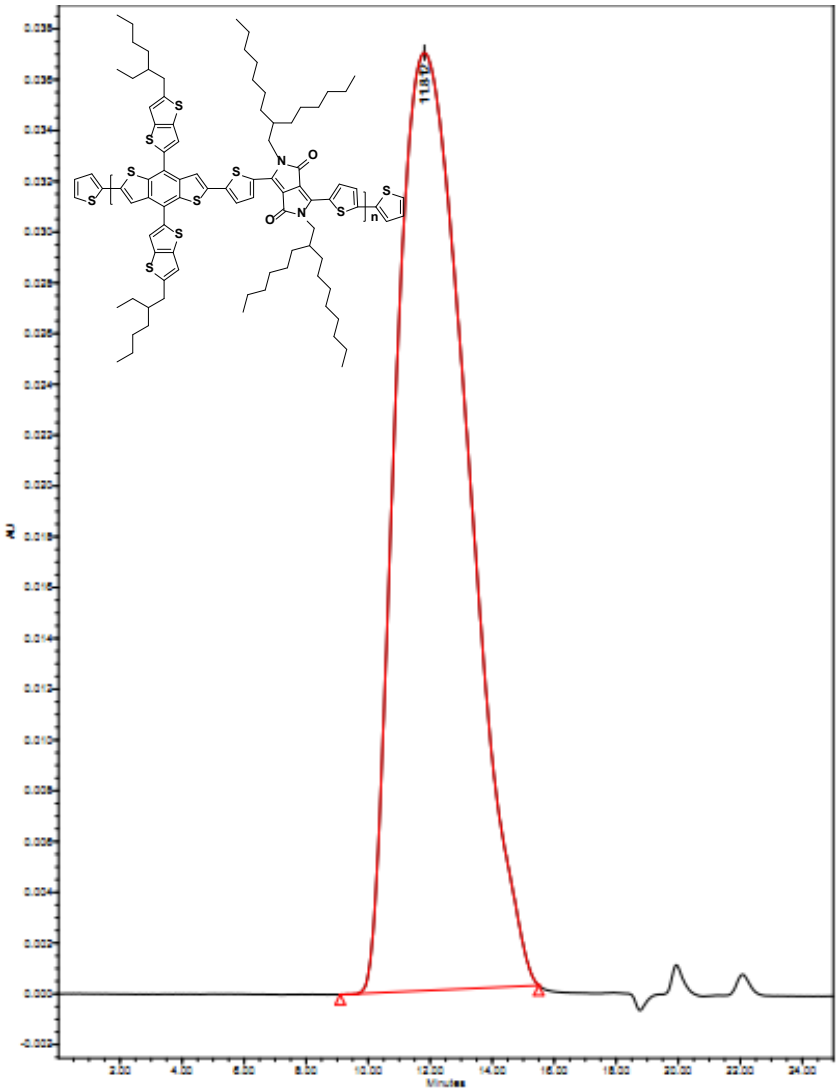


Figure S7. GPC spectrum of PBDTTT-DPP in THF

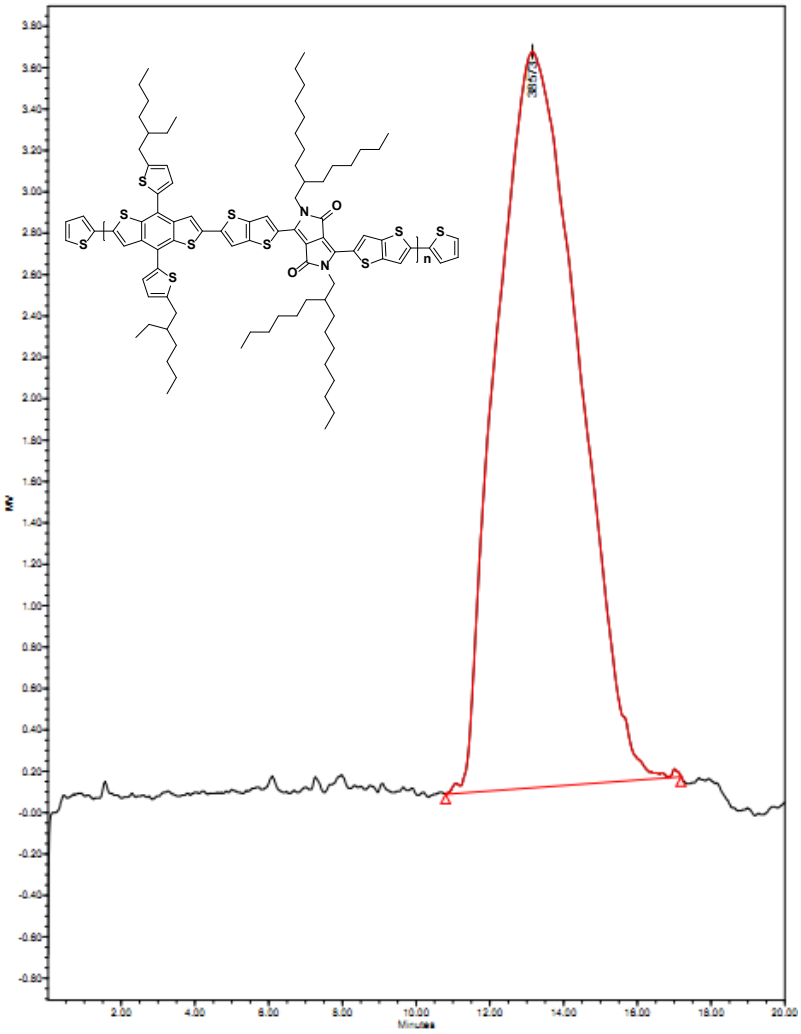


Figure S8. GPC spectrum of PBDT-TTDPP in THF

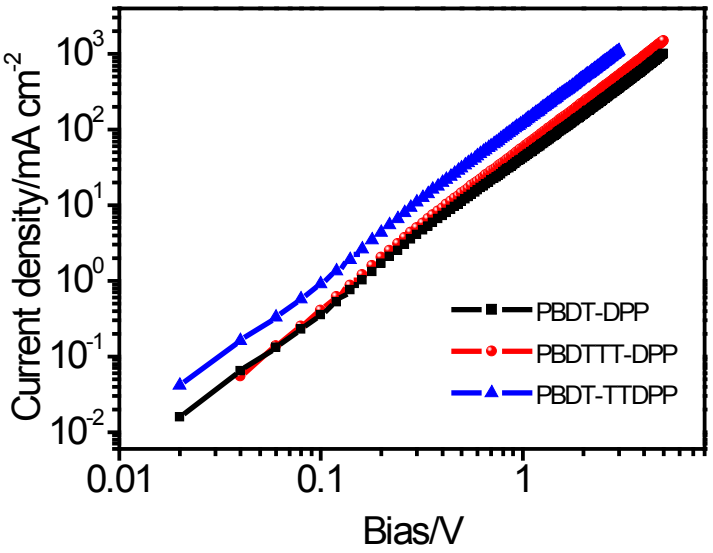


Figure S9. Current density and voltage (logJ–logV) curves of the hole-only devices containing polymer and $PC_{71}BM$.

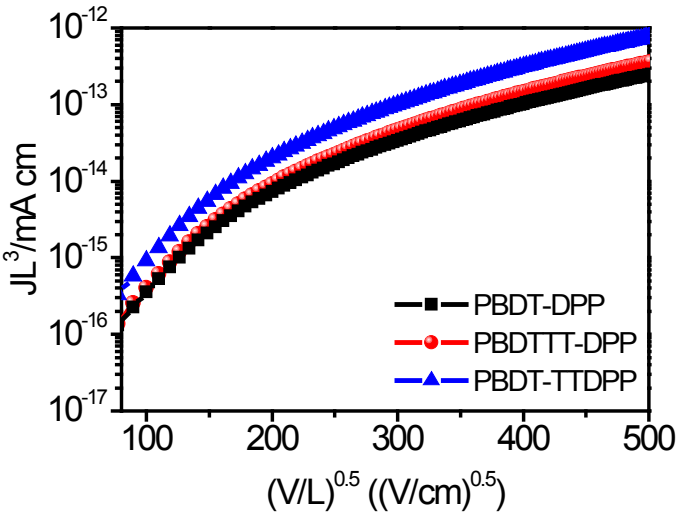


Figure S10. Plot of (JL^3) versus $(V/L)^{0.5}$ of the hole-only devices containing polymer and $PC_{71}BM$.

Table S1 Photovoltaic properties of PSCs based on the PBDTTT-DPP as the donor and $PC_{71}BM$ as the acceptor under the illumination of AM1.5G, 100 mW cm^{-2}.

Solvent	V_{oc}(V)	J_{sc} (mA cm^{-2})	FF	PCE (%)
CF	0.47	1.78	0.29	0.24
CF/O-DCB(4:1)	0.78	6.83	0.43	2.30
CF/O-DCB(1:4)	0.78	12.18	0.47	4.47