Supplementary Information

Synthesis and Photovoltaic Properties of An n-Type Two-Dimension-Conjugated Polymer Based on Perylene Diimide and Benzodithiophene with Thiophene Conjugated Side Chain

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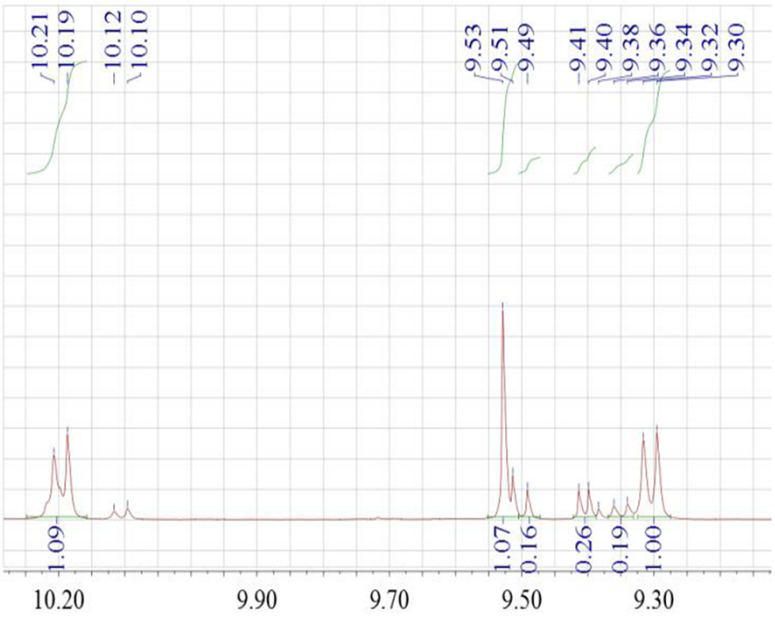

Fig. S1 ^{1}H-NMR spectrum of dibro-Perylene-3,4,9,10-tetracarboxylic dianhydride.

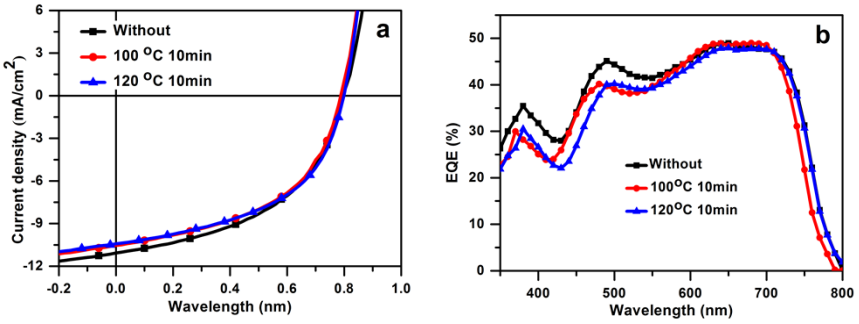

Fig. S2 *J*−*V* curves (a) and EQE curves (b) of the PSCs based on PTB7-Th:**P(PDI-BDT)** (1.5:1, w/w) without and with thermal annealing under the illumination of AM 1.5G, 100 mW cm^{-2}.

Table S1 Photovoltaic properties of the PSCs based on PTB7-Th:**P(PDI-BDT)** (1.5:1, w/w) without and with thermal annealing under the illumination of AM 1.5G, 100 mW cm^{-2}.

D/A=1.5:1	V_{oc} (V)	J_{sc} (mA cm^{-2})	FF (%)	PCE (%)	Thickness (nm)
w/o	0.80	11.06	48.6	4.31	90
100℃ 10min	0.79	10.54	49.8	4.15	85
120℃ 10min	0.80	10.42	50.2	4.17	83

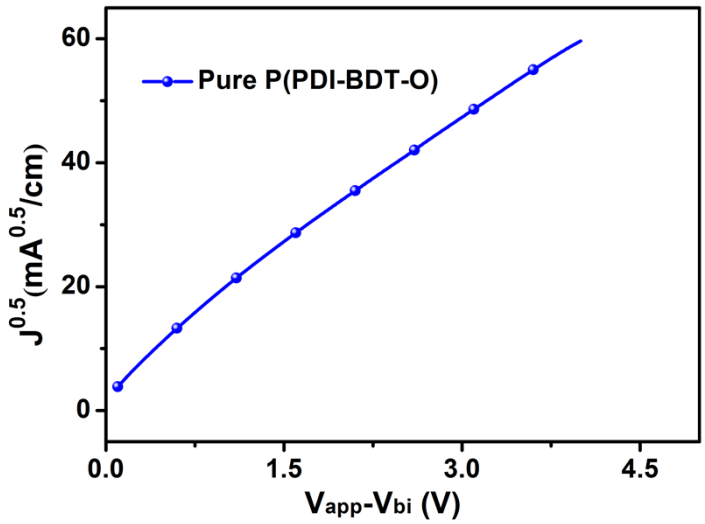

Fig. S3. $J^{0.5}$ vs (*Vapp-Vbi*) plots of electron-only diodes of Pure P(PDI-BDT-O) film.

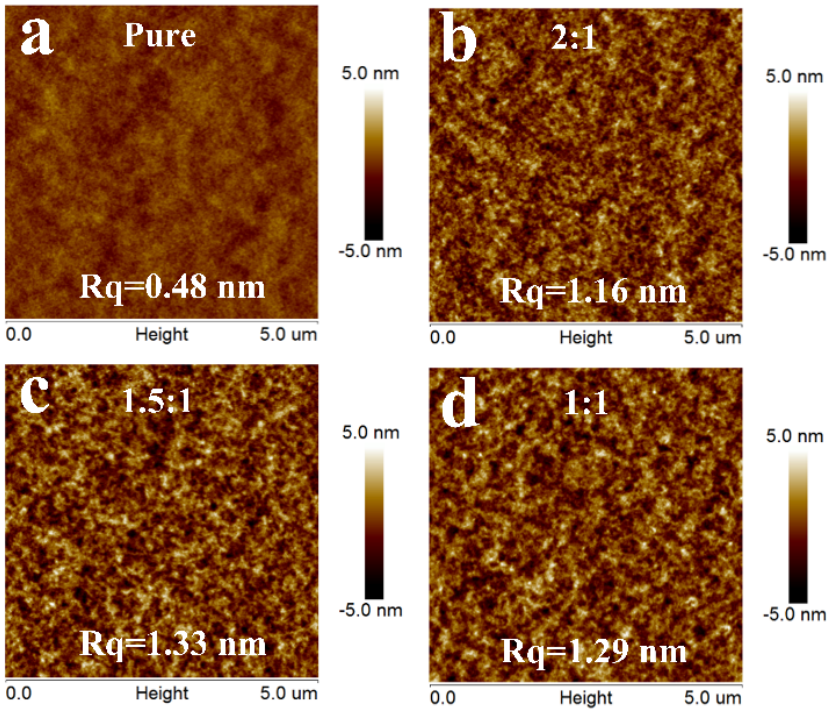

Fig. S4 AFM images of the polymer blend films of PTB7-Th:**P(PDI-BDT)** with various blend ratios: (a) pure **P(PDI-BDT)**; (b) 2:1; (c) 1.5:1; (d) 1:1.

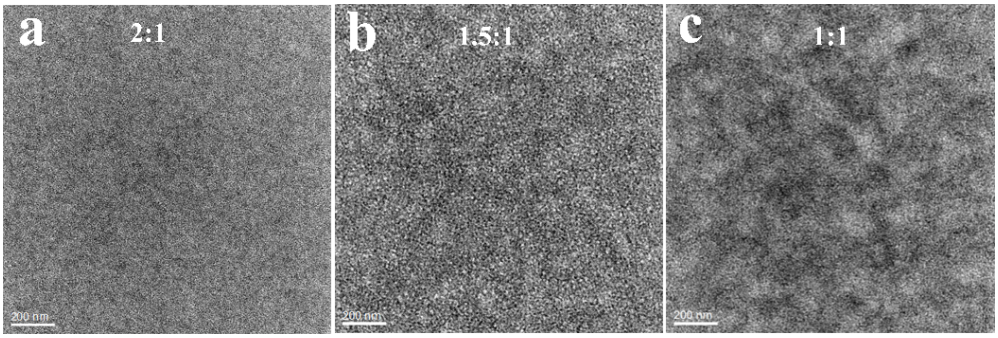

Fig. S5 TEM images of the polymer blend films of PTB7-Th:**P(PDI-BDT)** with various blend ratios: (a) 2:1; (b) 1.5:1; (c) 1:1.