Electronic Supplementary Information

Synthesis, characterization and photovoltaic properties of benzo[1,2-*b*:4,5-*b*′]dithiophene-bridged molecules

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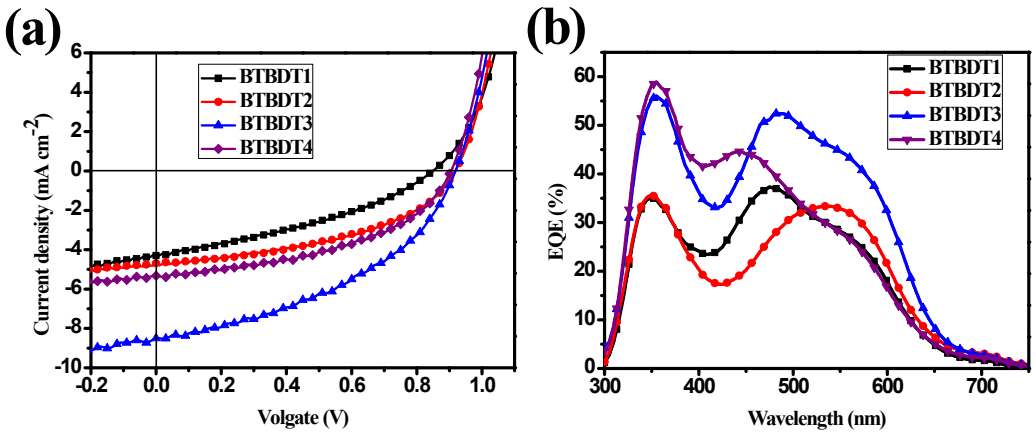

Fig. S1 (a) Current–density (*J–V*) curves and (b) EQE spectra of the OSC devices with the blend ratio of **BTBDT1–BTBDT4**/$PC_{61}BM$ = 1:3 (w/w) under the illumination of AM 1.5G, 100 mW cm^{-2}.

Table S1 Photovoltaic properties of the OSCs based on donor/$PC_{61}BM$ (different ratio, w/w) under illumination of AM 1.5G, 100 mW cm^{-2}.

Donor	Donor : $PC_{61}BM$ (w/w)	V_{oc} (V)	J_{sc} (mA cm^{-2})	FF	PCE (%)
BTBDT1	1 : 2	0.88	3.57	37.9	1.19
	1 : 3	0.85	4.29	35.6	1.30
	1 : 4	0.81	3.01	35.7	0.87
BTBDT2	1 : 2	0.92	4.61	41.8	1.78
	1 : 3	0.92	4.68	45.9	1.98
	1 : 4	0.90	4.85	42.6	1.86
BTBDT3	1 : 2	0.95	5.50	36.2	1.89
	1 : 3	0.92	8.50	42.6	3.33
	1 : 4	0.91	5.88	46.6	2.49
BTBDT4	1 : 2	0.88	5.38	40.8	1.93
	1 : 3	0.90	5.32	46.8	2.24
	1 : 4	0.73	3.94	34.6	0.99

Table S2 HOMO-1, HOMO, LUMO and LUMO+1 energy levels and E_g as determined by theoretical calculations for **BTBDT1–BTBDT4**.

	HOMO-1 (eV)	**HOMO (eV)**	**LUMO (eV)**	**LUMO+1 (eV)**	E_g **(eV)**
BTBDT1	–5.57	–4.98	–3.09	–2.89	1.89
BTBDT2	–4.88	–4.69	–2.85	–2.66	1.70
BTBDT3	–4.97	–4.74	–2.92	–2.75	1.82
BTBDT4	–4.86	–4.73	–2.88	–2.79	1.85

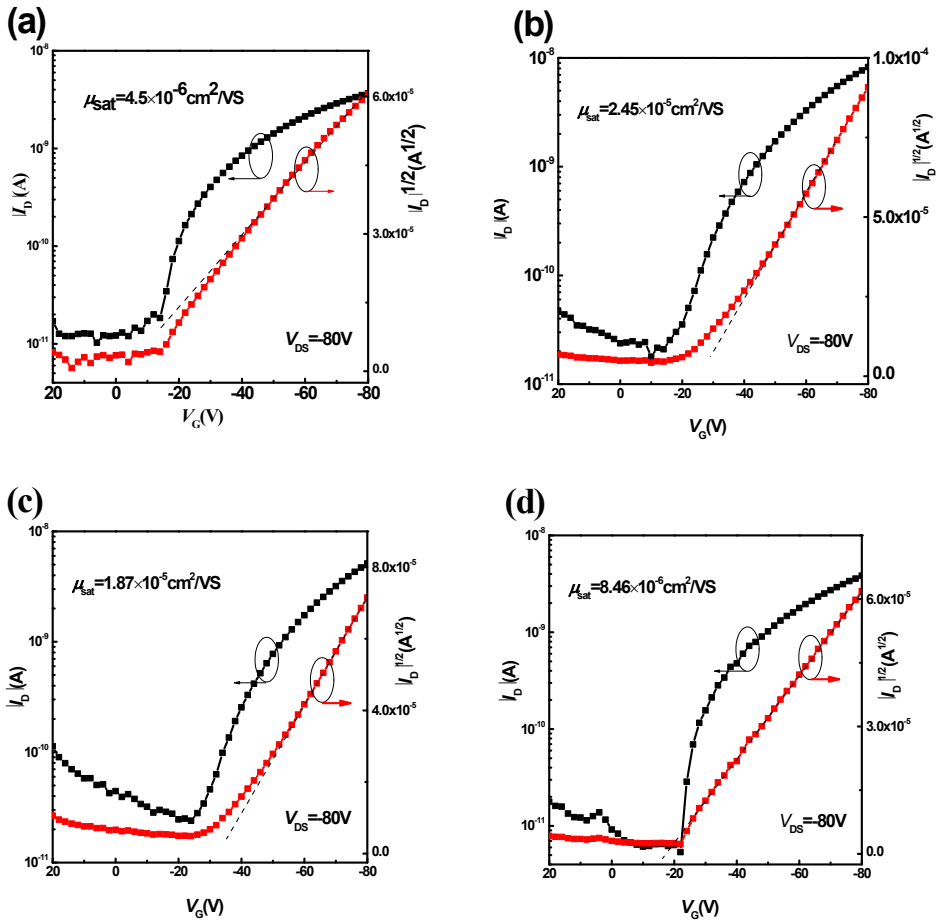

Fig. S2 Transfer characteristics at V_{DS} = –80 V from (a) **BTBDT1**, (b) **BTBDT2**, (c) **BTBDT3** and (d) **BTBDT4**.

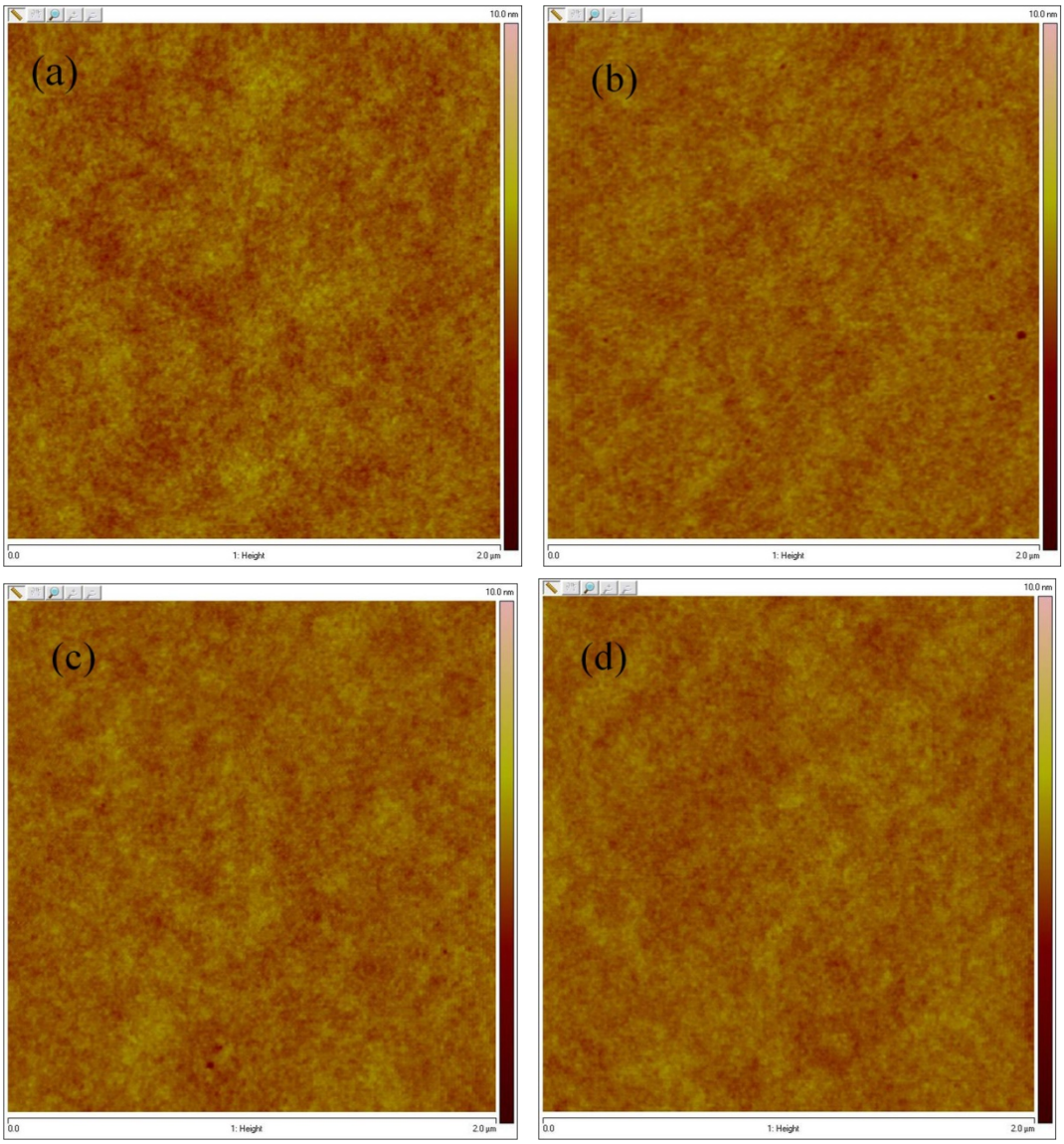

Fig. S3 Topography images obtained by tapping mode AFM of the blend films spin-coated from chloroform solutions of **BTBDT1–BTBDT4**:$PC_{71}BM$ in a weight ratio of 1:2: (a) **BTBDT1**/$PC_{71}BM$, (b) **BTBDT2**/$PC_{71}BM$, (c) **BTBDT3**/$PC_{71}BM$ and (d) **BTBDT4**/$PC_{71}BM$.