Supporting information for:

Tuning Molecule Diffusion to Control the Phase Separation of *p*-DTS(FBTTh$_2$)$_2$/EP-PDI Blend System via Thermal Annealing

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Fig. S1

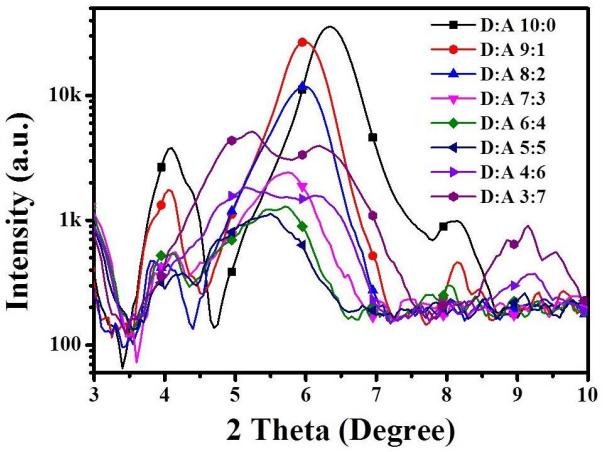
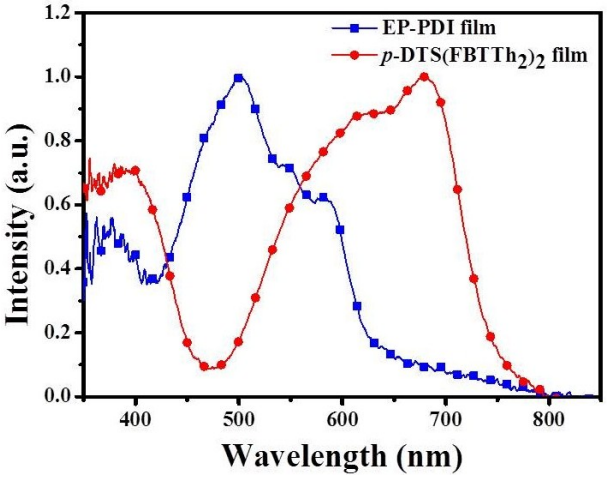
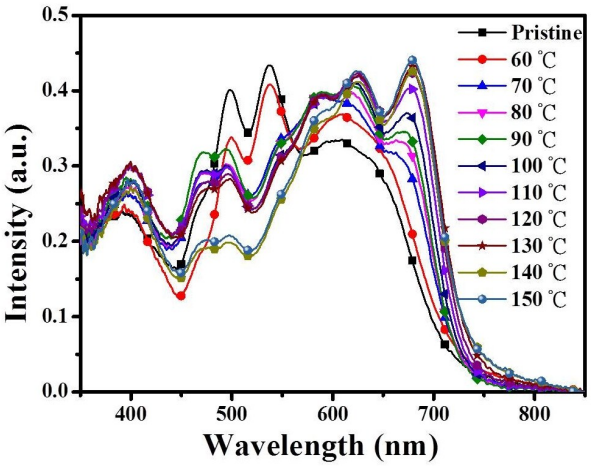


Fig. S1 1D out-of-plane X-ray profiles of blend films with different *p*-DTS(FBTTh$_2$)$_2$/EP-PDI ratios. The obtained X-ray intensities were added 200 to avoid the minus, thus we can use log scale to enhance the visibility of weak intensity.

Fig. S2



The UV-vis absorption spectra of pure *p*-DTS(FBTTh$_2$)$_2$ and EP-PDI films.



The UV-vis absorption spectra of *p*-DTS(FBTTh$_2$)$_2$:EP-PDI 6:4 blend film thermal annealed at different temperature for 10 min.

Fig.S3

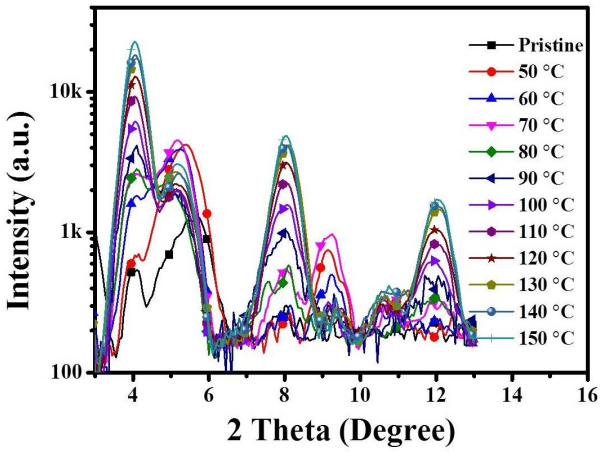


Fig. S3 Out-of-plane X-ray profiles of *p*-DTS(FBTTh$_2$)$_2$:EP-PDI blend films at 6:4 TA treated at different temperature for 10 min. The obtained X-ray intensities were added 200 to avoid the minus, thus we can use log scale to enhance the visibility of weak intensity.

Fig. S4

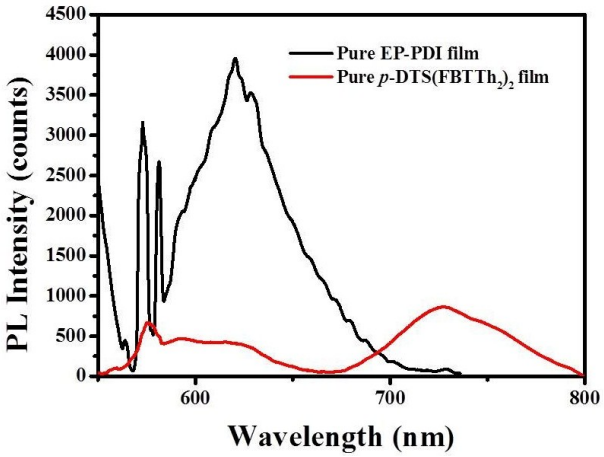
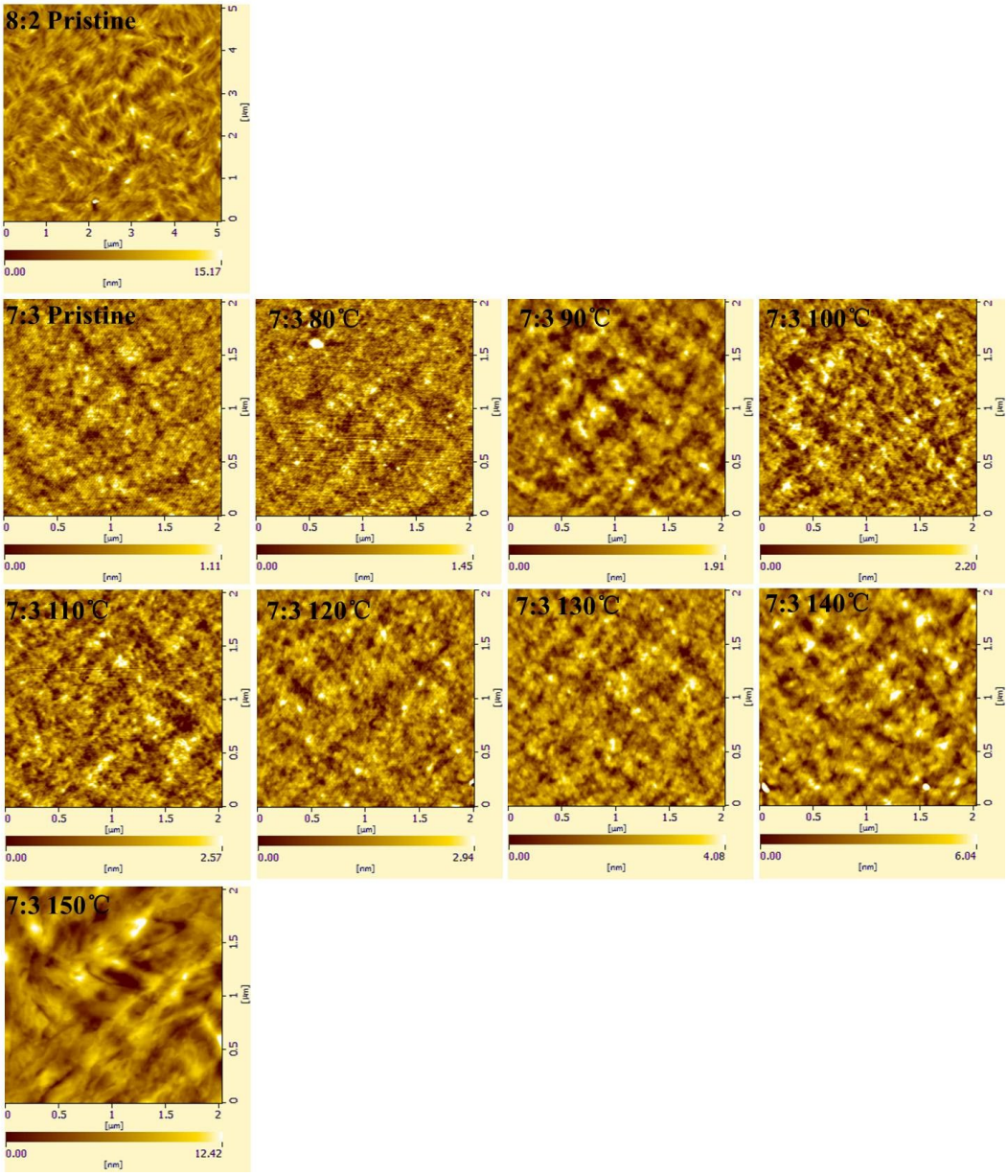


Fig. S4 Fluorescence spectra of pure *p*-DTS(FBTTh$_2$)$_2$ and EP-PDI films.

Fig. S5


8:2 Pristine
0.00
15.17
7:3 Pristine
0.00
1.11
7:3 80℃
0.00
1.45
7:3 90℃
0.00
1.91
7:3 100℃
0.00
2.20
7:3 110℃
0.00
2.57
7:3 120℃
0.00
2.94
7:3 130℃
0.00
4.08
7:3 140℃
0.00
6.04
7:3 150℃
0.00
12.42

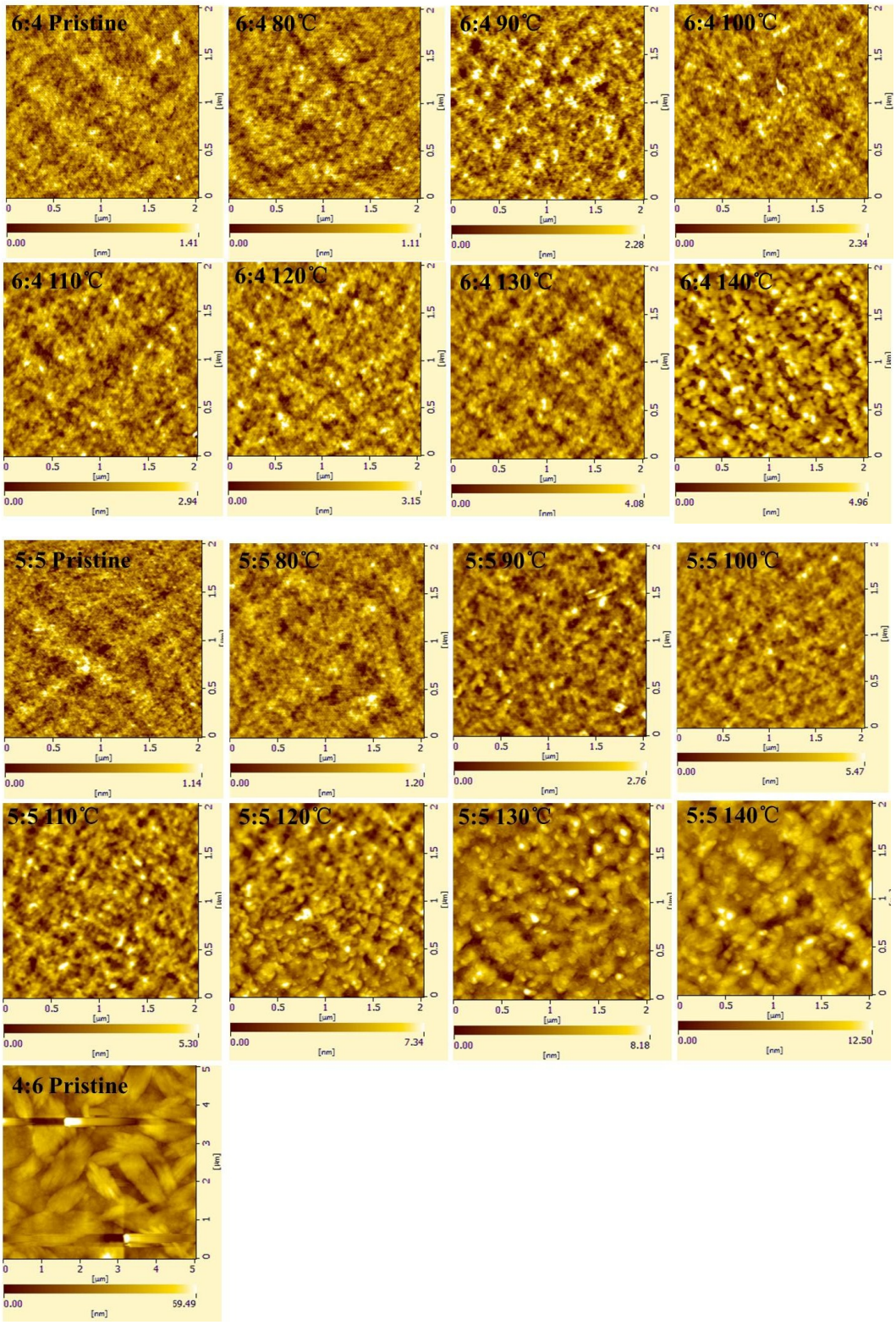


Fig. S5 The AFM images of different ratios of *p*-DTS(FBTTh$_2$)$_2$:EP-PDI blend film thermal annealed at different temperature.

Table S6

D:A 5:5	V_{OC} (V)	J_{SC}(mA/cm^2)	FF	PCE (%)
pristine	0.23	0.66	0.34	0.05
60 ˚C	0.48	1.34	0.39	0.25
70 ˚C	0.66	2.87	0.40	0.75
80 ˚C	0.69	4.98	0.45	1.54
90 ˚C	0.69	5.20	0.46	1.65
100 ˚C	0.75	7.58	0.55	3.12
110 ˚C	0.74	7.25	0.53	2.84
120 ˚C	0.57	5.92	0.39	1.31

D:A 7:3	V_{OC} (V)	J_{SC}(mA/cm^2)	FF	PCE (%)
pristine	0.21	0.75	0.37	0.06
80 ˚C	0.47	4.95	0.38	0.88
90 ˚C	0.66	6.05	0.48	1.91
100 ˚C	0.70	7.21	0.52	2.62
110 ˚C	0.72	7.53	0.55	2.98
120 ˚C	0.74	7.73	0.55	3.15
130 ˚C	0.73	6.57	0.56	2.68
140 ˚C	0.67	6.30	0.48	2.02
150 ˚C	0.57	5.62	0.40	1.28

Table S6 Device parameters of *p*-DTS(FBTTh$_2$)$_2$:EP-PDI ratio of 7:3 and 5:5 TA treated at different temperature.