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Supporting Information for

High-Efficiency Ternary Nonfullerene Organic Solar Cells Enabled by a Near Infrared Acceptor Enhancing Exciton Utilization and Extending Absorption

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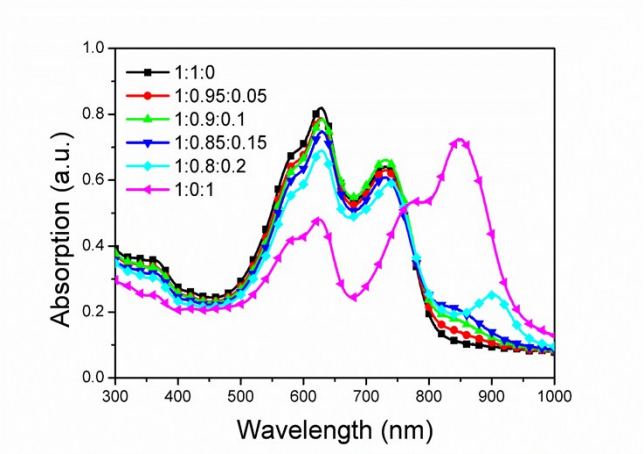

Figure S1. The absorption spectra of the PBDB-TF:IT-4F:O6T-4F ternary blends with different IT-4F:O6T-4F ratios. The donor/acceptor weight ratio is fixed at 1:1.

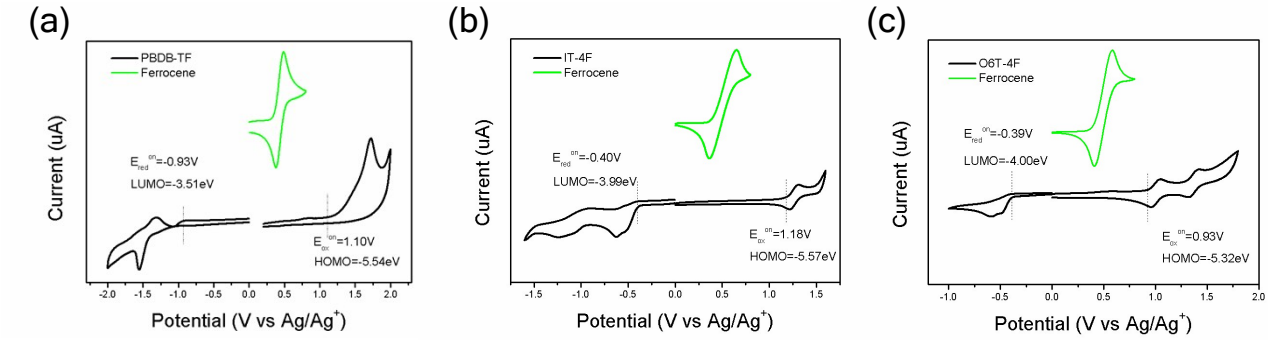

Figure S2. CV plots of (a) PBDB-TF, (b) IT-4F and (c) O6T-4F, respectively, from which the HOMO and LUMO levels of the respective materials are calculated.

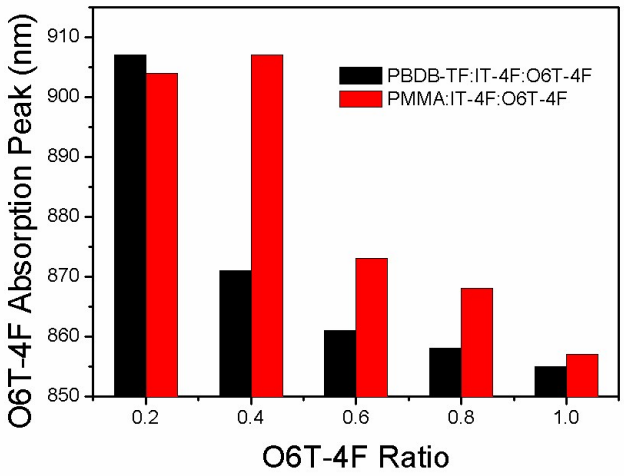

Figure S3. The O6T-4F absorption peak shifts with the IT-4F:O6T-4F ratio in PBDB-TF:IT-4F:O6T-4F and PMMA:IT-4F:O6T-4F films. The ratio between PBDB-TF (or PMMA) and acceptors is fixed at 1:1.

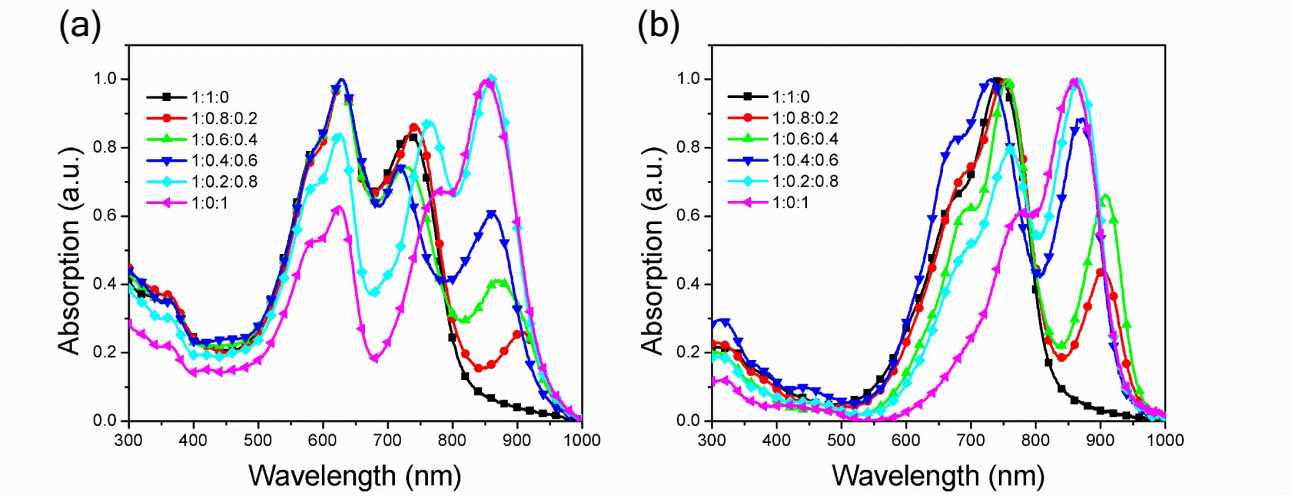

Figure S4. Normalized absorption spectra of (a) PBDB-TF:IT-4F:O6T-4F blend films and (b) PMMA:IT-4F:O6T-4F blend films.

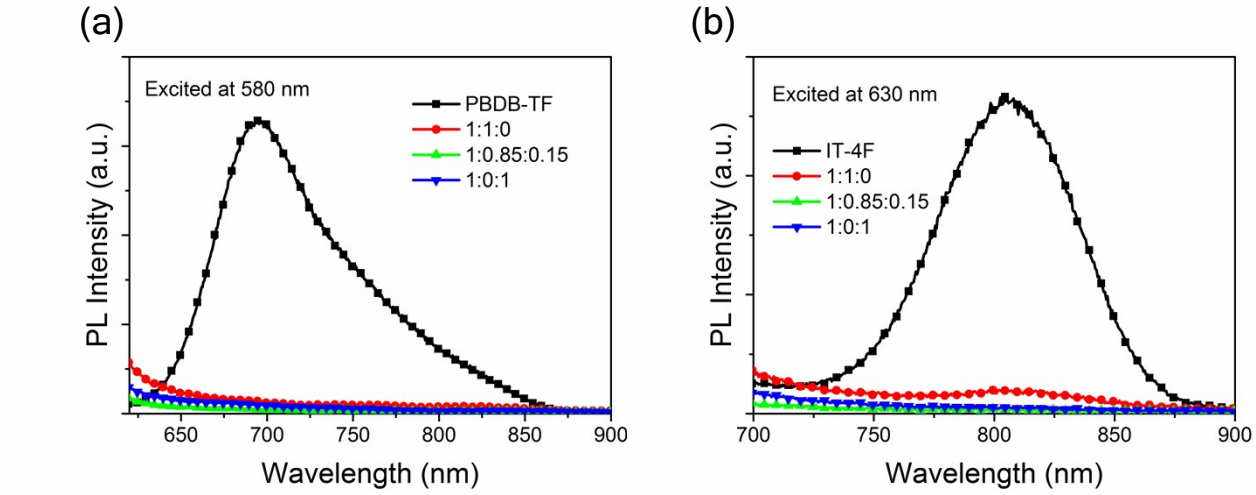

Figure S5. Photoluminescent quenching of (a) PBDB-TF donor (excited at 580 nm) and (b) IT-4F acceptor (excited at 630 nm) in binary and ternary blend films (PBDB-TF:IT-4F:O6T-4F=1:1:0, 1:0.85:0.15, 1:0:1).

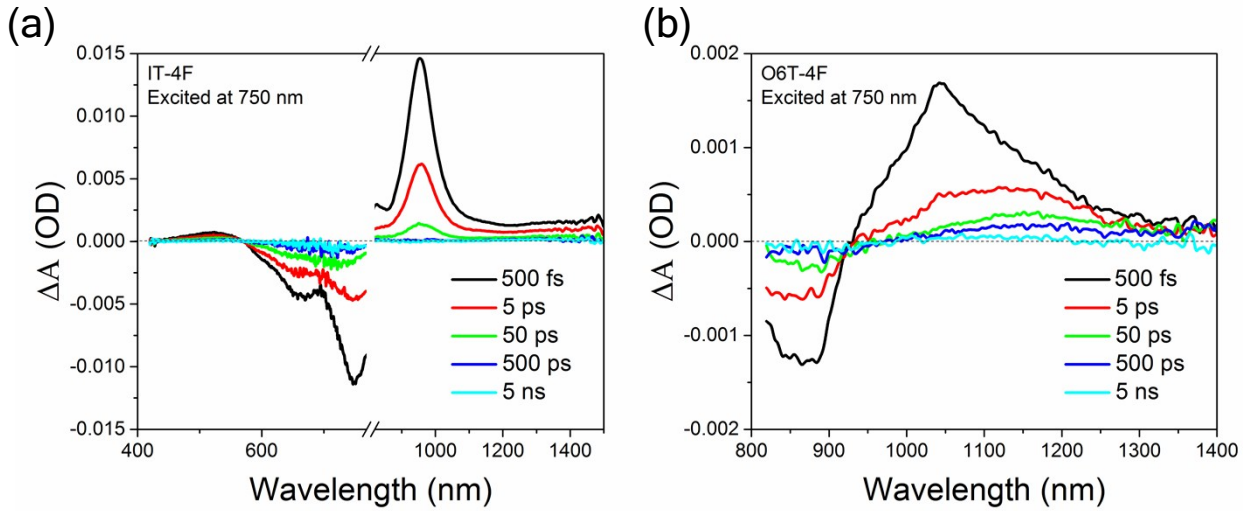

Figure S6. TA spectra of neat IT-4F and O6T-4F films pumped at 750 nm with 10 nJ pulse^{-1}.

Table S1. Detailed photovoltaic performance of the OSCs based on the PBDB-TF:IT-4F:O6T-4F blend active layers with various IT-4F:O6T-4F ratios.

PBDB-TF:IT-4F:O6T-4F (w/w/w)	V_{OC} [V]	J_{SC} [mA cm^{-2}]	FF	PCE [%]
1:1:0	0.82	19.72	0.740	11.97
1:0.8:0.2	0.81	21.33	0.699	12.08
1:0.6:0.4	0.81	19.24	0.614	9.57
1:0.4:0.6	0.80	18.73	0.562	8.42
1:0.2:0.8	0.78	17.24	0.576	7.75
1:0:1	0.77	16.43	0.547	6.92