

Supplementary data for

Efficient semi-transparent organic solar cells enabled by a quasi-heterojunction active layer structure

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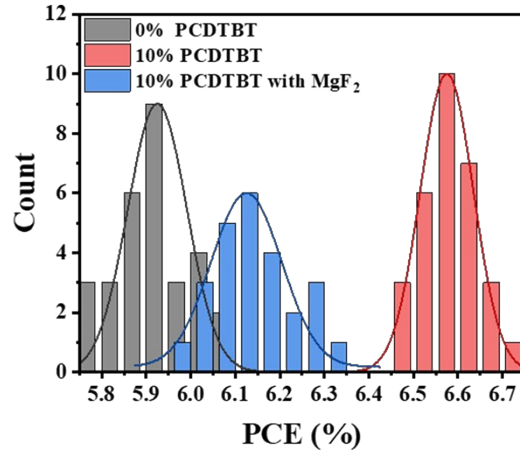


Fig. S1 The PCE Histogram for the SD-type binary PTB7-Th/IEICO-4Cl ST-OSCs, PTB7-Th:10%PCDTBT/IEICO-4Cl ST-OSCs and PTB7-Th:10% PCDTBT/IEICO-4Cl ST-OSCs covered with 60 nm MgF₂ light out-coupling layer.

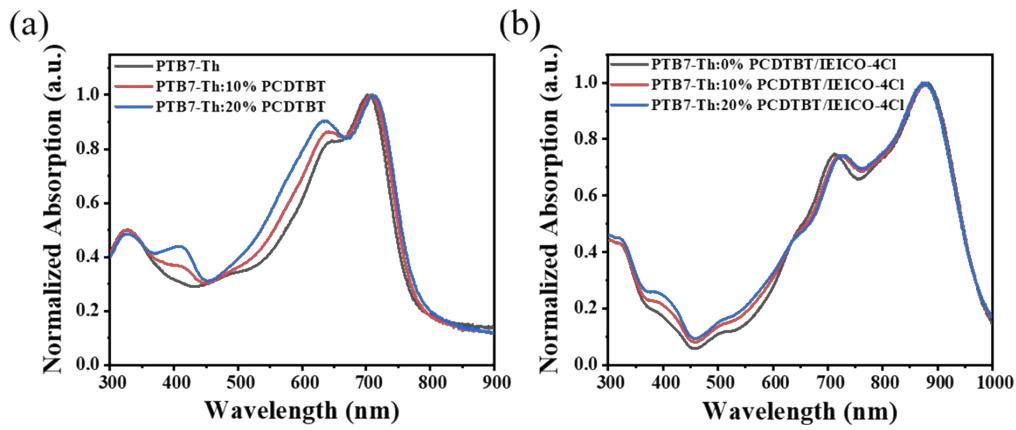


Fig. S2 Normalized absorption spectra of (a) PTB7-Th:PCDTBT blend films and (b) SD-type PTB7-Th:PCDTBT/IEICO-4Cl ternary films.

Table S1 Detailed photovoltaic parameters and optical parameters of SD-type PTB7-Th:PCDTBT:IEICO-4Cl based ST-OSCs with different PCDTBT ratio.

Donor layer	Device type	V_{oc} [V]	J_{sc} [mA cm ⁻²]	FF [%]	PCE [%] ^a	AVT [%]
PTB7-Th	SD	0.71	14.62	59.01	6.09 (5.92±0.17)	37.69
PTB7-Th:5% PCDTBT	SD	0.69	15.64	58.93	6.33 (6.22±0.11)	37.05
PTB7-Th:10% PCDTBT	SD	0.68	16.44	59.66	6.71 (6.59±0.12)	36.07
PTB7-Th:15% PCDTBT	SD	0.68	16.21	57.17	6.32 (6.19±0.13)	34.68
PTB7-Th:20% PCDTBT	SD	0.68	15.93	57.34	6.21 (6.03±0.18)	33.87
PCDTBT	SD	0.75	2.88	43.21	0.94 (0.87±0.07)	25.29

^a Average results from ten devices.

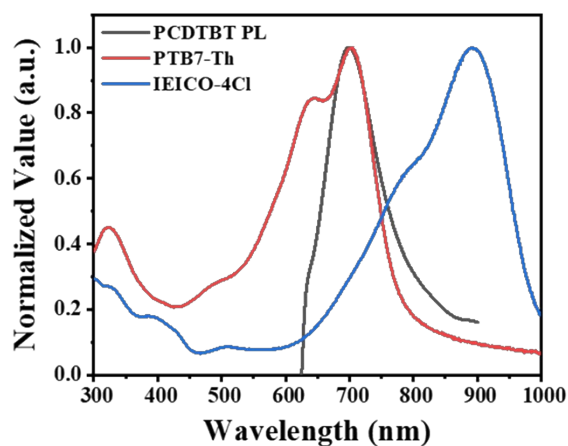


Fig. S3 The normalized absorption spectra of PTB7-Th and IEICO-4Cl as well as the photoluminescent spectrum of PCDTBT excited at 585 nm.

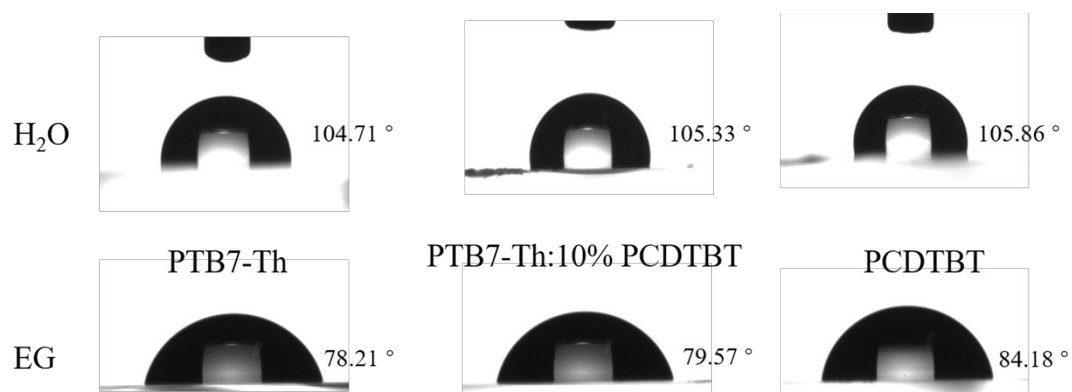


Fig. S4 The contact angle images of PTB7-Th, PCDTBT and PTB7-Th:10% PCDTBT blend films.

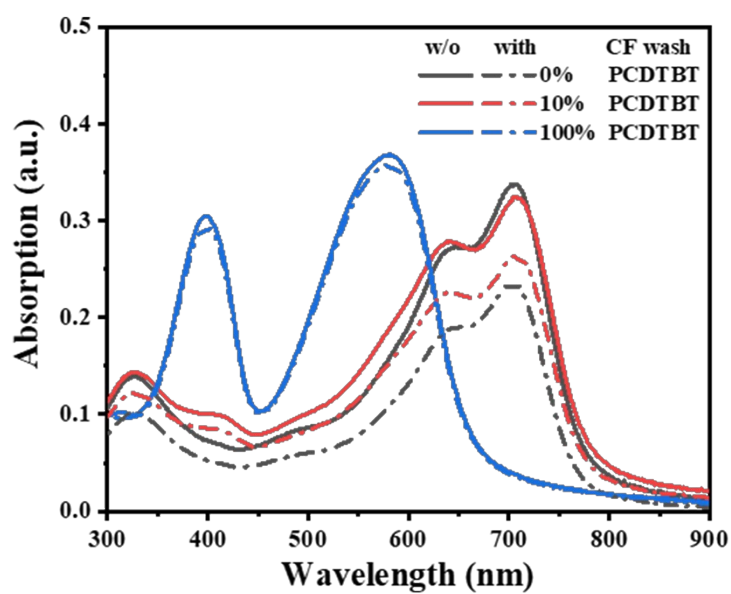


Fig. S5 Absorption spectra of PTB7-Th, PCDTBT and PTB7-Th:PCDTBT blend films without and with CF spin-rinsing.

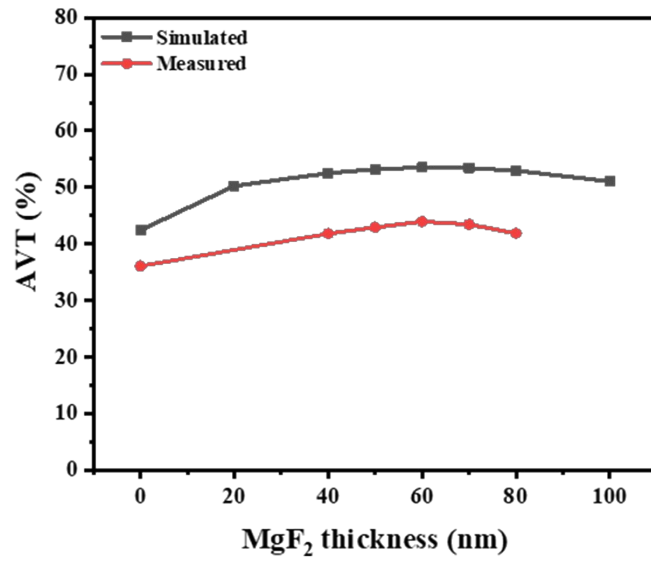


Fig. S6 The simulated and measured AVT of SD-type 10% PCDTBT ternary ST-OSCs as function of MgF₂ layer thickness.

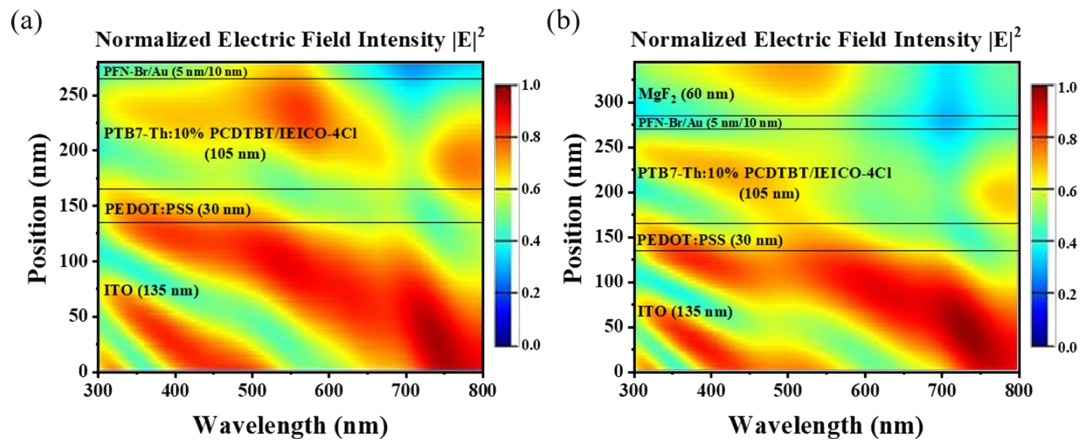


Fig. S7 Distribution of normalized modulus square of the optical electric field of PTB7-Th:10% PCDTBT:IEICO-4Cl ternary ST-OSCs (a) without MgF₂ (b) and with MgF₂.