

Supporting Information

Synergistic optimization of interfacial energy-level alignment and defects passivation toward efficient annealing-free inverted polymer solar cells

Shuai Huang,^{ab} Lian Duan,^{*ab} and Dongdong Zhang,^{*ab}

^a Key Lab of Organic Optoelectronics and Molecular Engineering of Ministry of Education, Department of Chemistry, Tsinghua University, Beijing 100084, China.

^b Center of Flexible Electronics Technology, Tsinghua University, Beijing 100084, P. R. China.

*Corresponding author: Lian Duan, and Dongdong Zhang

E-mail address: duanl@mail.tsinghua.edu.cn, ddzhang@mail.tsinghua.edu.cn.

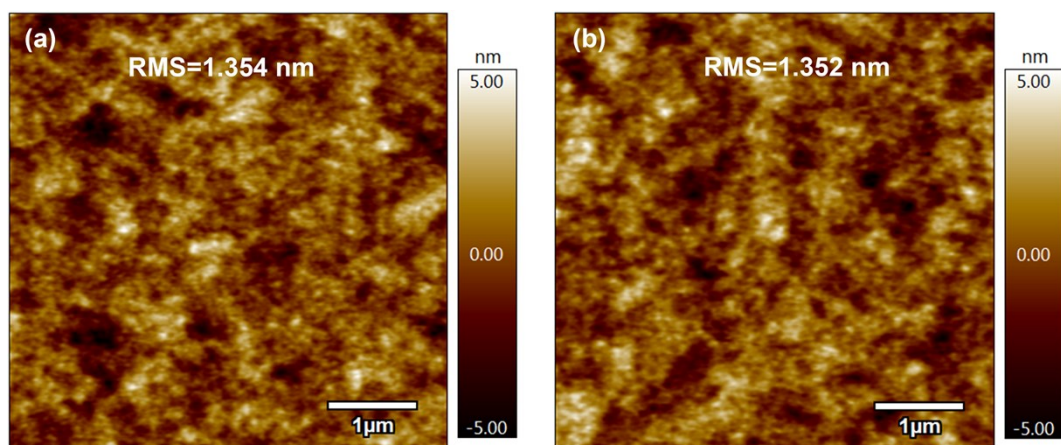


Fig. S1 AFM images of ITO/ZnO/BHJ and ITO/ZnO/CeF₃/BHJ films.

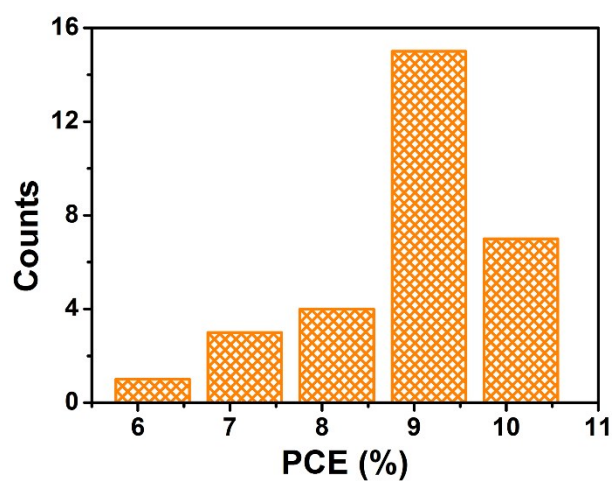


Fig. S2 Histogram of PCE for the CeF₃-based cells.

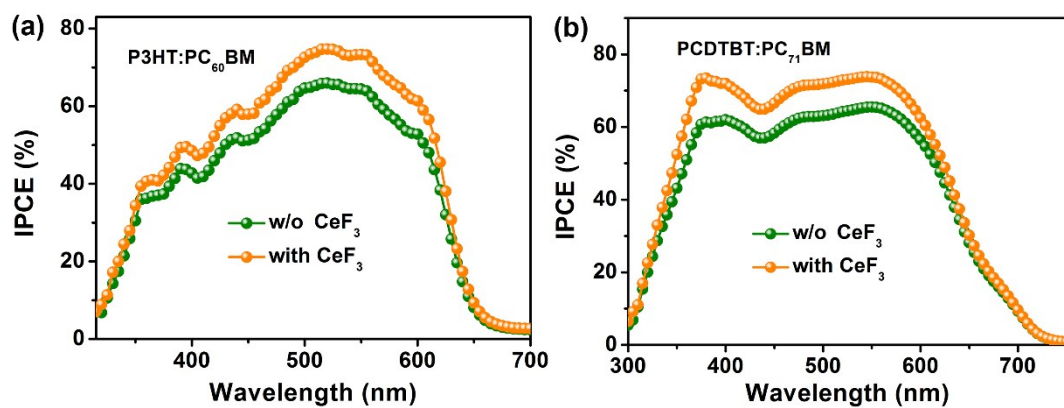


Fig. S3 IPCE spectra of the solar cells based on the (a) P3HT:PC₆₀BM and (b) PCDTBT:PC₇₁BM active layers.

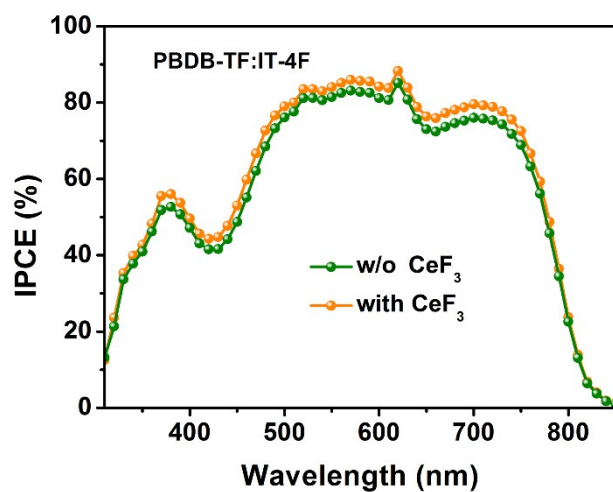


Fig. S4 The corresponding IPCE spectra of the PBDB-TF:IT-4F-based PSCs.

Table S1. Device parameters extracted from J - V characteristics.

Active layer	Interfacial layer	V_{oc} (V)	J_{sc} (mA cm ⁻²)	FF (%)	PCE (%)	Integrated J_{sc} (mA cm ⁻²)
P3HT:PC ₆₀ BM	w/o CeF ₃	0.60	9.12	58.08	3.17	8.64
	with CeF ₃ (5 Å)	0.63	10.56	64.13	4.26	9.95
PCDTBT:PC ₇₁ BM	w/o CeF ₃	0.84	10.92	60.13	5.52	10.39
	with CeF ₃ (5 Å)	0.89	12.31	63.95	7.02	11.68
PBDB-TF:IT-4F	w/o CeF ₃	0.81	20.58	70.86	11.81	18.67
	with CeF ₃ (5 Å)	0.83	21.50	73.88	13.18	19.54