

Supporting Information

**Two-in-one Alcohol-processed PEDOT Electrode Produced by
Solvent Exchange for Organic Solar Cells**

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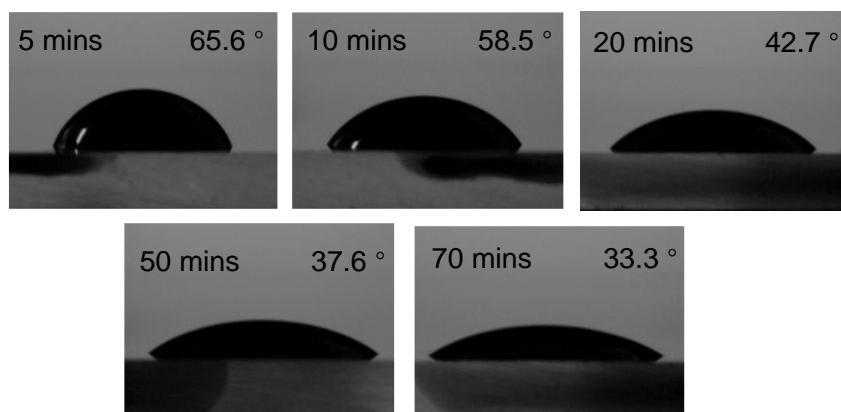


Figure S1. Contact angle images for *e*-PEDOT:PSS on PM6:BTP-eC9:PC₇₁BM surface with different treatment time.

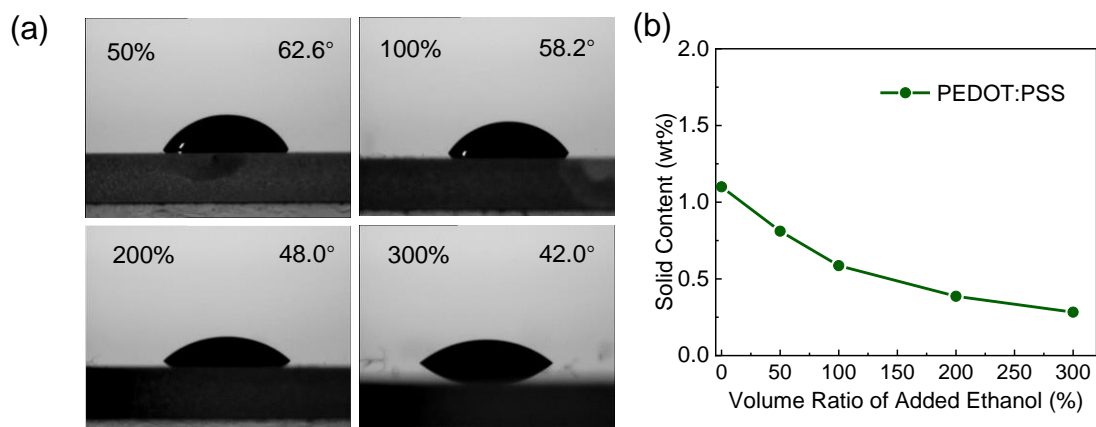


Figure S2. a) Contact angle images for diluted *a*-PEDOT:PSS with different volume ratios of ethanol on PM6:BTP-eC9:PC₇₁BM surface. b) Solid contents of diluted *a*-PEDOT:PSS.

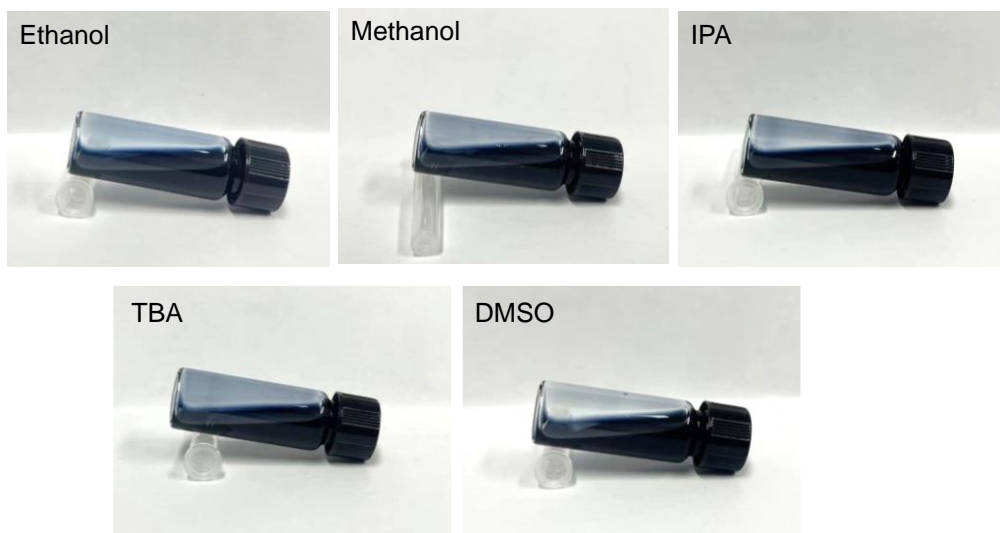


Figure S3. Optical images for the redispersed PEDOT:PSS in different solvents.

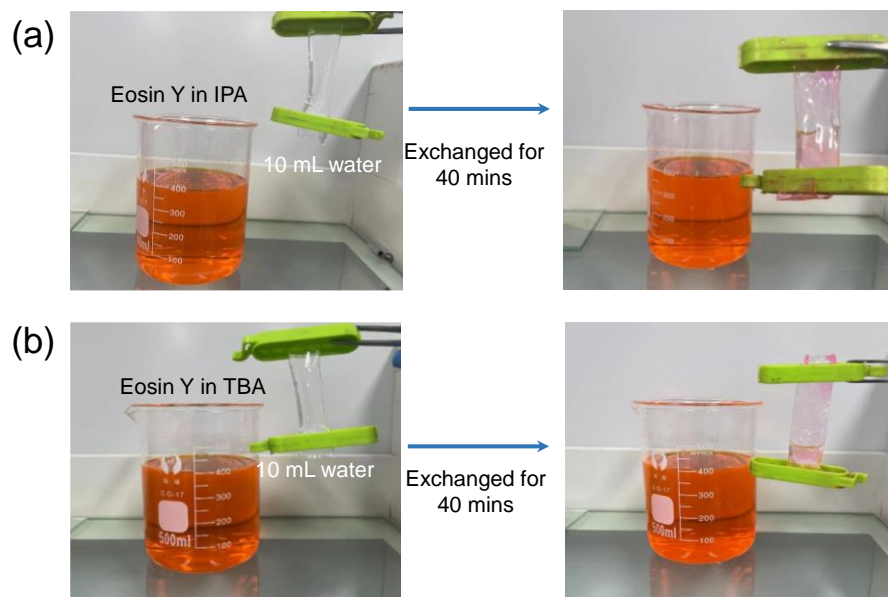


Figure S4. Pictures of water in the dialysis membrane and Eosin Y solution in a) IPA or b) TBA before and after solvent exchange.

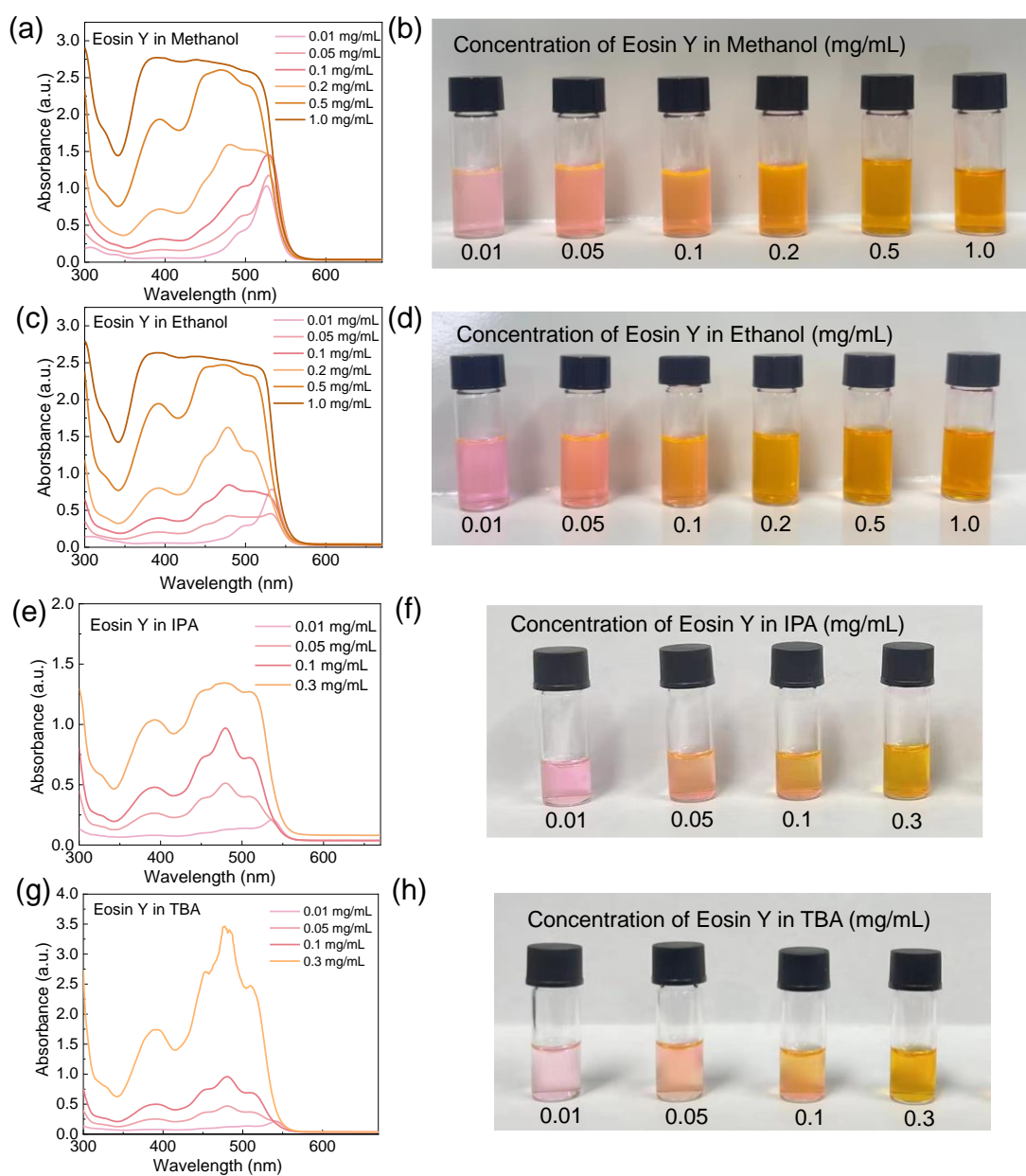
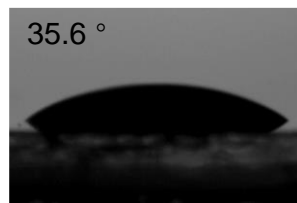


Figure S5. Absorbance spectra of Eosin Y dissolved in a) methanol, c) ethanol, e) IPA and g) TBA with different concentrations. Corresponding photographs of Eosin Y solution in b) methanol, d) ethanol, f) IPA and h) TBA.



e-PEDOT:PSS
(3 wt% PEDOT:F)

Figure S6. Contact angle image of *e*-PEDOT:PSS with the addition of PEDOT:F.

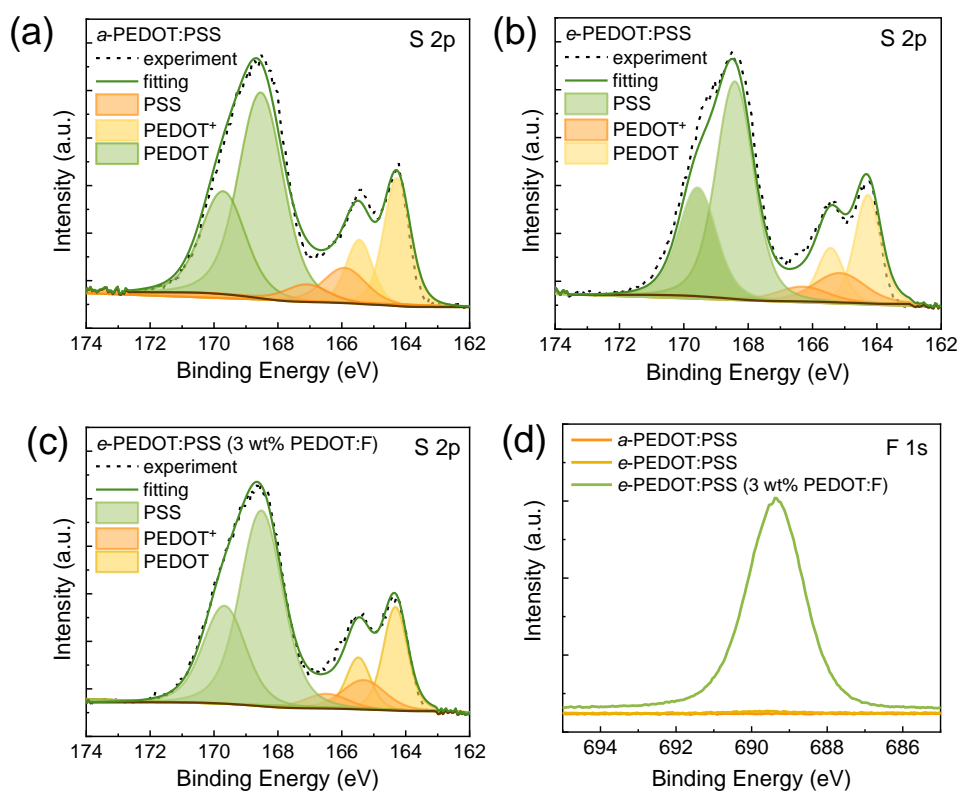


Figure S7. XPS spectra of *a*-PEDOT:PSS and *e*-PEDOT:PSS films; a-c) S 2p signals of *a*-PEDOT:PSS, *e*-PEDOT:PSS and *e*-PEDOT:PSS (3 wt% PEDOT:F). The doping levels of *a*-PEDOT:PSS, *e*-PEDOT:PSS and *e*-PEDOT:PSS (3 wt% PEDOT:F) are 30.9%, 33.3% and 33.5%, respectively; d) F 1s signal of *a*-PEDOT:PSS and *e*-PEDOT:PSS with the addition of PEDOT:F.

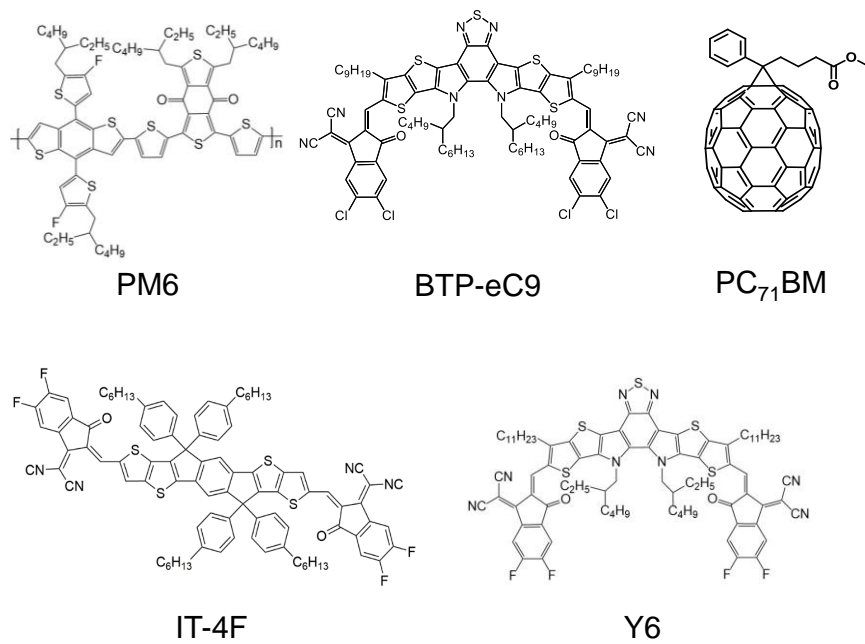


Figure S8. Molecular structures of polymer donor and non-fullerene acceptor used in OSCs.

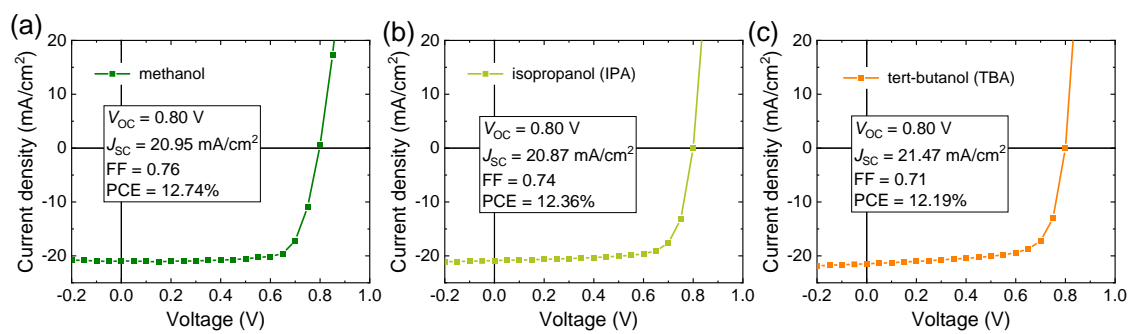


Figure S9. J - V curves for OSCs based on doctor-bladed PEDOT:PSS processed from a) methanol, b) isopropanol and c) tert-butanol. The device structure is ITO/PEI-Zn/PM6:BTP-eC9:PC₇₁BM/PEDOT:PSS processed from different alcohols.

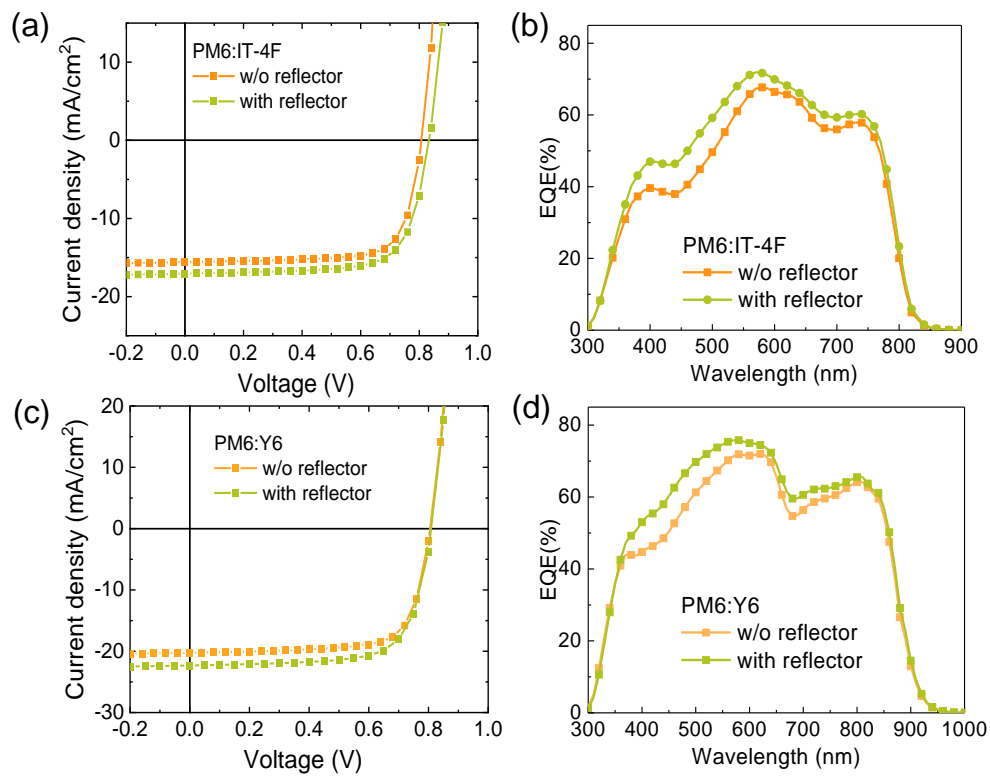


Figure S10. *J-V* curves and corresponding EQE spectra for OSCs based on doctor-bladed *e*-PEDOT:PSS top electrode with the active layers of a-b) PM6:IT-4F and c-d) PM6:Y6.

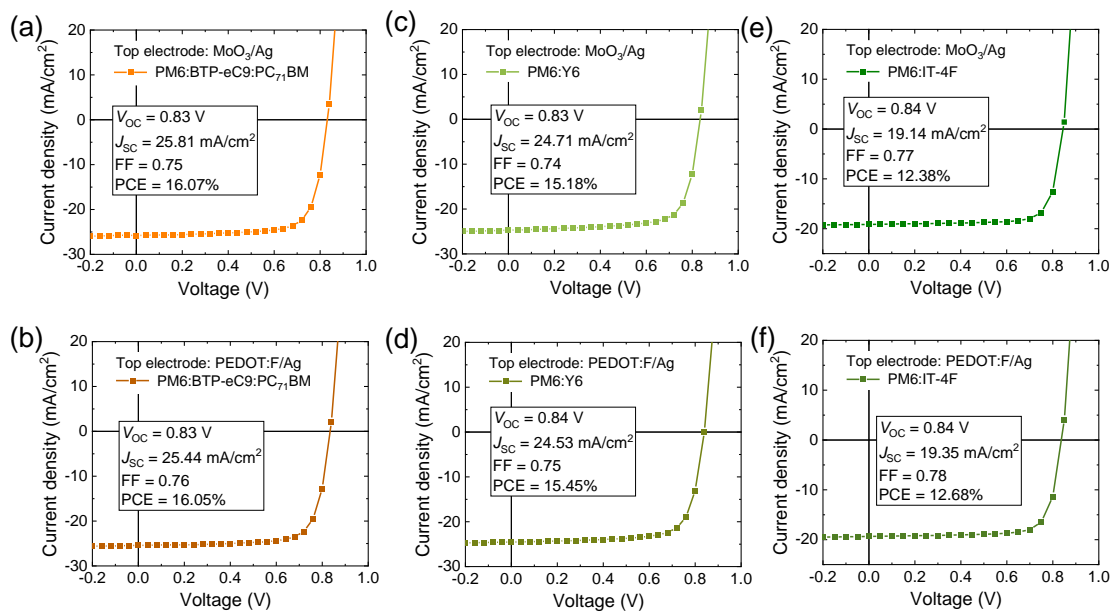


Figure S11. $J-V$ curves for reference OSCs based on MoO_3/Ag and PEDOT:F/Ag top electrode with the active layers of a-b) PM6:BTP-eC9:PC₇₁BM, c-d) PM6:Y6 and e-f) PM6:IT-4F.

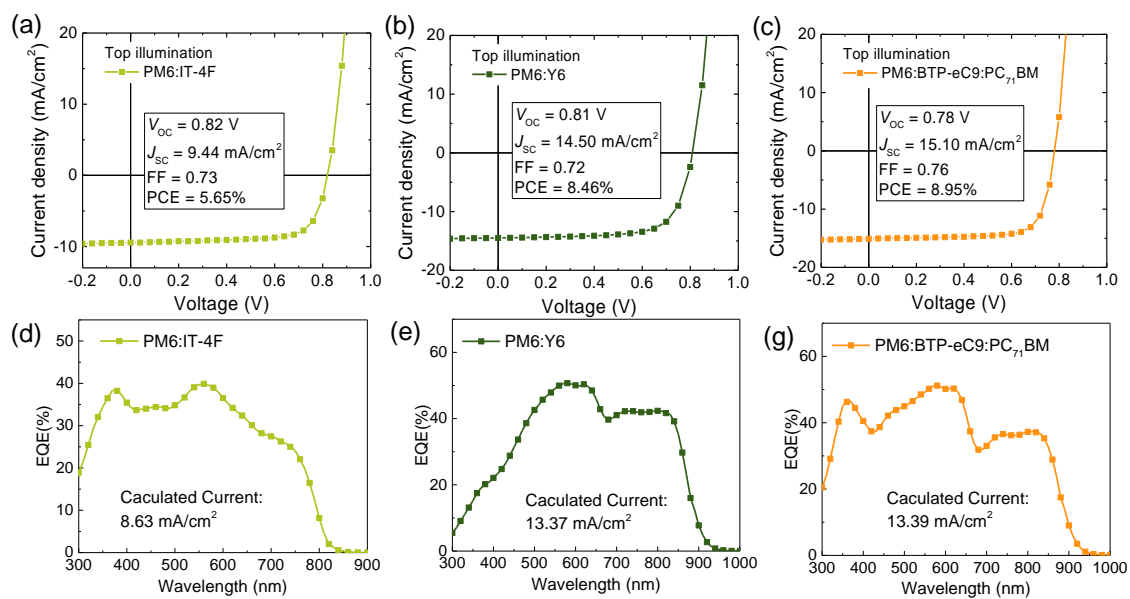


Figure S12. Top-illuminated $J-V$ curves and corresponding EQE spectra for OSCs based on doctor-bladed e -PEDOT:PSS top electrode.

Table S1. Summary of the device structures and efficiencies of OPVs based on 2-in-1 printable top electrodes in the literature.

	Device Structure	Area	PCE (%)	Reference
2011	Glass/ITO/PEDOT:PSS/P3HT:PCBM/Ag Ink	-	2.25	1
2014	PET/printed Cu/PEI/P3HT:PC ₆₁ BM/PEDOT:PSS	-	2.77	2
2015	PES/H ₃ PO ₄ -PEDOT:PSS/PEI/P3HT:ICBA/EG-PEDOT:PSS	-	3.3	3
2017	Ag ink/ZnO/PBTZT-stat-BDTT-8:PCBM/PEDOT:PSS:Ag NWs	19.7 cm ²	3.6	4
2018	Glass/ITO/P3HT:ICBA:PEI/PEDOT:PSS	1 cm ²	4.1	5
2020	Glass/ITO/ZnO NPs/PTB7-Th:EH-IDTBR/PEDOT:PSS (ionic liquid)	4.64 mm ²	6.32	6
2020	Glass/ITO/ZnO/PM6:IT-4F(with DIO)/PM6:IT-4F(without DIO)/PEDOT:PSS	0.03 cm ²	10.1	7
2021	TPU/Ag NWs/PEDOT:PSS/PTB7-Th:IEICO-4F/EGaIn	-	10.1	8
2021	Glass/ITO/ZnO/PCE10:IEICO-4F/Ω-PEDOT	0.1 cm ²	8.21	9
2023	Glass/ITO/PEI-Zn/PM6:BTP-eC9:PC₇₁BM/e-PEDOT:PSS (without reflector)	0.04 cm² 23.8 cm²	12.80 10.94	This Work

Reference

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Table S2. Photovoltaic parameters of OSCs based on *e*-PEDOT:PSS top electrode added with different ratios of PEDOT:F. The active layer of OSCs is PM6:BTP-eC9:PC₇₁BM.

Concentration of PEDOT:F	V_{oc} (V)	J_{sc} (mA/cm²)	FF	PCE (%)
without	0.77 ± 0.01	21.26 ± 0.21	0.72 ± 0.01	11.83 ± 0.10
3 wt%	0.82 ± 0.01	21.19 ± 0.26	0.74 ± 0.01	12.80 ± 0.24