Electronic Supplementary Material (ESI) for Materials Advances.

High-Efficiency ITO-Free Organic Solar Cells Through Top Illumination

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S1. Calculation of Power-per-weight

Parylene thickness = 2.0 μm

(1) $$\text{Weight - per - area} = \frac{\text{Device weight}}{\text{Device area}} = \frac{0.0015\ \text{g}}{504\ mm^2} = 2.98\ \mu\text{g/mm2} = 2.98\ \text{g/m}^2$$

(2) $$\text{Power density} = \text{Efficiency} \times \text{incident power} = 9.26\ \% \times 100\ mW/cm^2 = 92.6\ W/m^2$$

(3) $$\text{Power - per - weight} = \frac{\text{Power density}}{\text{Weight - per - area}} = \frac{92.6\ \text{W}/m^2}{2.98\ \text{g}/m^2} = 31.07\ W/\text{g}$$

Table S1. Comparison of PCE vs. W/g vs. T80 of our crumple OPV and reported results in the literature of solar cells.

System	Device structure	Substrate thickness (μm)	PCE (%)	Power-per-weight (W/g)	T80 (hr)	Ref.
OPV	Parylene/PEDOT:PSS/ZnO/P3HT:O-IDTBR/PEDOT:PSS/Parylene	1.7	4.73	6.3	NA	1.
	PE/PEDOT:PSS FTE/PEDOT:PSS/PM6:Y6/PFN-Br/Al	24	14.66	6.33	NA	2.
	PET/PEDOT:PSS/P3HT:PCBM/Ca/Ag	1.4	4.2	10	NA	3.
	PDMS/PET/PEDOT:PSS/D18-Cl:Y6/PFNCI-Br/Al	2.5	15.5	32.07	NA	4.
	PI/Ag/PCP-2F-Li-PEDOT:PSS/PM6:L8-BO/Bis-FIMG	125	17.32	39.72	NA	5.
	Parylene/Al_2O_3/Ag/PFN-Br/PM6:Y6/MoO_3/Ag/WO_3/Al_2O_3	2.0	9.26	31.07		This work
Perovskite	NCP/PEDOT:PSS:ethylene glycol:Triton-X100/PEDOT:PSS/$CH_3NH_3PbI_3$/PCBM/Al	0.5	4.25	0.56	NA	6.
	PET/PH1000/PEDOT:PSS/PbI_2/CH_3NH_3I(MAI)/PCBM/Al	50	14	1.96	NA	7.
	PET/Ag NWs/m-FCE/PEDOT:PSS/$MAPbI_3$/PC61BM/Al	17	13.32	4.16	NA	8.
	PET/graphene/P3HT/$CH_3NH_3PbI_3$/$PC_{71}BM$/Ag	20	11.5	5	NA	9.
	PET/PEDOT:PSS/$CH_3NH_3PbI_{3-x}Cl_x$/PCBM/PTCDI/Cr/Cr_2O_3/Al	3	12	23	NA	10.
	PET/ITO/NiOx/$CH_3NH_3PbI_3$/C_{60}/Bis-C_{60}/Ag	1.4	14.19	23.26	NA	11.
	PET/NiOx NP/R-BA/$MAPbI_3$/PCBM/bis-C_{60}/Ag	1.4	16.2	26.9	360	12.
	PEN/Ag NW/PH1000/AI4083/MAIMABrPbI$_2$/$PC_{61}BM$/Al	1.3	15.18	29.4	500	13.
Quantum dot	PET/parylene/graphene/oCVD PEDOT/PbS-EDT/Pbs-TBAI/LiF/Al	1.0	7.1	12.3	NA	14.
	PEN/Ag NWs/AZO/PbS-PbX_2/PbS-EDT/Ag	1.3	9.9	15.2	840	15.

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S2. Demonstration Video:

The video file is attached with this supplementary file. This video serves to demonstrate the smooth removal of our device from the ITO substrate. Notably, the peeling process showcases the device's extraordinary stability as no damage to its structure is observed.