Electronic Supplementary Information

for

Flexible Near-Infrared Organic Photodetectors Based on a High Work Function Anode

Jun Ma, [†a] Jiahui Wang, [†bc] Junli Hu *[a] and Yichun Liu [a]

[a] Key Laboratory of UV-Emitting Materials and Technology, Northeast Normal University, Ministry of Education, Changchun 130024 (P. R. China)

[b] State Key Laboratory of Polymer Physics and Chemistry, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022 (P. R. China)

[c] School of Applied Chemistry and Engineering, University of Science and Technology of China, Hefei 230026 (P. R. China)

* Corresponding author. Email: hujl100@nenu.edu.cn.

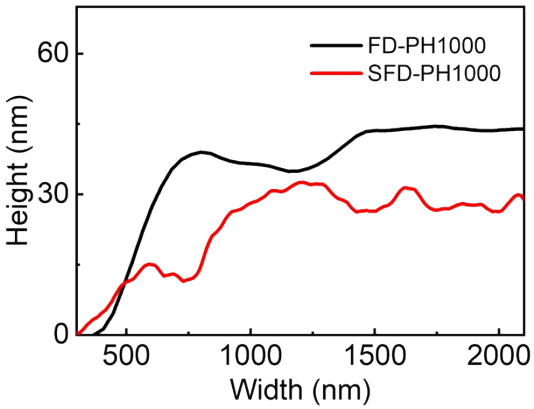

Figure S1. Thickness of FD-PH1000 and SFD-PH1000 films.

Figure S2. The contact angle of FD-PH1000 and SFD-PH1000 solution on the PEN substrate.

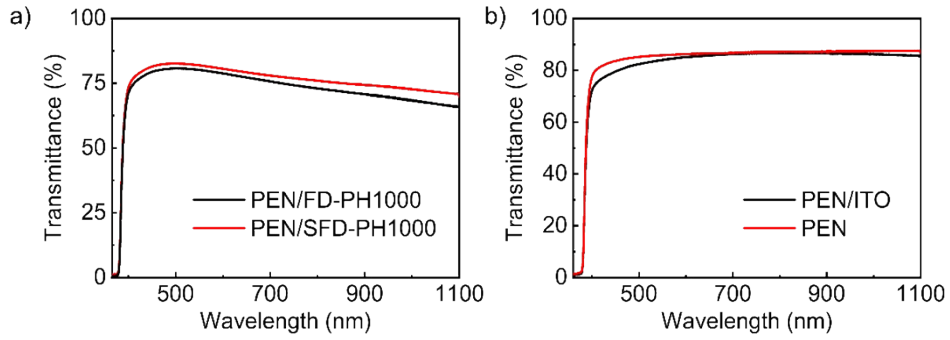

Figure S3. a) Transmission spectra of FD-PH1000 and SFD-PH1000 films on PEN substrate. b) Transmission spectra of PEN or PEN/ITO.

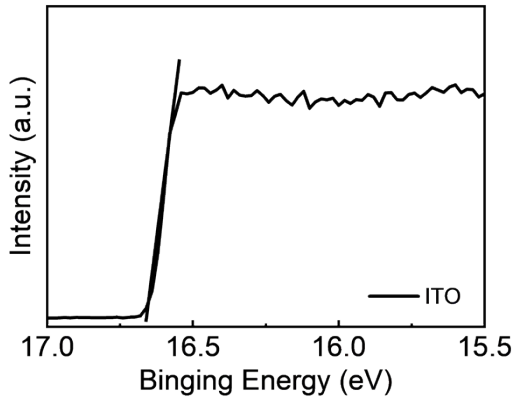

Figure S4. Secondary electron cutoff regions in UPS of ITO.

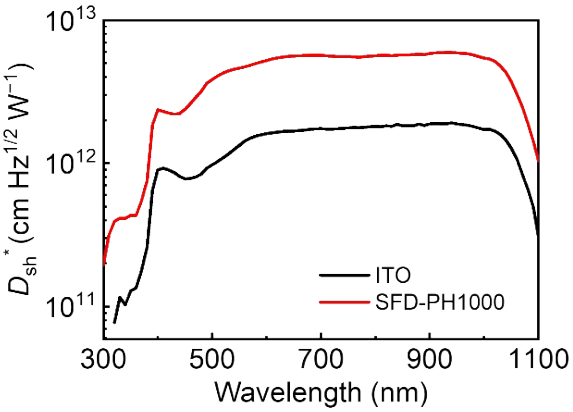

Figure S5. D_{sh}^{*} spectra under −0.1 V applied voltage of the flexible OPD devices with different anodes.

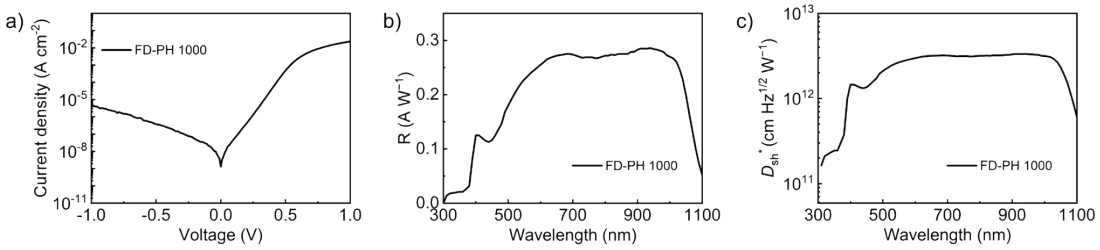

Figure S6. a) *J–V* curves in the dark, b) responsivity of the devices at −0.1 V. c) D_{sh}^{*} spectra under −0.1 V applied voltage of the FD-PH1000-based OPD device.

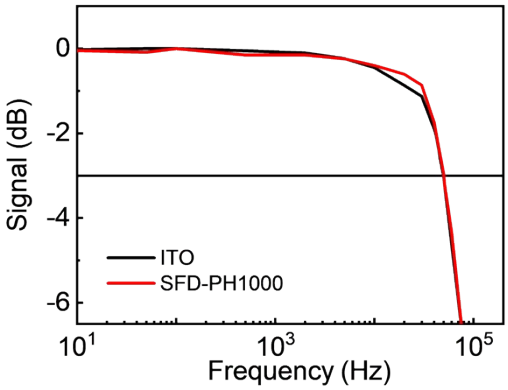

Figure S7. Normalized photo-response as a function of frequency.

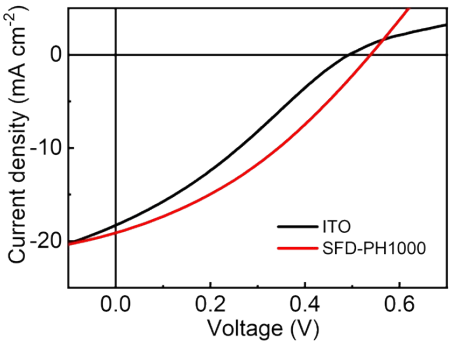

Figure S8. *J–V* curves of the flexible OPD devices based on ITO and SFD-PH1000 anodes under AM 1.5G solar irradiation.

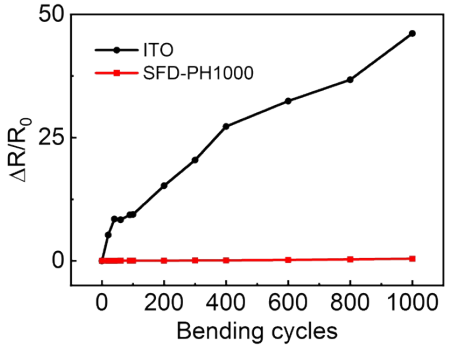

Figure S9. Sheet resistance variation ($\Delta R/R_0$) of the ITO and SFD-PH1000 electrodes on PEN substrate as a function of bending cycles at bending radii of 5 mm.

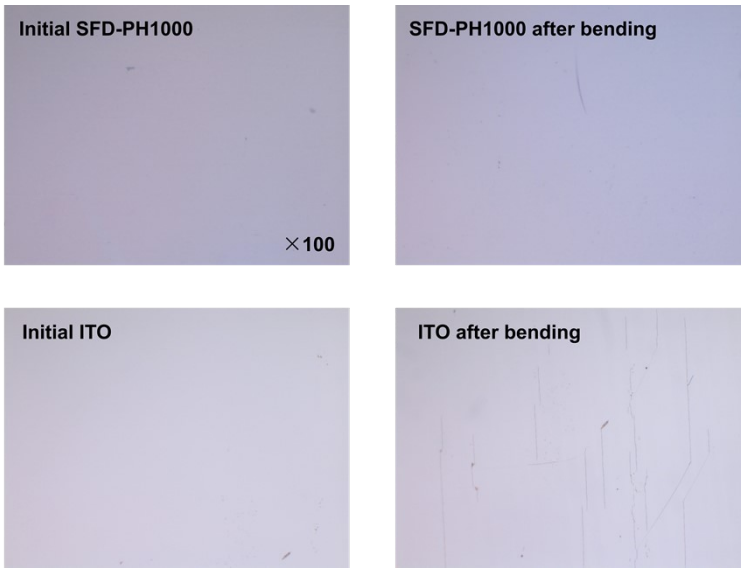

Figure S10. Optical microscope images of PEN/ITO and PEN/SFD-PH1000 before and after 1000 bending cycles.

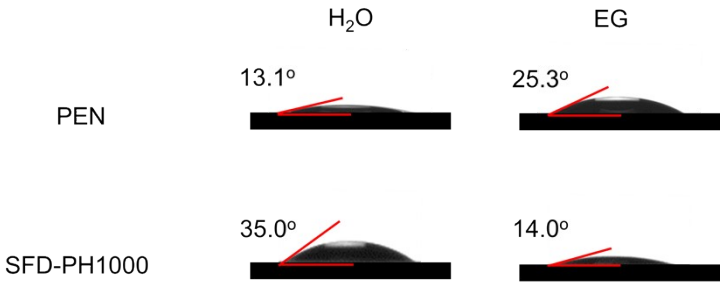

Figure S11. Contact angles of water and ethylene glycol on the PEN and SFD-PH1000.

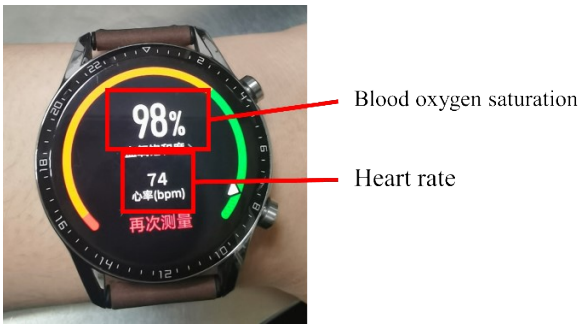

Figure S12. Heart rate and blood oxygen saturation by HUAWEI WATCH GT 2 Pro.

Table S1. Electrical Characteristics of different electrodes.

Anode	R_{sq} (Ω/sq)	d (nm)	σ (S/cm)	$T_{940\ nm}$ (%)
ITO	40	50	5000	86.3
FD-PH1000	77	44	2952	69.9
SFD-PH1000	71	32	4400	73.7

Table S2. Performance of OPD device with FD-PH1000 anodes at −0.1 V.

Anode	J_d (A cm^{-2})	R_{940nm} (A W^{-1})	D_{sh}^* (cm Hz$^{1/2}$ W^{-1})
FD-PH1000	2.30×10^{-8}	0.286	3.33×10^{12}

Table S3. Surface energy of the substrate and electrodes as calculated from contact angle measurement results. The work of adhesion (W) between SFD-PH1000 electrode and the PEN substrate is calculated to be 141.32 mJ m^{-2}.

Materials	θ_{H2O} (°)	θ_{EG} (°)	γ^d (mJ m^{-2})	γ^p (mJ m^{-2})	γ (mJ m^{-2})
PEN	13.1	25.3	0.52	91.91	92.43
SFD-PH1000	35.0	14.0	2.71	56.25	58.96