Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supplementary Information

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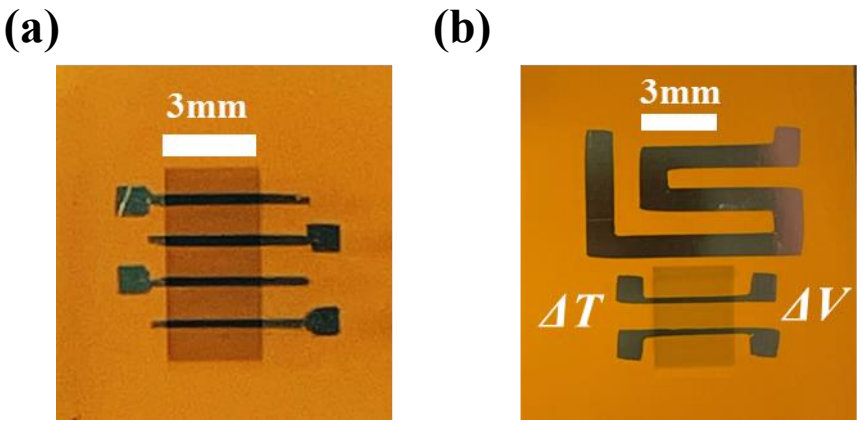

Fig. S1. Photograph of inkjet-printed PEDOT: PSS thin films (5-layers) on PI substrates for (a) conductivity measurement device, (b) Seebeck coefficient measurement device.

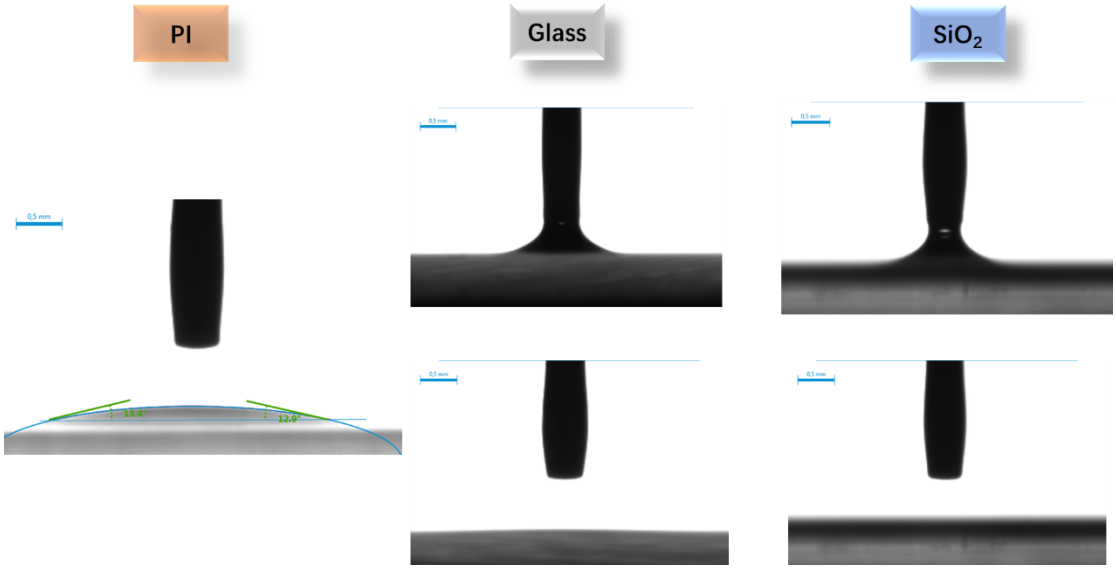

Fig. S2. Contact angle of PEDOT:PSS ink on the different substrates after UV-Ozone treatment. Contact angle is around 13° on the polyimide substrate. As shown, the contact angle for glass and silicon oxide substrate was undetermined following the UV-Ozone treatment due to the extreme hydrophilicity of the surface.

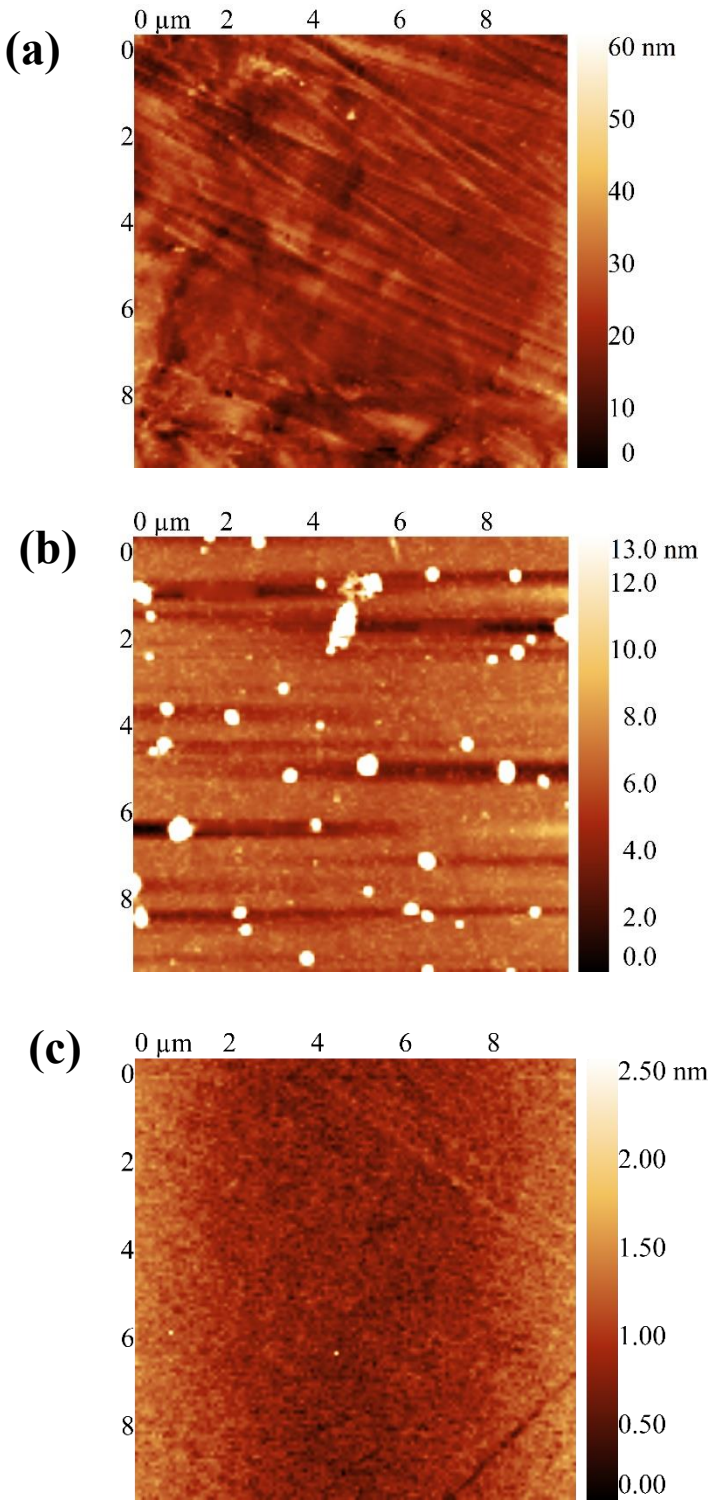

Fig. S3. AFM images for bare substrate (a) polyimide, Roughness≈20nm, (b) glass, Roughness≈5nm, (c) silicon oxide, Roughness≈＜1.0nm. (image size 10×10 µm^2)

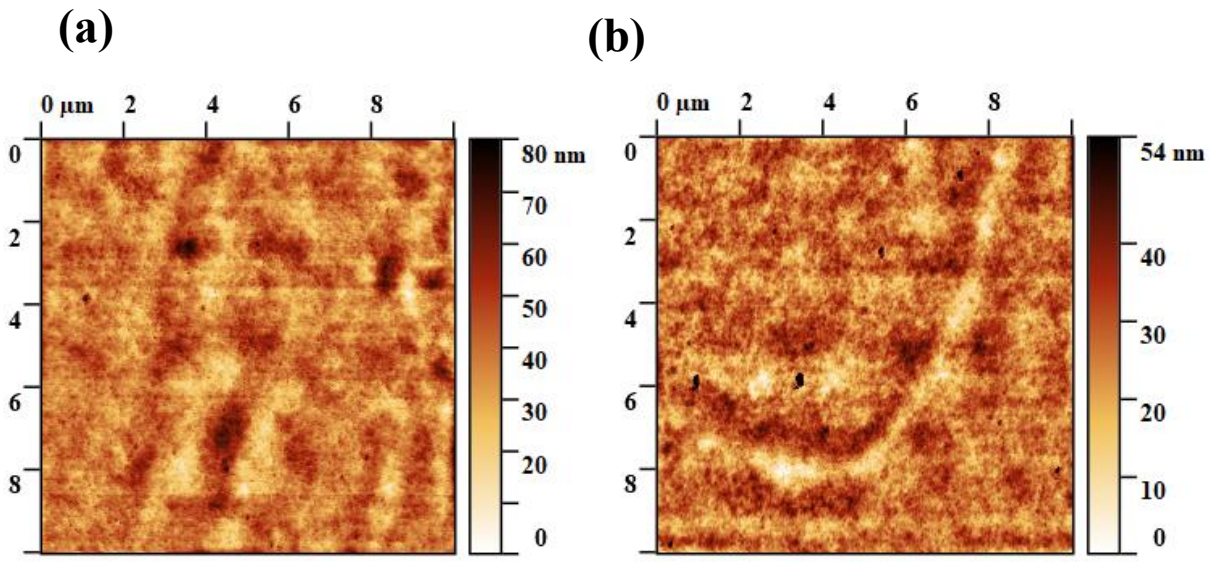

Fig. S4. AFM images of a five printed layers of PEDOT:PSS on (a) polyimide and (b) silicon oxide. (image size 10 x 10 μm^2)

Table S1. Properties of inkjet-printed PEDOT:PSS thin films on polyimide as a function of the number of layers.

Layers	Thickness [µm]	σ [S cm^{-1}]	Density [g cm^{-3}]	S [µV K^{-1}]
1	0.12±0.02	265±10	0.9	6.6±0.5
5	0.65±0.05	330±10	3.0	7.4±0.5
10	1.2±0.1	410±10	3.4	3.8±1.0
15	1.5±0.1	410±10	3.5	3.5±1.0

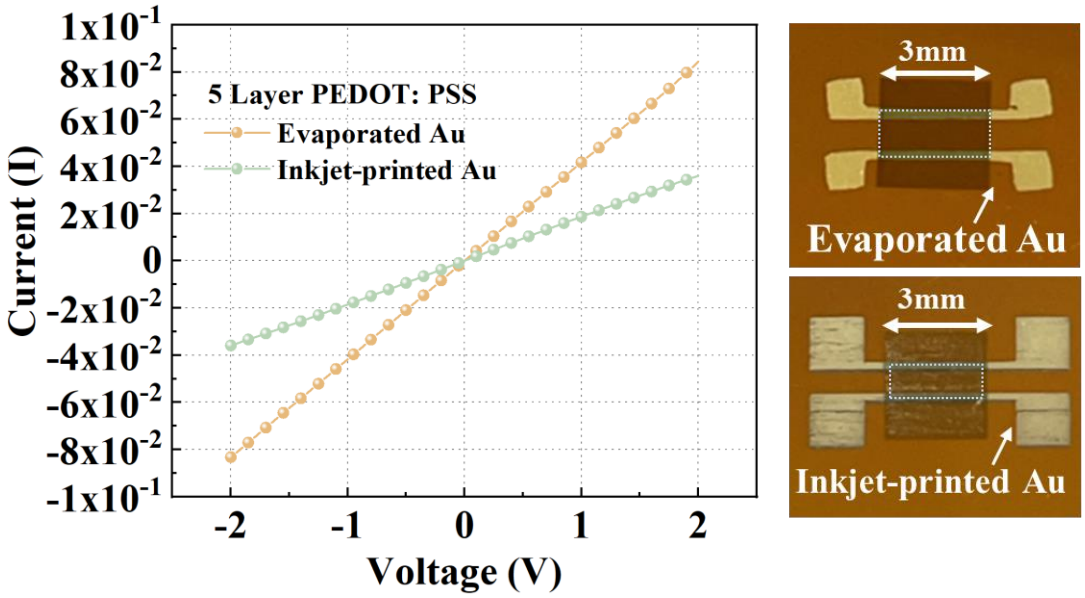

Fig. S5. *I* - *V* curves acquired on a 5-layer thin film of inkjet-printed PEDOT:PSS deposited on the top of thermally evaporated Au electrodes (orange circles) and inkjet-printed Au electrodes (green circles) on PI substrates. Top right: PEDOT: PSS deposited on thermally evaporated gold. Bottom right: PEDOT:PSS deposited on inkjet-printed gold. The ratio of active area between two electrodes (the dashed rectangle) is $A_{\text{Eva-Au}}/ A_{\text{Inkjet-Au}} \approx 1.65$, the current ratio is $I_{\text{Eva-Au}}/ I_{\text{Inkjet-Au}} \approx 2.35$.

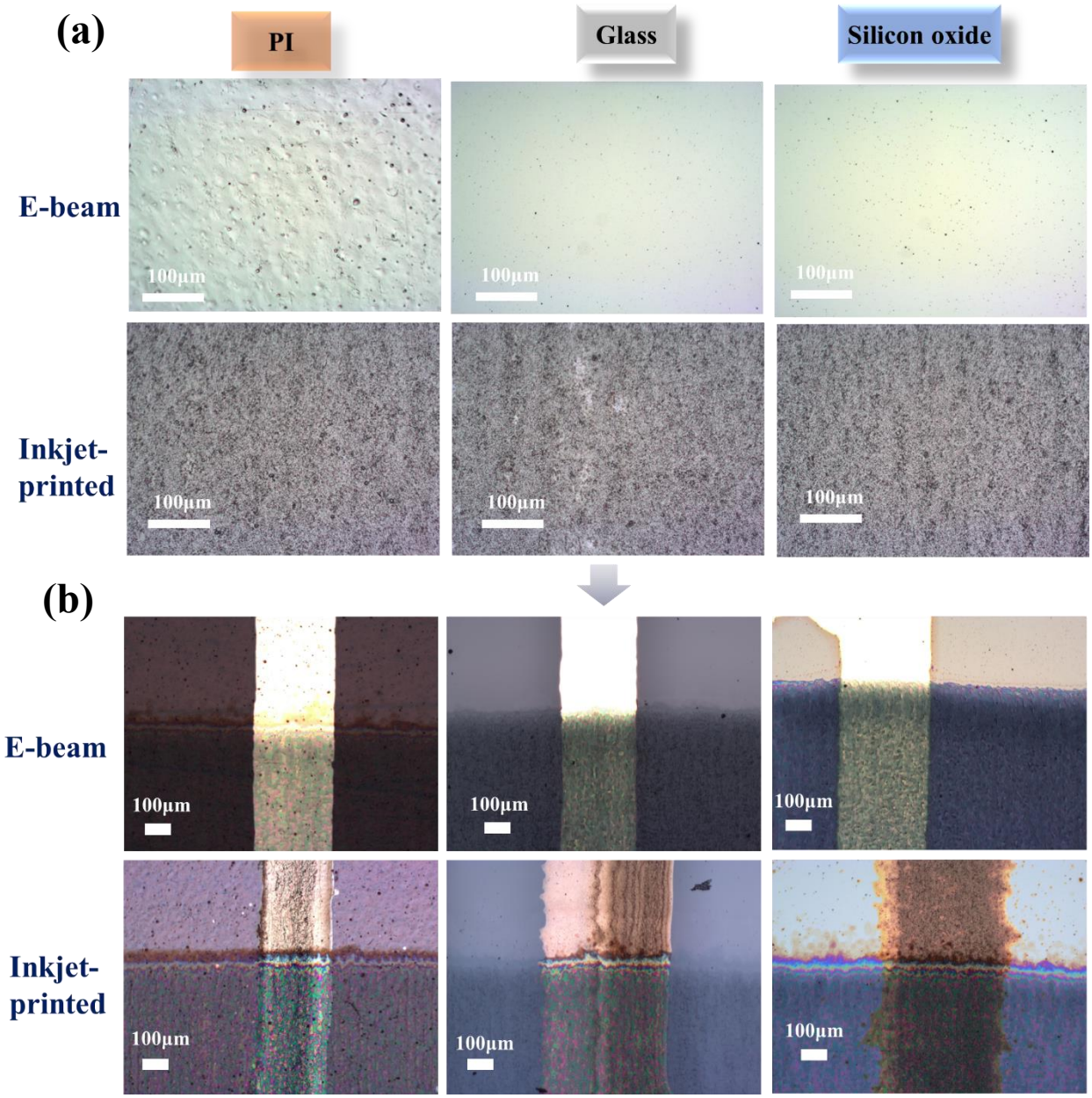

Fig. S6. Optical microscopic pictures (a) of e-beam and inkjet-printed gold electrodes on the different substrates; (b) of the 5-layer inkjet-printed PEDOT:PSS film deposited on the aforementioned electrodes.

Table S2. Work function of different electrodes and ionization potential of PEDOT:PSS.

Material	Work Function or Ionization Potential [eV]
e-beam evaporated Au	4.39 ± 0.02
Inkjet-printed Au	3.50 ± 0.10
PEDOT:PSS (DMSO 5%, PEO 0.6%, by volume)	4.47 ± 0.05