

Supplementary Information

**Counterbalancing of Morphology and Conductivity for Poly(3,4-ethylenedioxythiophene) Polystyrene Sulfonate based Flexible Devices**

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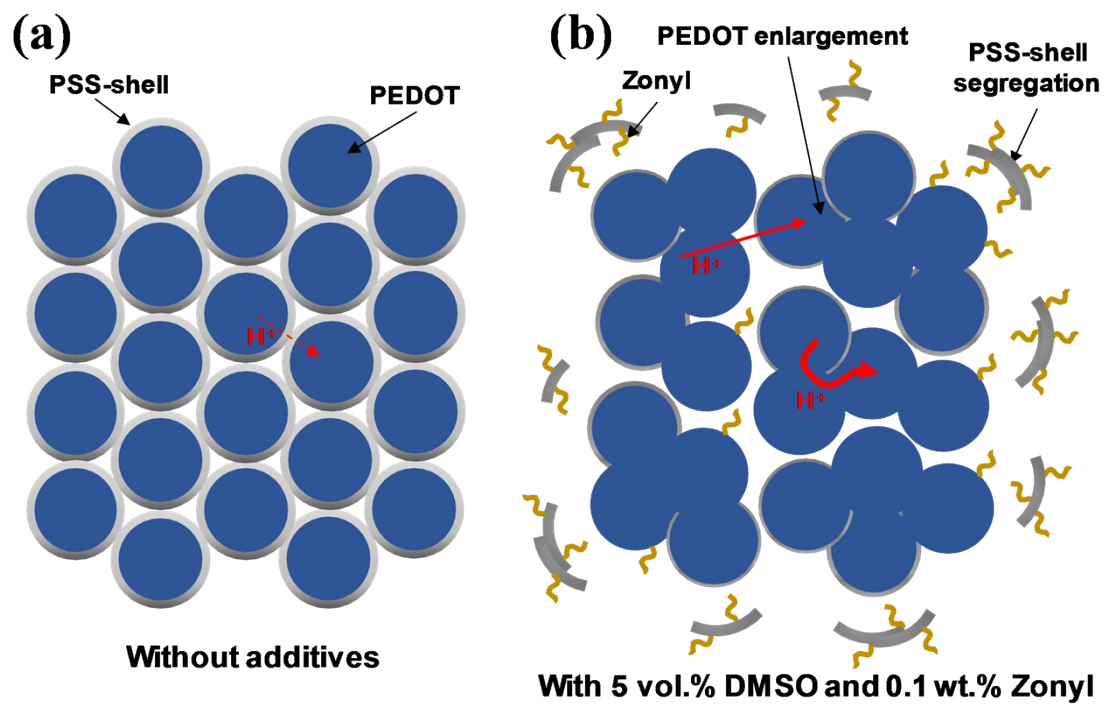
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Keywords: PEDOT:PSS anode, additive, morphology, conductivity, Raman spectroscopy, flexible device

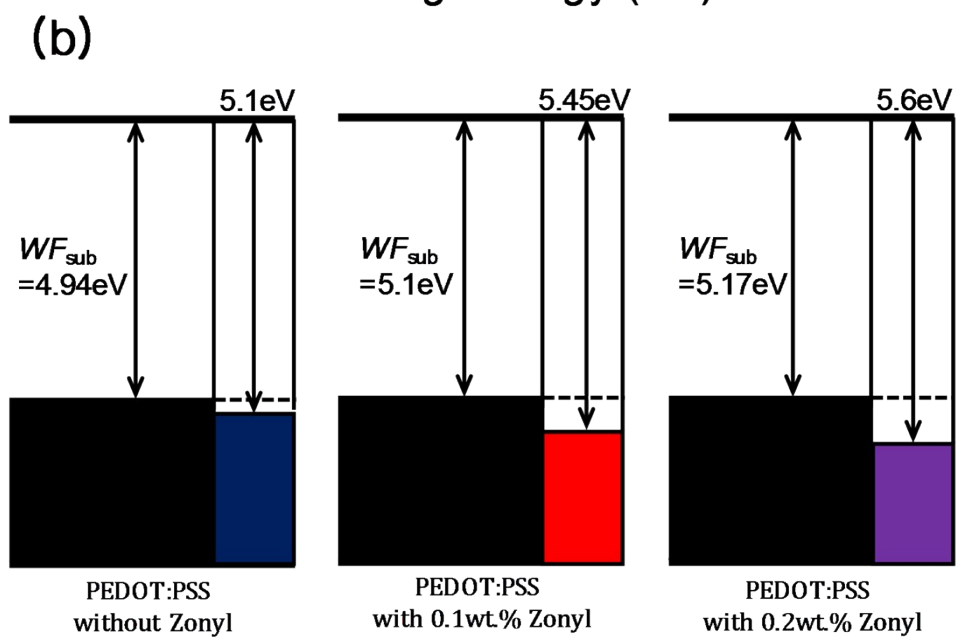
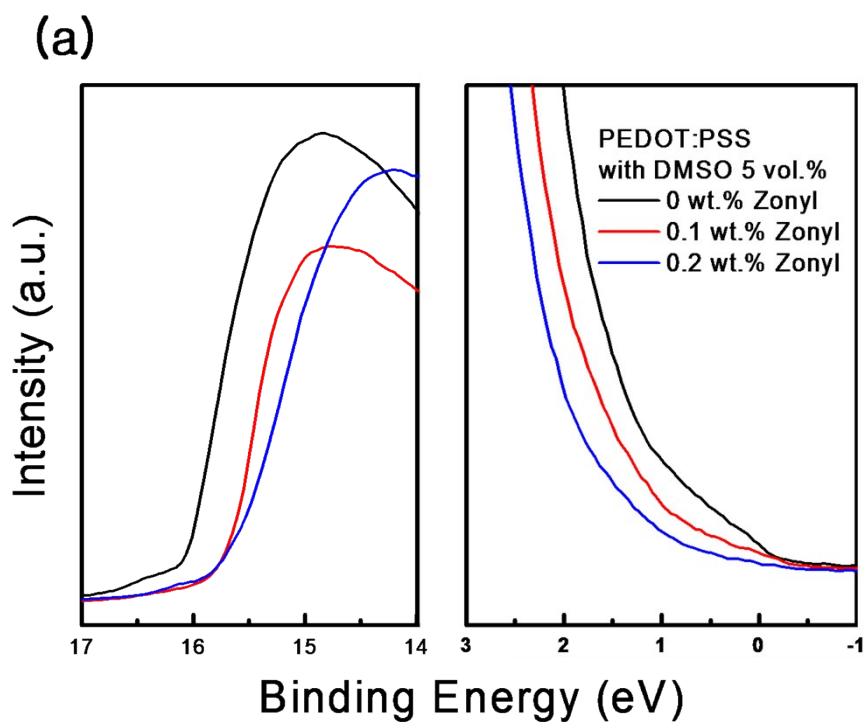
**Table S1** The sheet resistance of PEDOT:PSS electrode with DMSO 5vol.% and different concentration of Zonyl with 0, 0.1, 0.2 and 1 wt.%, respectively.

PEDOT:PSS with DMSO 5 vol.%	Zonyl 0 wt.%	Zonyl 0.1 wt.%	Zonyl 0.2 wt.%	Zonyl 1 wt.%
Sheet resistance <sup>a</sup> [ $\Omega \cdot \text{cm}^{-2}$ ]	209.8	88.5	51.5	153.1

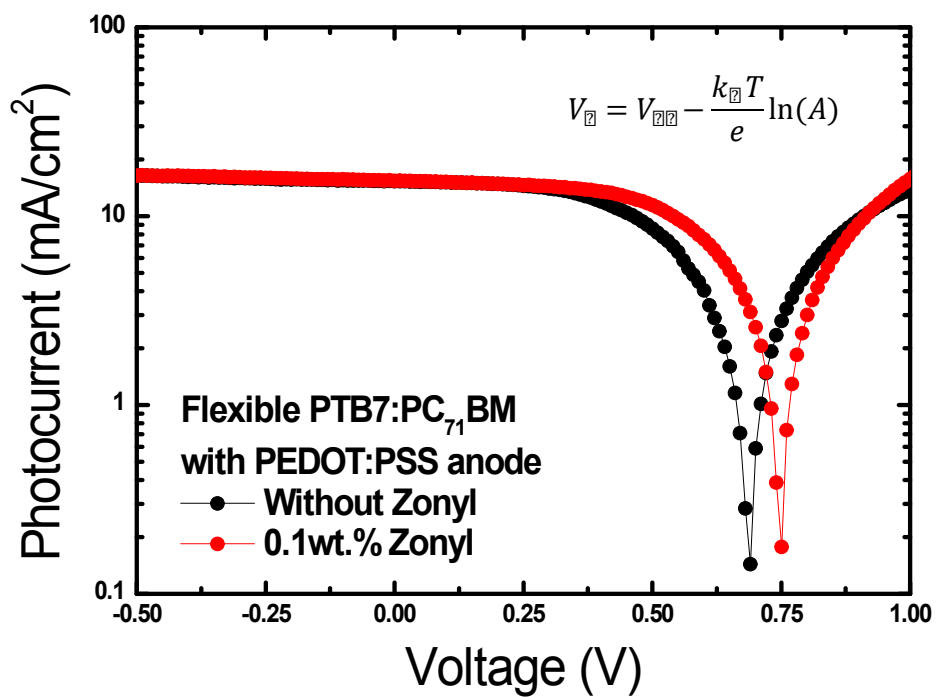
<sup>a</sup> Average values from 10 samples per condition



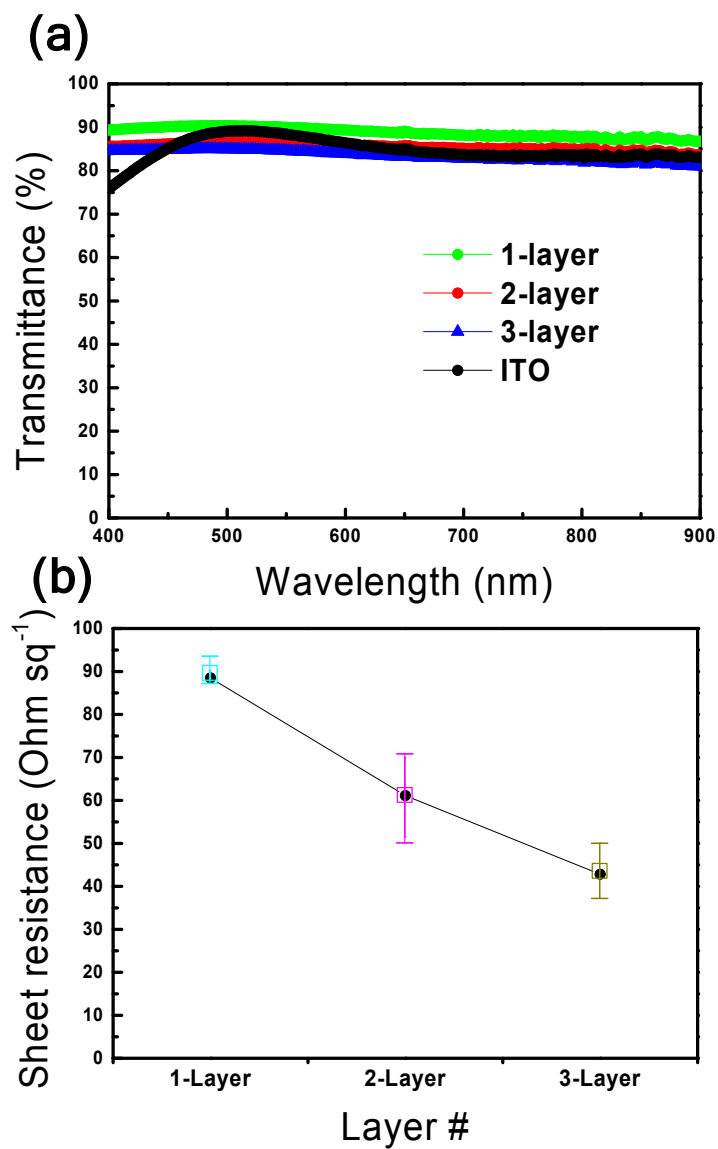
**Fig. S1** Schematics of the PEDOT:PSS electrode (a) without additives, and (b) with 5 vol.% DMSO and 0.1 wt.% Zonyl.



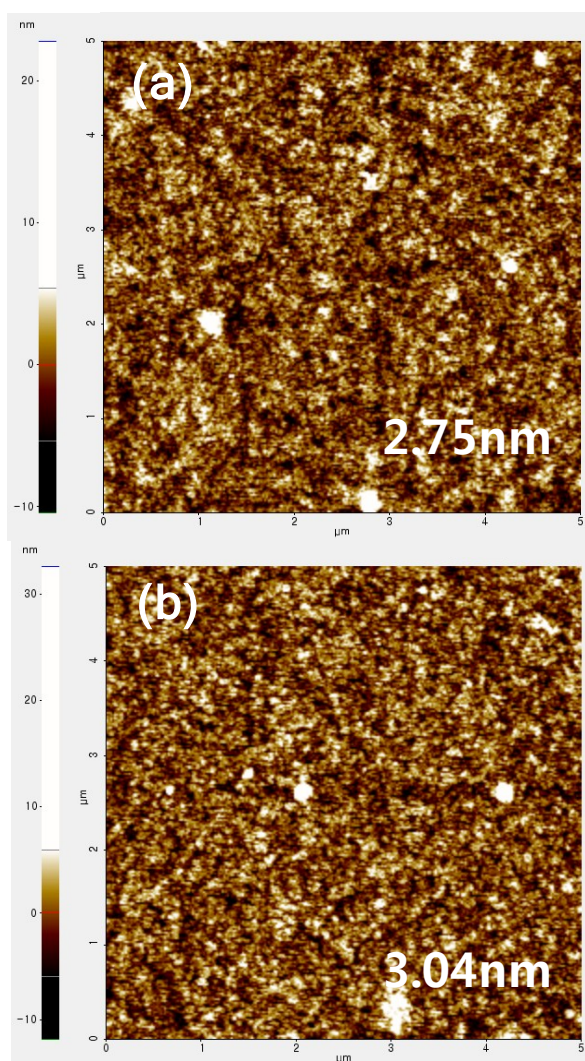
**Fig. S2** (a) Ultraviolet photoelectron spectroscopy of PEDOT:PSS electrode as a function of the concentration of Zonyl (0, 0.1 and 0.2 wt.%). The 5 vol.% DMSO was added to all the PEDOT:PSS solutions. (b) Scheme of energy level of PEDOT:PSS without Zonyl and with Zonyl of 1wt.% and 2wt.%, respectively.



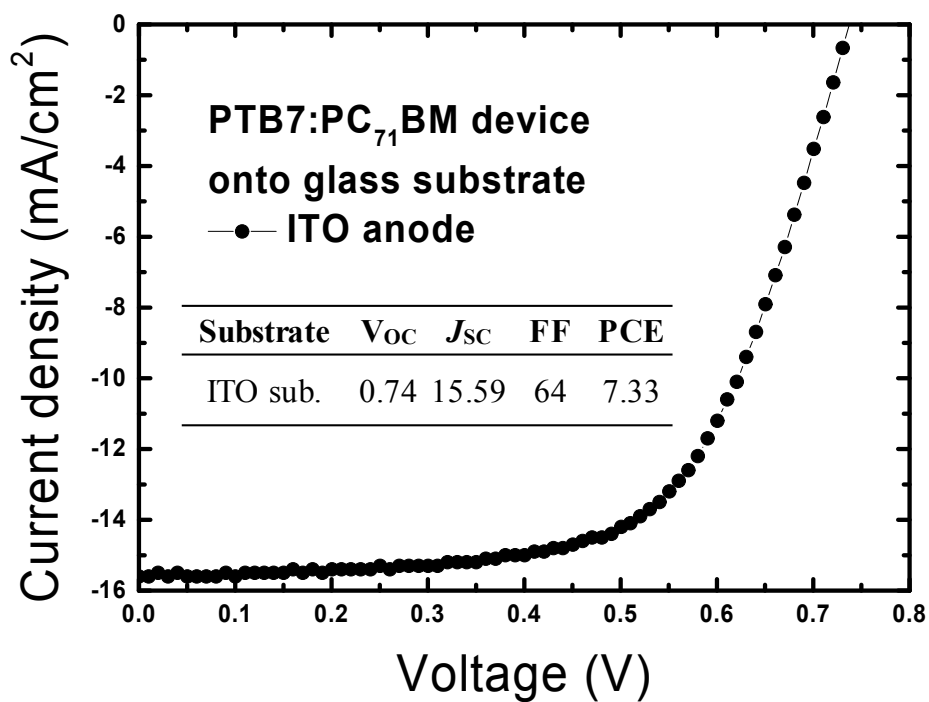
**Fig. S3** The photocurrent density ( $J_{ph}$ ) versus voltage for the devices based on PTB7:PC<sub>71</sub>BM BHJ with PEDOT:PSS electrode without and with Zonyl (0.1 wt.%).



**Fig. S4** (a) Transparency of PEDOT:PSS films with increasing numbers of anode layers, and an ITO electrode. (b) The sheet resistance of PEDOT:PSS films versus number of anode layers. All the PEDOT:PSS solutions included 5 vol.% DMSO and 0.1 wt.% Zonyl.



**Fig. S5** Non-contact mode AFM 3D surface images of PEDOT:PSS films with (a) 2 layers and (b) 3 layers (inset values show the RMS). All the samples were fabricated by 5 vol.% DMSO and 0.1 wt.% Zonyl.



**Fig. S6** The J-V characteristics of the device fabricated with a rigid conventional ITO anode based on PTB7:PC<sub>71</sub>BM BHJ; the inset shows the photovoltaic parameters.