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COMMUNICATION

Supplementary information

# Photolithographic stretchable transparent electrode for all-solution-processed fully transparent conformal organic transistor array†

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**S1. Morphology of SWCNT network on PEDOT:PSS thin film.**

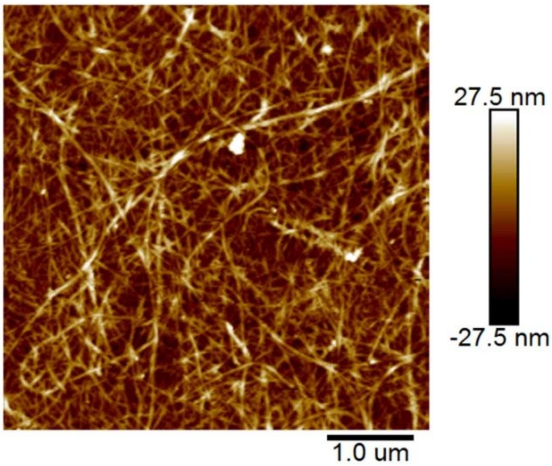



**Fig. S1** AFM image of dense SWCNT network on PEDOT:PSS thin film.

**S2. Fabrication process of photolithographic stretchable transparent PEDOT:PSS/SWCNT hybrid electrode.**

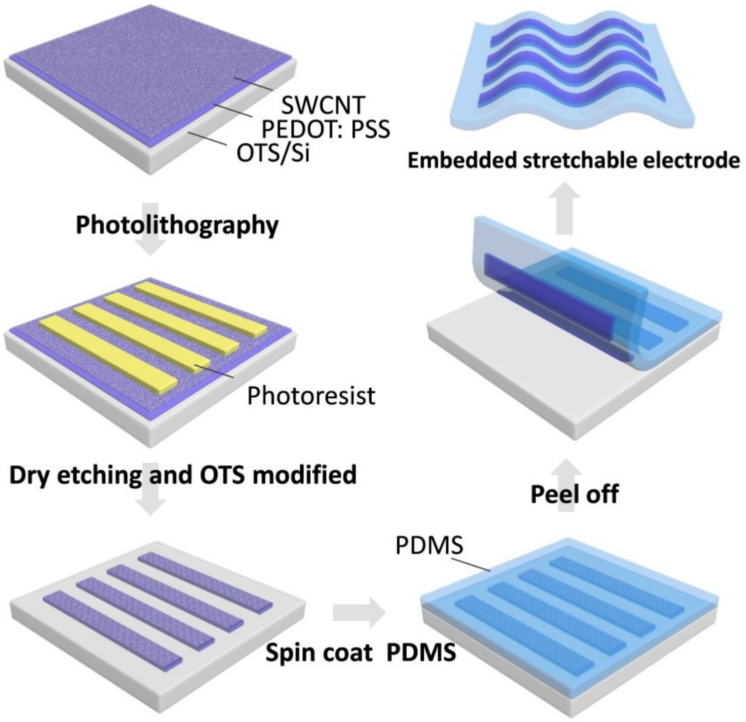



**Fig. S2** Schematic illustration for the fabrication process of photolithographic stretchable transparent PEDOT:PSS/SWCNT hybrid electrode.

**S3. Morphology of photolithographic PEDOT:PSS/SWCNT patterns.**

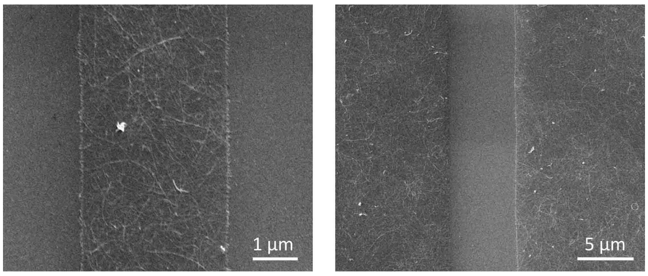
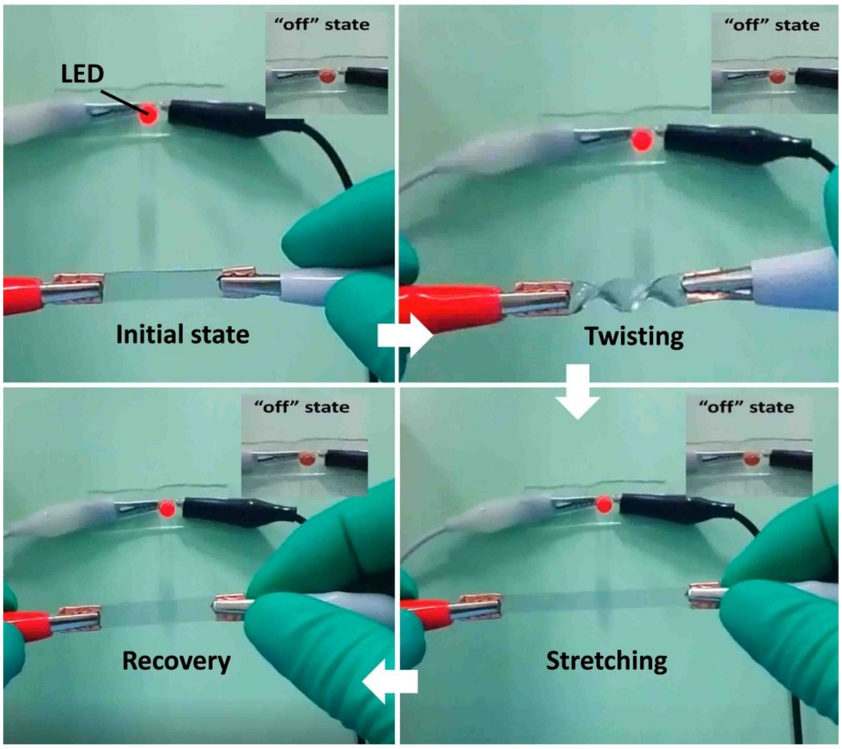



**Fig. S3** SEM images of PEDOT:PSS/SWCNT patterns.

**S4. Deformability of the PEDOT:PSS/SWCNT electrode.**



**S5. OTFT devices fabricated by conventional method.**

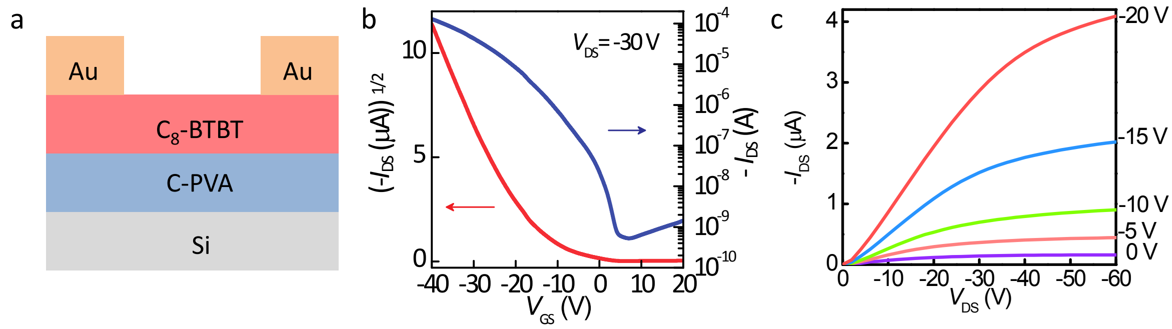



**Fig. S5** (a) Schematic image of $C_8$-BTBT OTFT fabricated on silicon substrate (gate) with thermally evaporated Au source/drain electrode through a shadow mask. (b,c) Typical transfer and output characteristics of the device measured in air at room temperature. ($\mu$ = 1.7 $cm^2$ $V^{-1}$ $s^{-1}$)

## S6. Performances of reported flexible OTFTs and our transparent conformal OTFTs with PEDOT:PSS/SWCNT electrode.

Table S6. Performances of reported flexible OTFTs and our transparent conformal OTFTs.

| Semiconductor | Electrode | Dielectric | $\mu$ ($cm^2 V^{-1} s^{-1}$) | $V_T$ (V) | $I_{on}/I_{off}$ | Ref. |
|---|---|---|---|---|---|---|
| DPh-DNTT | Au (source/drain); Al (gate) | $AlO_x$/SAM | 2.0 | 2 V | $>10^5$ | [1] |
| pentacene<br>DNTT<br>PTAA | Au (source/drain); Ag (gate) | parylene-C | 0.37<br>0.36<br>0.013 | −21.3<br>−15.7<br>−13.0 | $4.9 \times 10^5$<br>$1.6 \times 10^5$<br>$6.9 \times 10^4$ | [2] |
| TIPS pentacene | PEDOT:PSS (source/drain); Ag (gate) | PVP | 0.95 ± 0.12 | −0.19 ± 0.03 | $2.5 \times 10^3$ | [3] |
| P3HT | Au (source/drain); PEDOT:PSS (gate) | polyelectrolyte | 2.0 | 0.5-1.0 | $10^5$ | [4] |
| BTBT-$C_{12}$-PA | Au (source/drain); Al (gate) | $AlO_x$ | $1.7 \times 10^{-3}$ | - | $10^2$ | [5] |
| TIPS pentacene<br>TES-ADT | Ag (source/drain/gate) | Mylar membrane | 0.15<br>0.4 | - | $10^3$ - $10^4$<br>$10^3$ - $10^4$ | [6] |
| PDPP5T | Au (source/drain); Cr/Au (gate) | $Al_2O_3$ | 0.62 | - | $2.47 \times 10^6$ | [7] |
| PIDT-BT<br>P3HT | Au (source/drain/gate) | PEG | 0.56<br>1.28 | −0.35<br>0.11 | $>10^4$<br>$>10^3$ | [8] |
| N2200<br>pBTTT | Au (source/drain/gate) | PMMA | 0.1<br>0.3 | - | $10^2$<br>$10^5$ | [9] |
| C8-BTBT | Au (source/drain); Au grid (gate) | C-PVA | 2.0 | -15 | $10^5$ - $10^6$ | [10] |
| pentacene<br>PDI-C8 | Au (source/drain/gate) | PAN/PS | 0.52<br>0.23 | −8.6<br>8.5 | - | [11] |
| PTDPPSe-SiC4 | Graphene/Au (source/drain); Au (gate) | SU-8 | 1.43<br>0.37 | - | $>10^5$<br>$>10^2$ | [12] |
| C8-BTBT | PEDOT:PSS/SWCNT (source/drain/gate) | C-PVA | 2.7 | ±10 | $>10^4$ | Our work |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