Supplementary Information for:

## Direct patterning of conductive carbon nanotube/polystyrene sulfonate composites via electrohydrodynamic jet printing for use in organic field-effect transistors

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Figure S1. Scanning Electron Microscopy (SEM) images according to MWCNT/PSS concentration.



**Figure S2.** Thickness profiles of EHD-printed MWCNT/PSS film (at 300 mm/sec printing speed). The inset shows optical microscopy images of measured MWCNT/PSS lines.



Figure S3. Current-Voltage curve of EHD-printed MWCNT/PSS lines.

Cross-sectional area A = w (line width) • t (average thickness) = 4.5 X 10<sup>-12</sup> m<sup>2</sup> By using the following equation:

$$R = \frac{V}{I}$$
$$R = \rho \frac{L}{A} = \frac{1}{\sigma} \frac{L}{wt}$$
$$\sigma = \frac{IL}{Vwt}$$

Conductivity  $\sigma$  was calculated to the value of 14.3 S/cm



**Figure S4.** AFM images of MWCNT/PSS and pentacene films deposited on at the edge and the center region of printed line, respectively. An optical microscopy image of pentacene film and MWCNT/PSS line is shown in the middle.



**Figure S5.** Comparative UPS spectra showing the secondary cutoff regions of Au and MWCNT/PSS electrodes. The energy of light source in the UPS was 90 eV.

The work function of MWCNT/PSS electrodes could be derived using the following equation:

$$\Phi = hv - E_{\text{sec}}$$

where  $\Phi$  was work function,  $h\nu = 90$  eV, and  $E_{sec}$  is the binding energy at the onset of secondary emission.



**Figure S6.** (a) Current-Voltage curve of EHD-printed MWCNT/PSS lines with the printing speed at 200 mm/sec and 40 mm/sec, respectively. (b) AFM topography images of EHD-printed MWCNT/PSS lines with the printing speed at 200 mm/sec and 40 mm/sec, respectively.



**Figure S7.** (a) Transfer in the saturation regime ( $V_D = -40$  V), and (b) output characteristics of the OFETs prepared using prepared using the EHD-printed MWCNT/PSS S/D electrodes with the printing speed at 40 mm/sec deposited on three types of surface treated substrates.