# Supplementary Information

## Paper-based all-solid-state flexible micro-supercapacitors with ultra-high rate and rapid frequency response capabilities

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| Product name | Size (cm) | Finish | Thickness (mm) | Weight ($g \cdot m^{-2}$) | Brightness |
|---|---|---|---|---|---|
| Photo Paper Plus Glossy II PP-201 | 10 × 15 | High gloss | 0.27 | 275 | 92% |

**Fig. S1** The digital photograph of inkjet printing paper and its corresponding physical/chemical properties.


**Fig. S2** The digital photograph of Dimatix DMP-2800 inkjet printer used in this work.

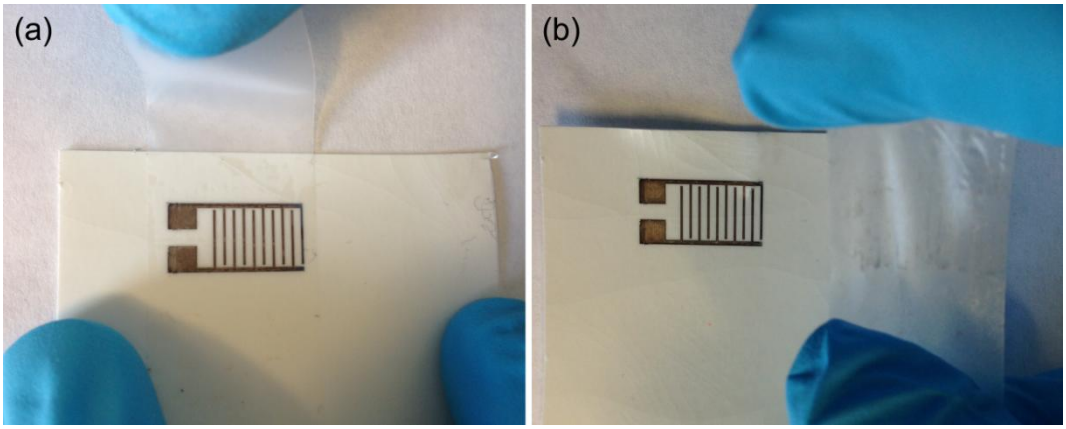



**Fig. S3** 'Scotch Tape test' on the paper-based PEDOT: PSS-CNTs/Ag MSCs. The tape before (a) and after (b) peeling demonstrates the strong adhesion between PEDOT: PSS-CNTs/Ag film and paper substrate.

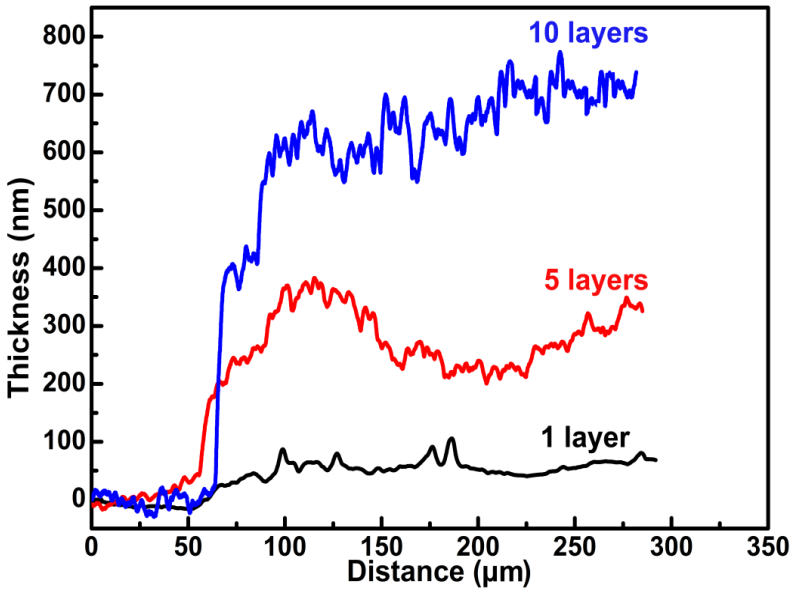
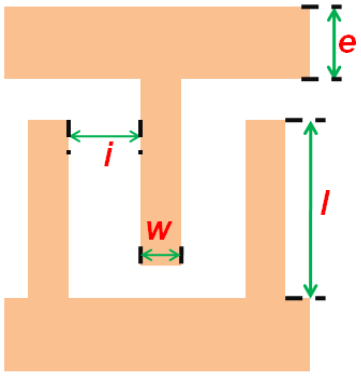



**Fig. S4** Thickness of the paper-based PEDOT: PSS-CNTs/Ag MSCs produced with the different film layer number (1 layer, 5 layers, and 10 layers).




| Number of film layers (N) | N=1 | N=5 | N=10 |
|---|---|---|---|
| Thickness, T (nm) | 51 | 276 | 628 |
| Interspace, i (μm) | 600 | 600 | 600 |
| Width, w (μm) | 300 | 300 | 300 |
| Length, l (mm) | 6.5 | 6.5 | 6.5 |
| Edge, e (μm) | 600 | 600 | 600 |
| Total surface area ($cm^2$) | 1.2 | 1.2 | 1.2 |

**Fig. S5** Dimensions of the paper-based PEDOT: PSS-CNTs/Ag MSCs produced with the different film layer number (1 layer, 5 layers and 10 layers).

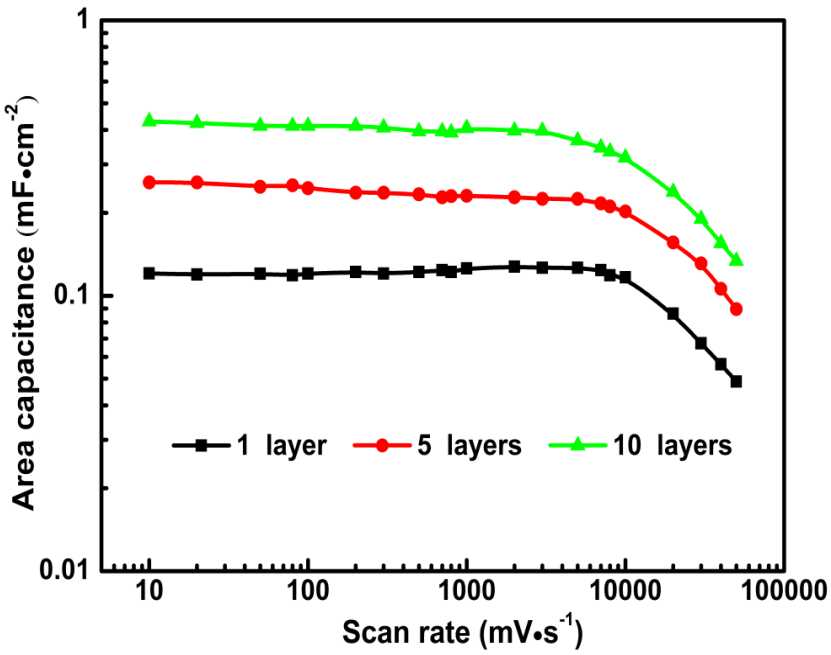



**Fig. S6** Evolution of the area capacitance of paper-based PEDOT: PSS-CNTs/Ag MSCs versus scan rate.

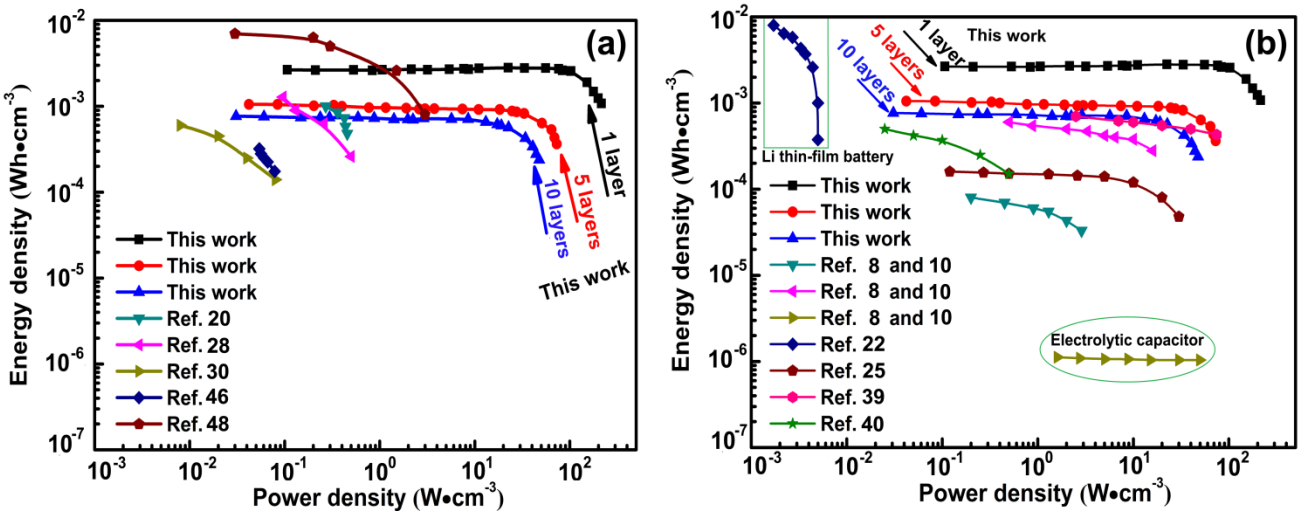



**Fig. S7** Ragone plots showing energy and power densities of paper-based PEDOT: PSS-CNTs/Ag MSCs in comparison to those of (a) reported paper-based MSCs (or SCs) and (b) other micro-supercapacitors and commercially available energy storage devices.

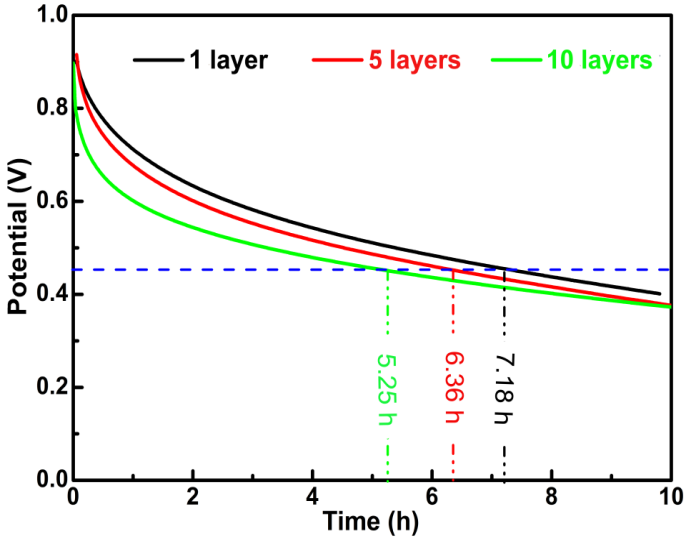



**Fig. S8** Self-discharge curves (open-circuit potential versus time) of paper-based PEDOT: PSS-CNTs/Ag MSCs with different PEDOT: PSS-CNTs film layer number obtained immediately after pre-charged to $V_{max}$.

| Number of interdigital fingers (N) | N=14 | N=10 | N=8 |
|---|---|---|---|
| Interspace, i (μm) | 600 | 900 | 1200 |
| Width, w (μm) | 300 | 300 | 300 |
| Length, l (mm) | 6.5 | 6.5 | 6.5 |
| Edge, e (μm) | 600 | 600 | 600 |
| Total surface area ($cm^2$) | 1.2 | 1.2 | 1.2 |

**Fig. S9** Dimensions of the paper-based PEDOT: PSS-CNTs/Ag MSCs produced with the different interspaces between neighbor fingers of 600 μm, 900 μm and 1200 μm, respectively.

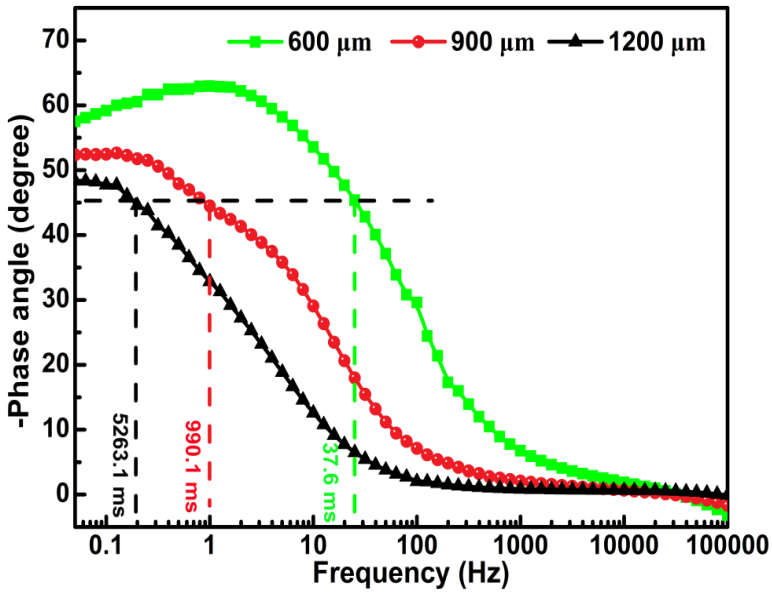



**Fig. S10** Impedance phase angle as a function of frequency ranging from 100 kHz to 0.05 Hz for paper-based PEDOT: PSS-CNTs/Ag MSCs with different inter-space between the adjacent fingers.