Electronic Supplementary Information

Flexible, sandwich-like Ag-nanowire/PEDOT:PSS-nanopillar/MnO_2 high performance supercapacitors

*Zenan Yu, Chao Li, Danielle Abbitt, and Jayan Thomas**

NanoScience Technology Center, Department of Material Science and Engineering, and CREOL, College of Optics and Photonics, University of Central Florida, Florida 32826, United States

1. Specific capacitance calculation.

a. Single electrode.

The specific capacitance (C_{sp}) of one electrode is calculated as:

$$C_{sp} = \frac{C_{electrode}}{m}$$

where m is the mass of active material of one electrode. $C_{electrode}$ is the capacitance measured by three-electrode system.[1, 2]

In GCD measurements, capacitance can be computed as given below: [3-6]

$$C_{electrode} = \frac{I \times (\Delta t_{Ag/PEDOT:PSS/MnO_2} - \Delta t_{Ag/PEDOT:PSS})}{\Delta V}$$

where I is the discharge current, Δt is the discharge time, and ΔV is the voltage window excluding the voltage drop.

b. Device.

Cell capacitance (C_{cell}) is calculated from the discharge curve of GCD measurement using the following equation:

$$C_{cell} = \frac{I \times \Delta t}{\Delta V}$$

where I is the discharge current, Δt is the discharge time, and ΔV is the voltage difference of discharge (obtained from the discharge curve excluding the voltage drop).

Volumetric specific capacitance (C_{vsp}) of device can be calculated as:

$$C_{vsp} = \frac{C_{cell}}{v}$$

where v (cm^3) is the total volume of device including active material, current collector, PAN substrate, electrolyte, and separator.

2. Energy and power densities calculation.

The energy density (E) and power density (P) can be calculated as follows:

$$E = \frac{1}{2} C_{vsp} \Delta V^2$$

$$P = \frac{E}{\Delta t}$$

where, ΔV is the voltage difference of discharge and Δt is the discharge time.[7, 8]

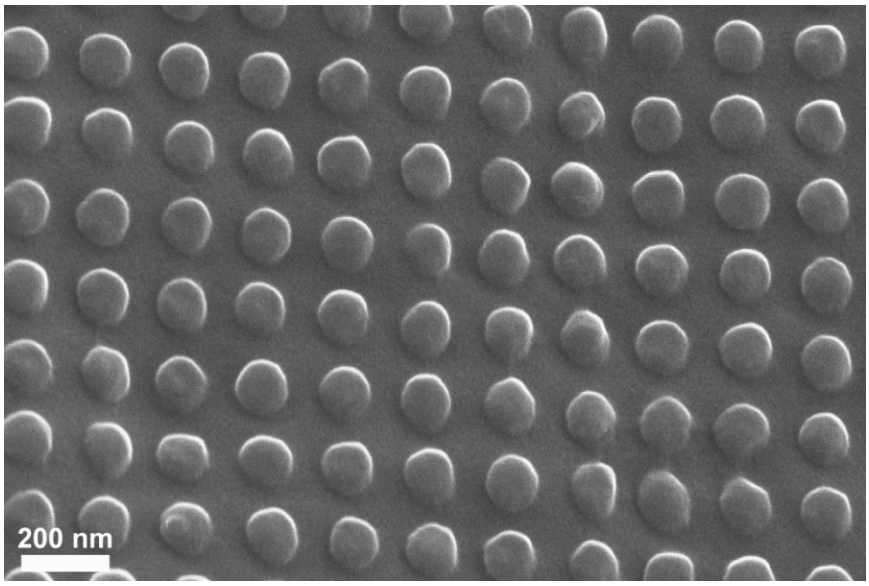

Fig. S1 SEM image of PEDOT:PSS nanostructure.

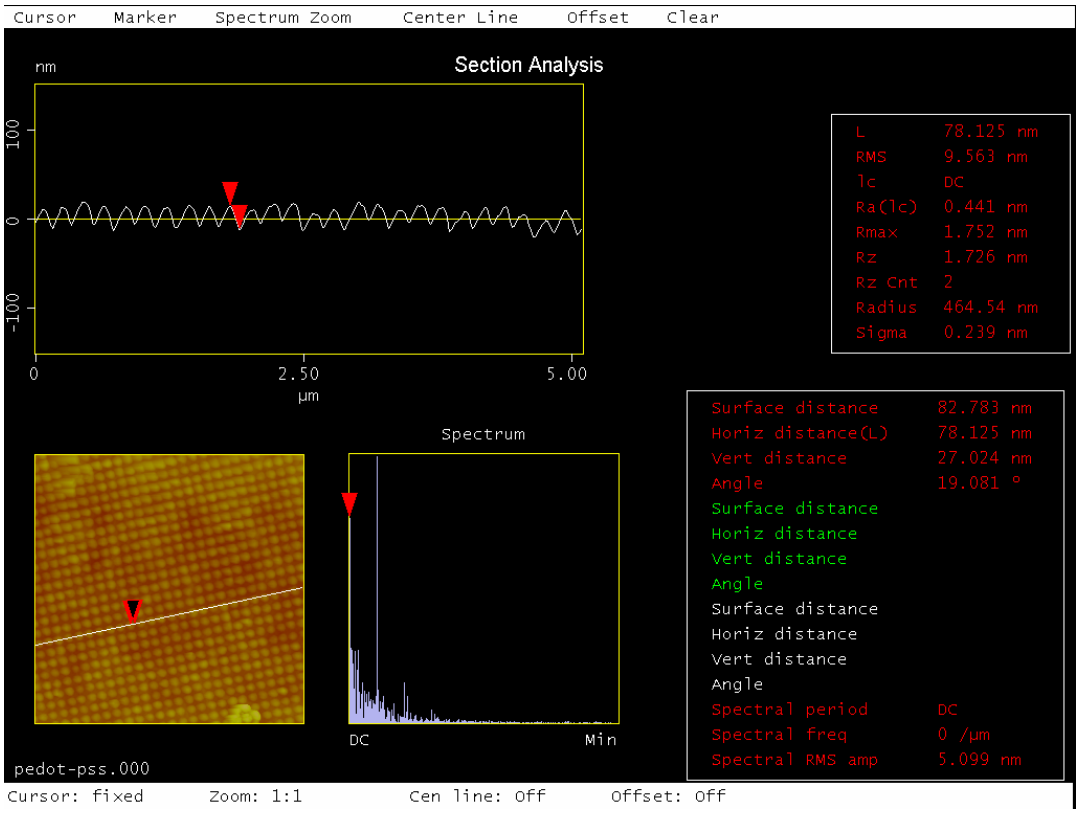

Fig. S2 AFM image of Ag-NW/PEDOT:PSS nanostructure.

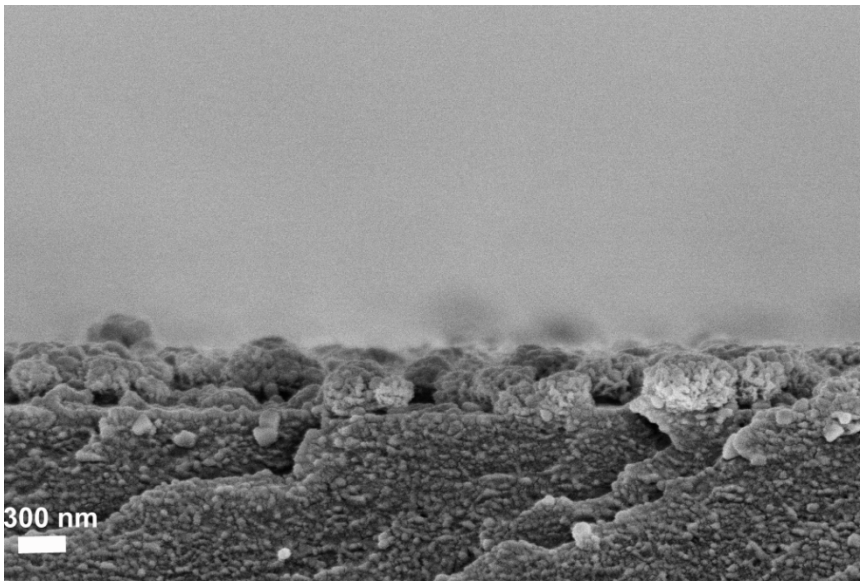

Fig. S3 Cross-sectional SEM image of Ag-NW/PEDOT:PSS-NP/MnO_2 composites.

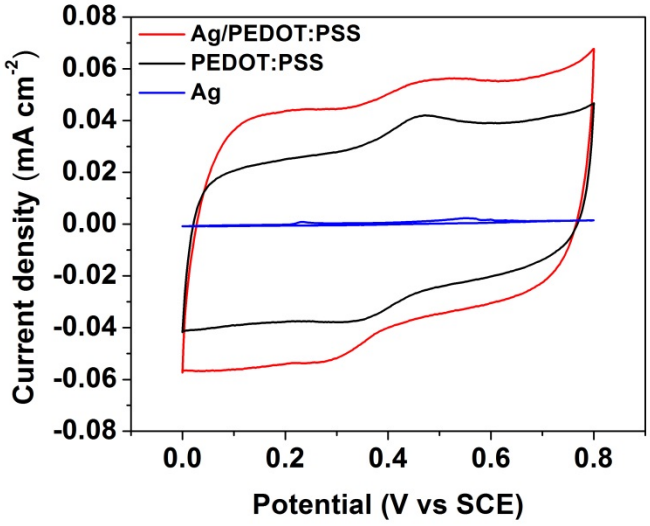

Fig. S4 CV curves of Ag-NW, PEDOT:PSS-NP, and Ag-NW/PEDOT:PSS-NP at a scan rate of 100 mV s^{-1}.

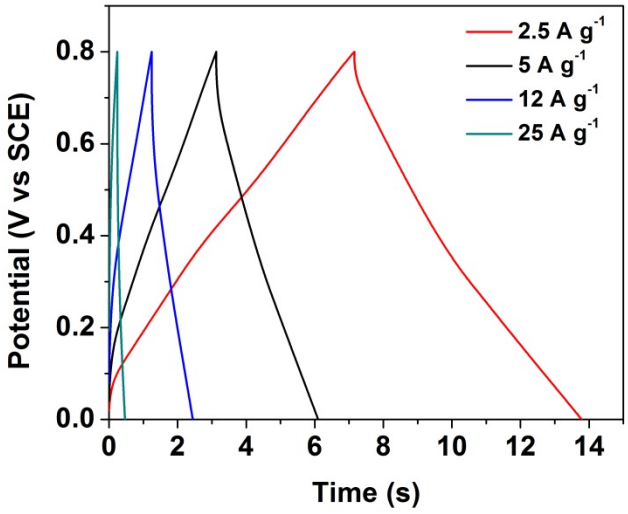

Fig. S5 GCD curves of Ag-NW/PEDOT:PSS-NP at different current densities (2.5-25 A g^{-1}).

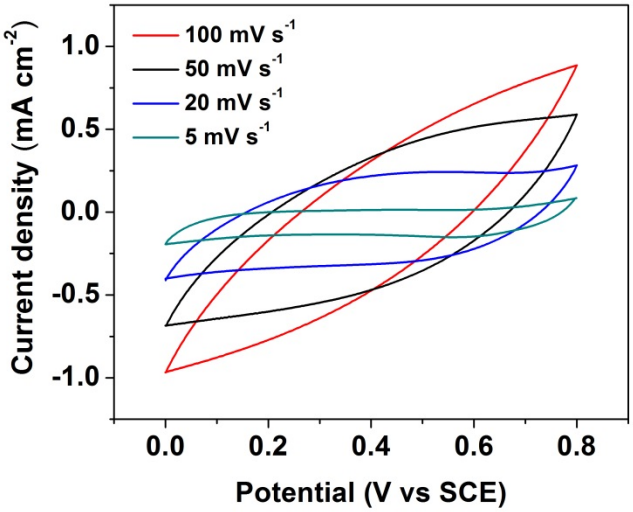

Fig. S6 CV curves of Ag-NW/PEDOT:PSS-NP/MnO_2 at different scan rates (5-100 mV s^{-1}).

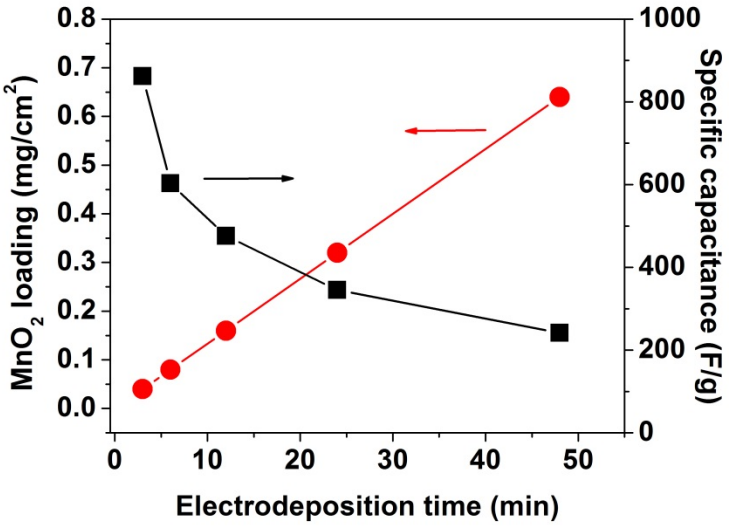

Fig. S7 MnO2 loading and specific capacitance at 2.5 A g^{-1} as a function of electrodeposition time.

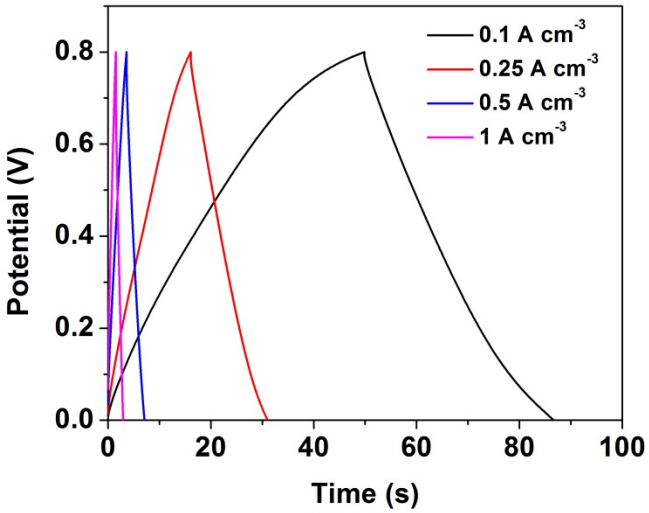

Fig. S8 GCD curves of Ag-NW/PEDOT:PSS-NP/MnO_2 SC device at different current densities.

References for supporting section

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