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Supporting Information

Flexible Supercapacitors Based on Cloth-Supported Electrodes of Conducting Polymer Nanowire Array / SWCNT Composites

Kai Wang,[a, b] Pu Zhao,[a] Xiaomo Zhou,[a] Haiping Wu,[a, b] and Zhixiang Wei[a, *]

[a] *National Center for Nanoscience and Technology, Beiyitiao No. 11, Zhongguancun, Beijing 100190, China, E-mail: weizx@nanoctr.cn; Fax: +86-62656765; Tel: +86-82545565*

[b] *Graduate School of the Chinese Academy of Sciences, Beijing 100190, China.*

1. The morphologies and structures of wiper cloth and SWCNT/cloth

It is observed that the non-woven wiper cloth is composed of viscose fibers connected each other to form 3D network (Figure S1a). The diameters of viscose fiber are *c.a.* 10 μm observed from Figure S1b (the sample was dipped in SWCNTs ink for 1 cycle to improve the conductivity). Figure S1c-f shows the morphology evolvement of SWCNTs on the surface of conductive cloth with the dipping cycles increased. SWCNTs bundles with a diameter of *c.a.* 10 nm were observed clearly and the loading quantities also increase with the increase of the dipping cycles. When the dipping cycles in SWCNTs ink is large than 5, the SWCNTs can cover almost all the surface of fibers of wiper cloth and form a cross-linked conductive network. The conductivity difference of SWCNT/Cloth with different dipping cycles is due to a different SWCNTs coverage density of SWCNTs. A full coverage of SWCNTs conductive network was obtained after 5 cycles. Further increase dipping cycles can increase the loading quantities of SWCNTs, but their conductivity kept almost stable.

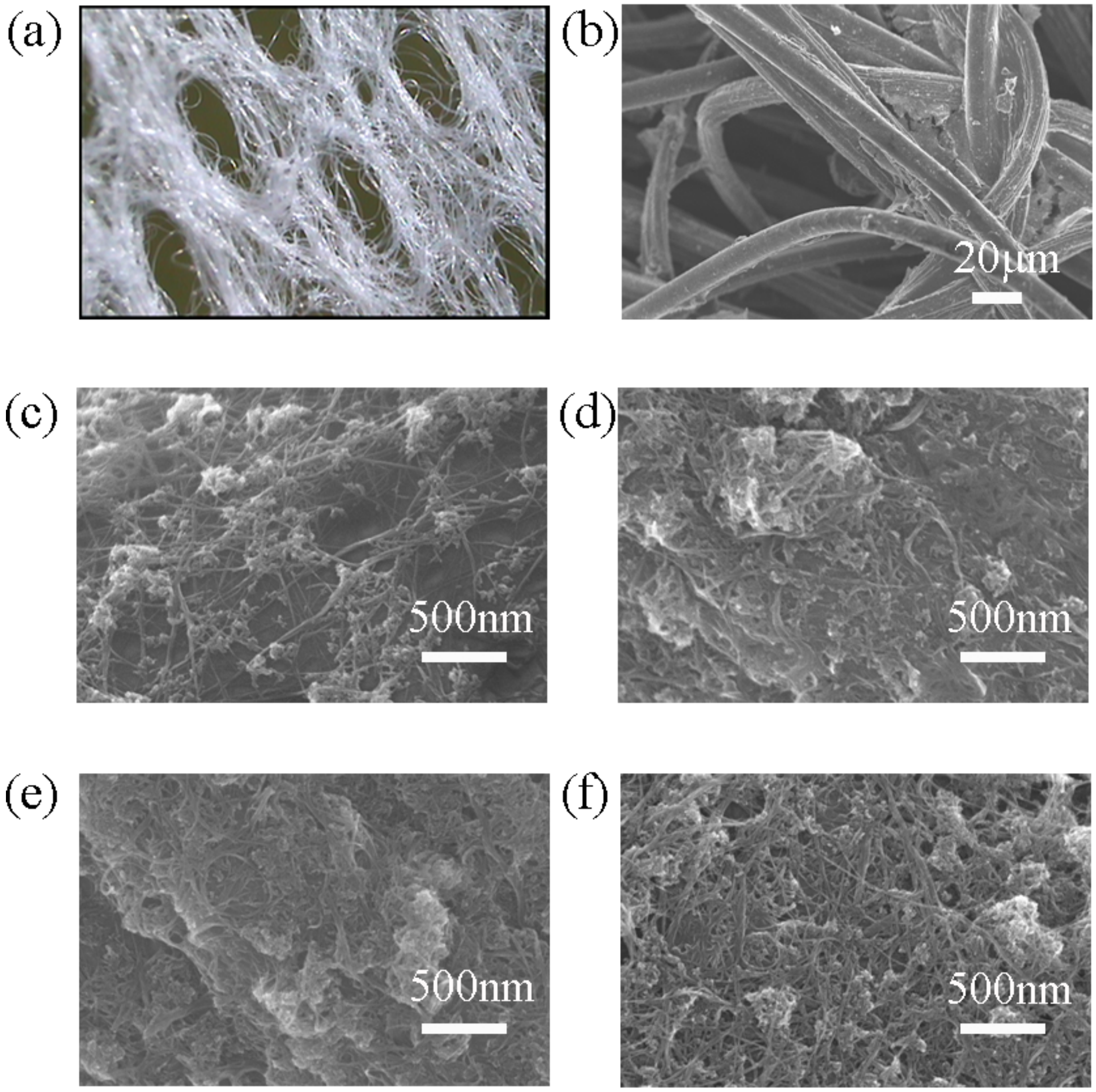

Figure S1. a) The microstructure of non-woven wiper cloth obtained by a optical microscopy, b) SEM image of non-woven wiper cloth that has been dipped into ink for 1time, c-f) SEM image of SWCNTs on the wiper cloth that was dipped into SWCNTs ink for different cycles, c) 1, d) 3, e) 5, f) 10, cycles.

2. Raman spectroscopy of SWCNT/Cloth, PANI/Cloth and PANI /SWCNT /Cloth electrodes

Raman spectroscopy was used to study the surface compositions of SWCNT/Cloth, PANI/Cloth and PANI /SWCNT /Cloth electrode. The pristine cloth shows no obvious Raman peaks. For SWCNT/Cloth, there are two feature peaks D and G peak at 1329 and 1584 cm^{-1}, respectively. It is noted that the most intense band at _1590 cm^{-1} is referred to as the graphitic (G) band. And the feature around 1329 cm^{-1} is termed the D band, due to it being related to scattering from defects present in the SWCNTs. The low I_D/I_G ratio stands for the feature of the SWCNTs. For PANI/Cloth, C–H bending of quinoid ring at 1170 cm^{-1}, $C–N^{+}$, stretching at 1327 cm^{-1} and C=N stretching vibration at 1484 cm^{-1} are observed, revealing the presence of the PANI structures. The same Raman peaks are observed for the PANI/SWCNT/Cloth electrode that indicates the present of the PANI. Furthermore, the peaks at 1327 and 1592 cm^{-1} became wider than that of pristine PANI due to the effect of D and G band of SWCNTs.

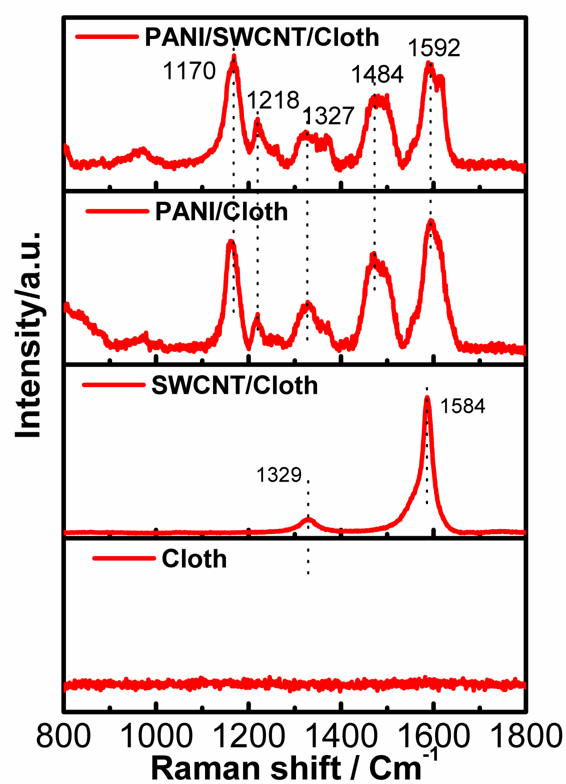

Figure S2. Raman spectroscopy of SWCNT/Cloth, PANI/Cloth and PANI /SWCNT /Cloth electrode excited with 632.8 nm radiation

3. CV curves of SWCNT/Cloth, PANI/Cloth and PANI /SWCNT /Cloth electrode based supercapacitor at different scan rates

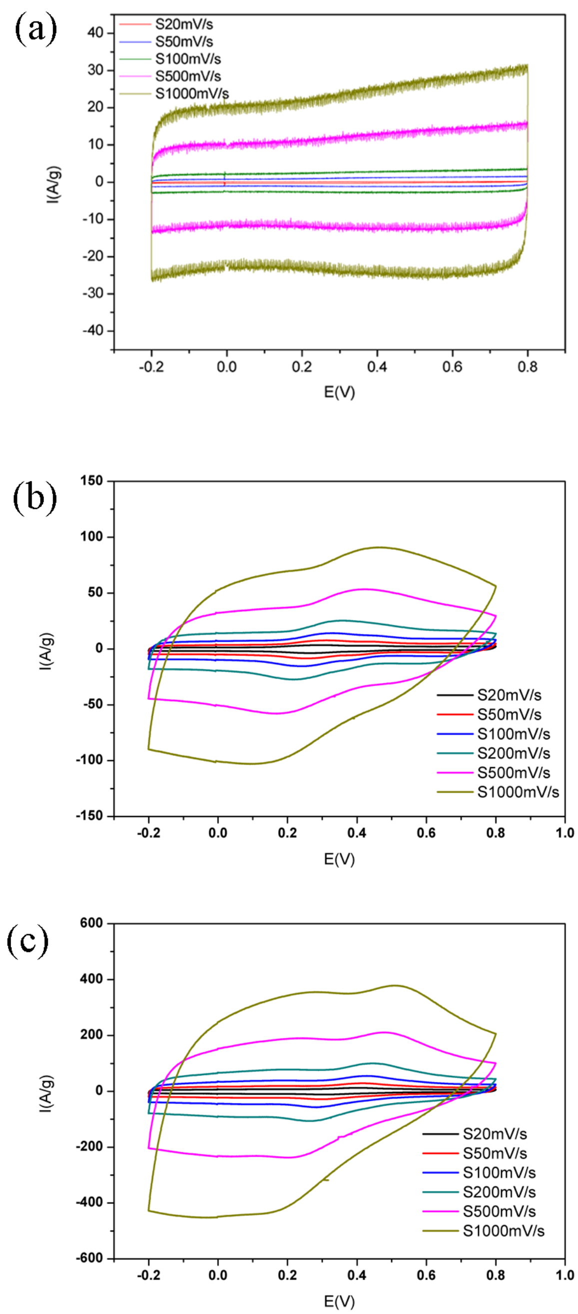

Figure S3. CV curves of a) SWCNT/Cloth, b) PANI/Cloth and c) PANI /SWCNT /Cloth electrode at different scan rates with a potential window -0.2V-0.8V in 1M H_2SO_4 aqueous electrolytes.

4. Galvanostatic charge-discharge plots of SWCNT/Cloth, PANI/Cloth and PANI /SWCNT /Cloth electrode based supercapacitor at different current densities

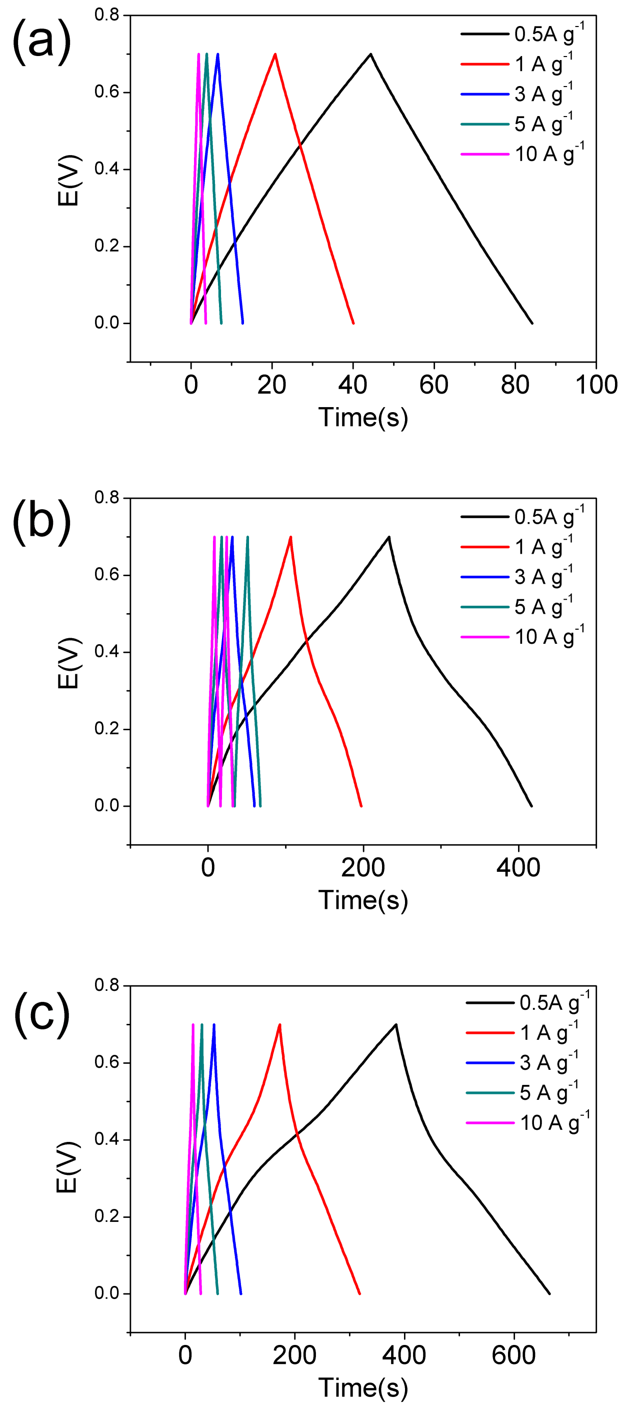

Figure S4. Galvanostatic charge-discharge plots of (a) SWCNT/Cloth, (b) PANI/Cloth and (c) PANI /SWCNT /Cloth electrode based supercapacitor at a series of current densities (0.5A g^{-1}, 1 A g^{-1}, 3 A g^{-1}, 5 A g^{-1}, 10 A g^{-1}).

5. Date processing

The specific capacitances (C) from charge/discharge measurements were calculated using following equation:

$$C=2\times(I\times t)/(m\times V) \quad (1)$$

Where I represents the discharge current density, t is the discharging time, and m stands for the active mass of one electrode, V for the voltage window.

The energy density (E) was calculated using this equation:

$$E = 0.5CV^2/m \quad (2)$$

Where V is the voltage window and m is the active weight of single electrode, and C is the measured capacitance.

The power density (P) was obtained using following equation:

$$P= E/t \quad (3)$$

Where E stands for the energy density, and t is the discharge time in charge/discharge measurement.