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ADVANCED MATERIALS

Supporting Information

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Flexible and Weaveable Capacitor Wire Based on a Carbon
Nanocomposite Fiber

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Supporting Information

Experimental Section

Poly(ethylene glycol)-b-poly(propylene glycol)-b-poly(ethylene glycol) ($M_w=5800$) and tetraethyl orthosilicate (CP, 97%) were obtained from Sigma-Aldrich. Poly(vinyl alcohol) ($M_w=1750\pm 50$) was obtained from Sinopharm Chemical Reagent Co., Ltd. Furfuryl alcohol (CP, 97%) was ordered from Aladdin Chemistry Co., Ltd. N,N-Dimethylformamide was provided by Shanghai Qiangshun Chemical Reagent Corp. Anhydrous ethanol ($\geq 99.7\%$) was ordered from Shanghai Zhenxing Chemical No.1 Factory. Silver paint was ordered from Uninwell International LTD.

The structures were characterized by scanning electron microscopy (Hitachi FE-SEM S-4800 operated at 1 KV) and transmission electron microscopy (JEOL JEM-2100F operated at 200 KV). Cyclic voltammograms were recorded on an electrochemical analyzer system (CHI 660D) at room temperature with increasing scan rates from 0.01 to 0.2 V/s by a three-electrode method. Galvanostatic charge-discharge measurements were made at a current range of 5×10^{-4} to 1×10^{-2} mA by an ARBIN electrochemical workstation (MSTAT-5V/10mA/16Ch).

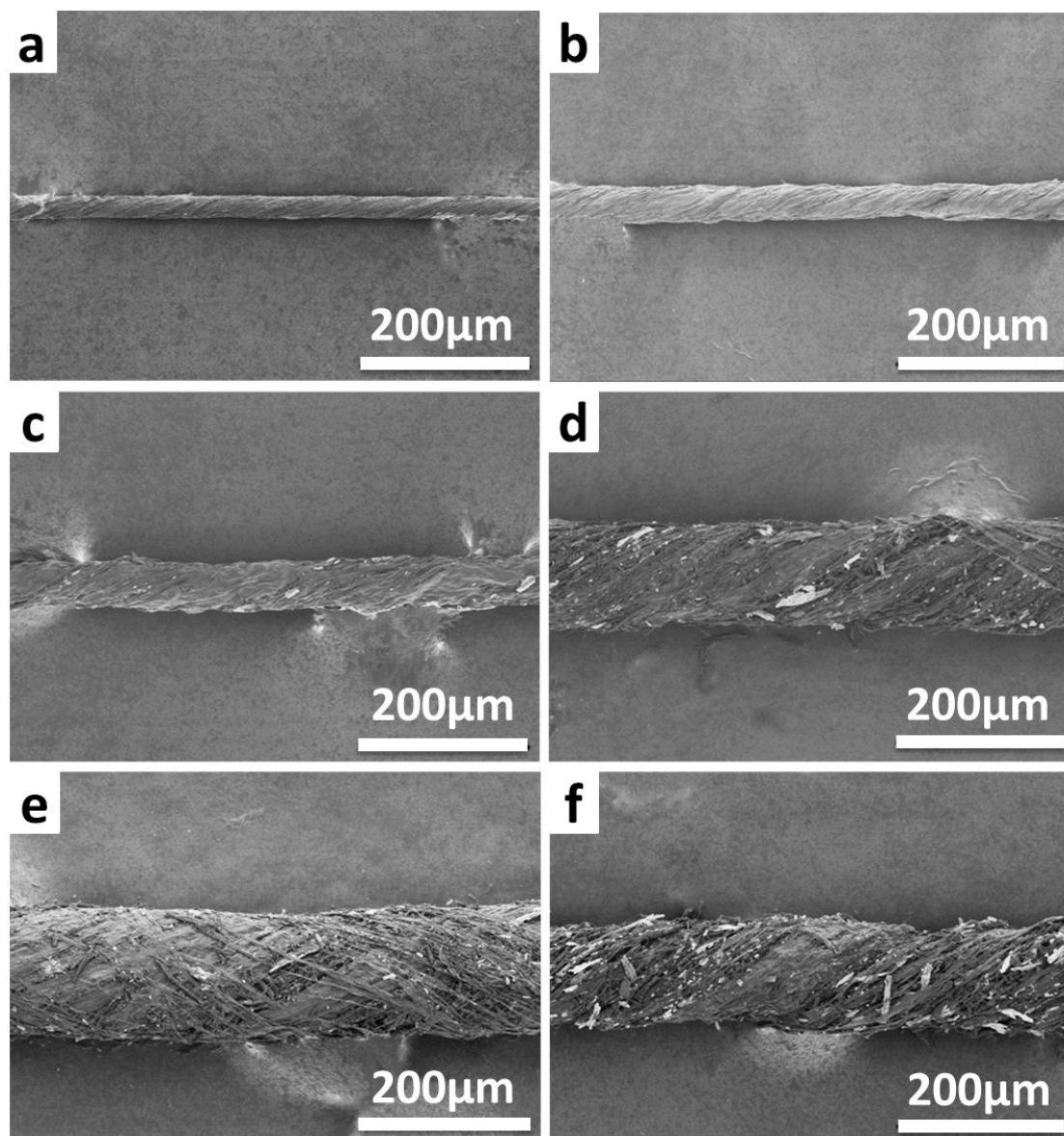


Figure S1. SEM images of the bare MWCNT fiber and composite fibers. **a.** Bare fiber. **b, c, d, e,** and **f.** Composite fibers with OMC weight percentages of 46%, 70%, 84%, 87%, and 90%, respectively.

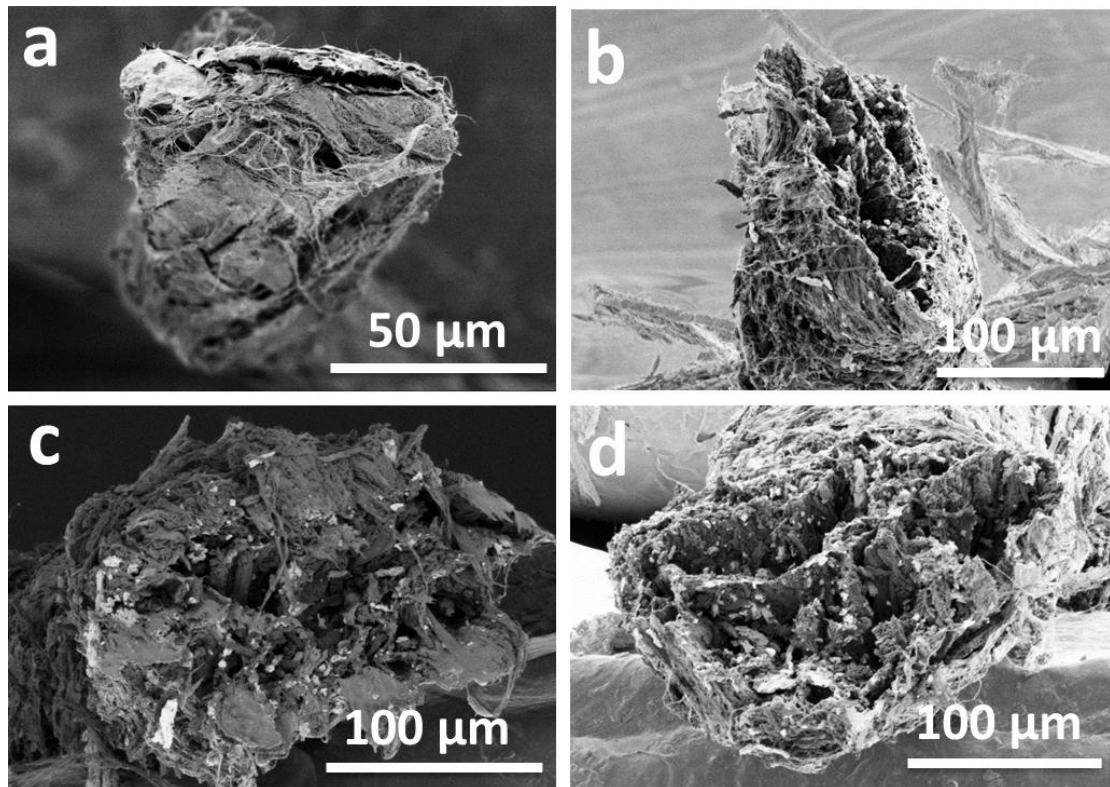


Figure S2. a, b, c and d. Sectional SEM images of composite fibers with OMC weight percentages of 0% , 70%, 84% and 90%, respectively.

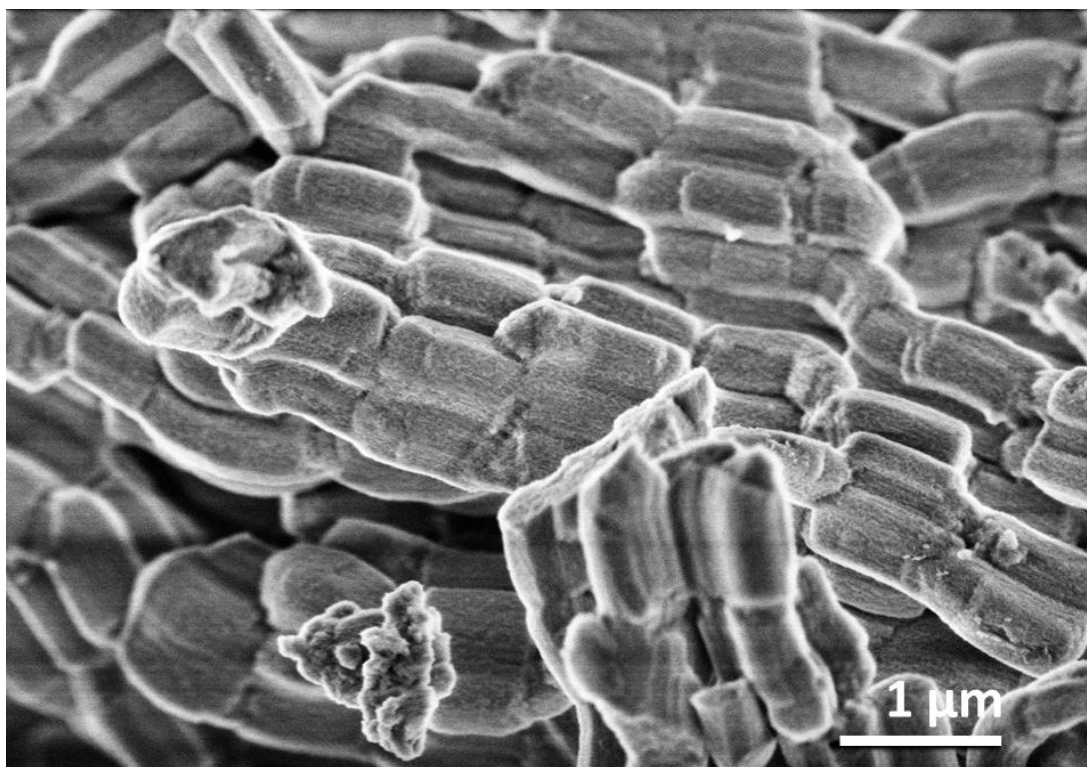


Figure S3. SEM image of OMC particles.

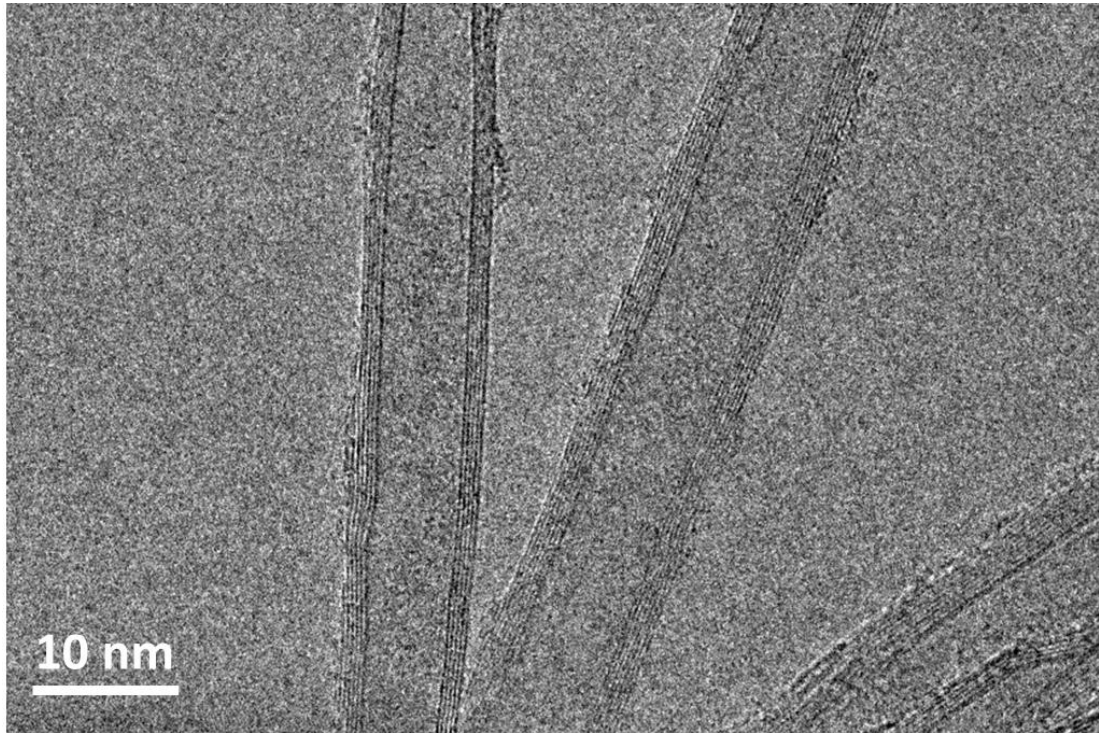


Figure S4. High resolution transmission electron microscopy image of the individual MWCNT.

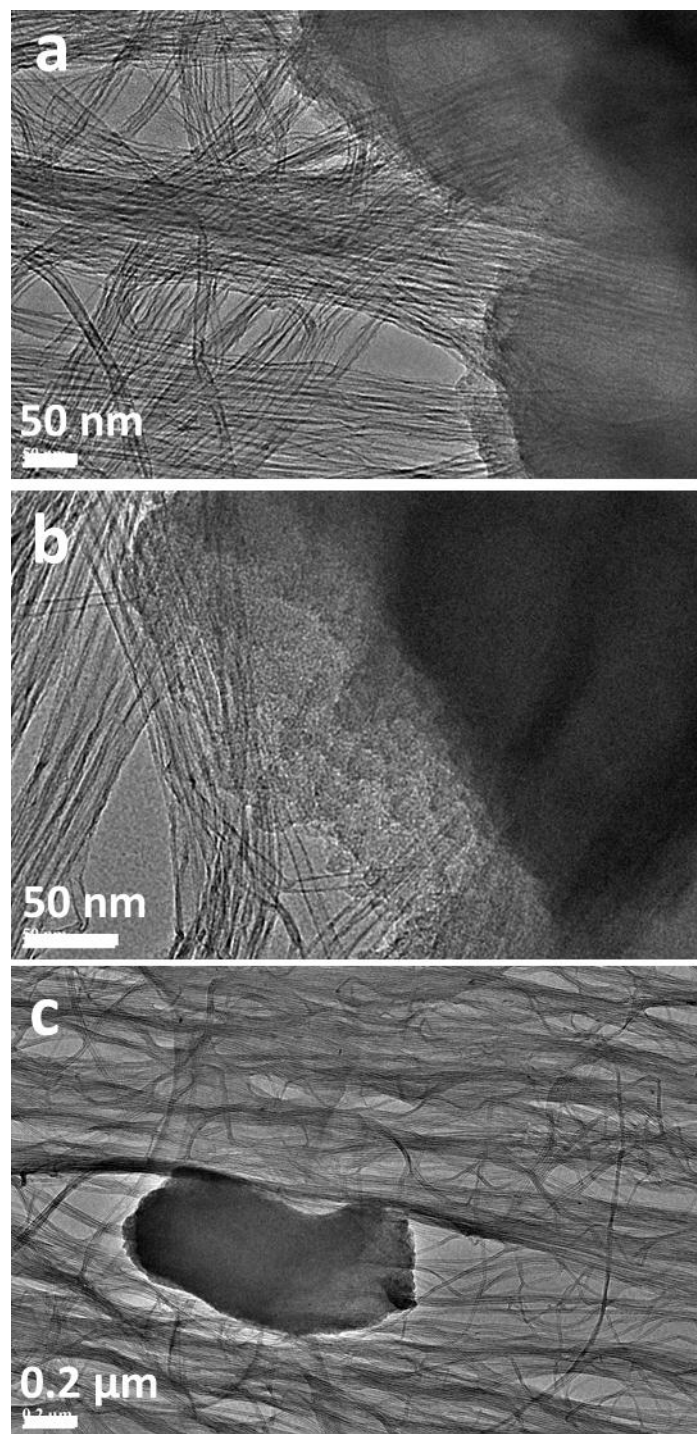


Figure S5. **a** and **b.** High resolution transmission electron microscopy images of the interface between MWCNTs and OMC particles. **c.** High resolution transmission electron microscopy image of an OMC particle restricted by MWCNT bundles.

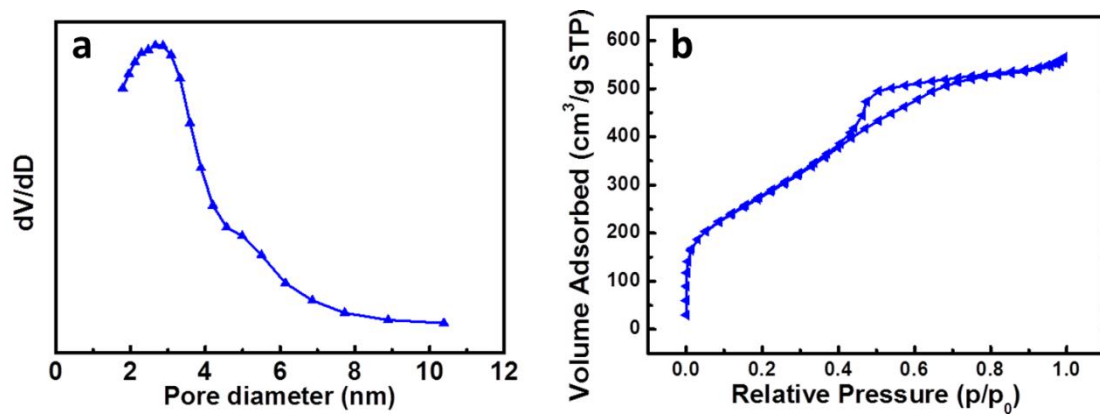


Figure S6. **a.** Pore size distribution of the OMC. **b.** Nitrogen sorption isotherms of the OMC.

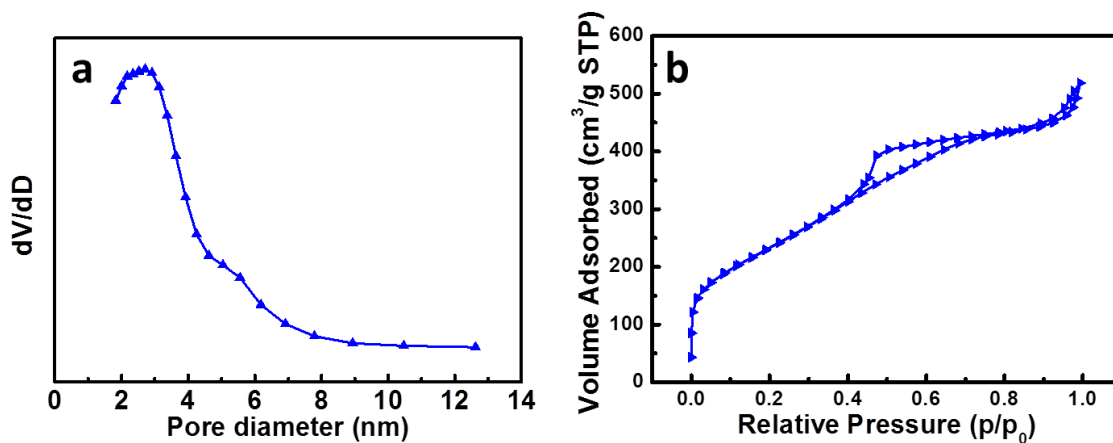


Figure S7. **a.** Pore size distribution of the MWCNT/OMC composite material. **b.** Nitrogen sorption isotherms of the MWCNT/OMC composite. The OMC weight percentage was 87% in the composite material, and a specific surface area of 884 m²/g was obtained.

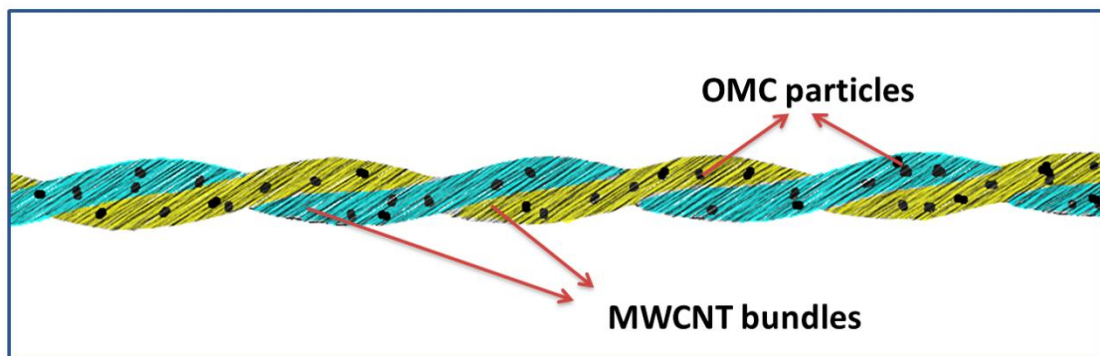


Figure S8. Schematic illustration to the EDLC wire which is composed of two MWCNT/OMC composite fibers.

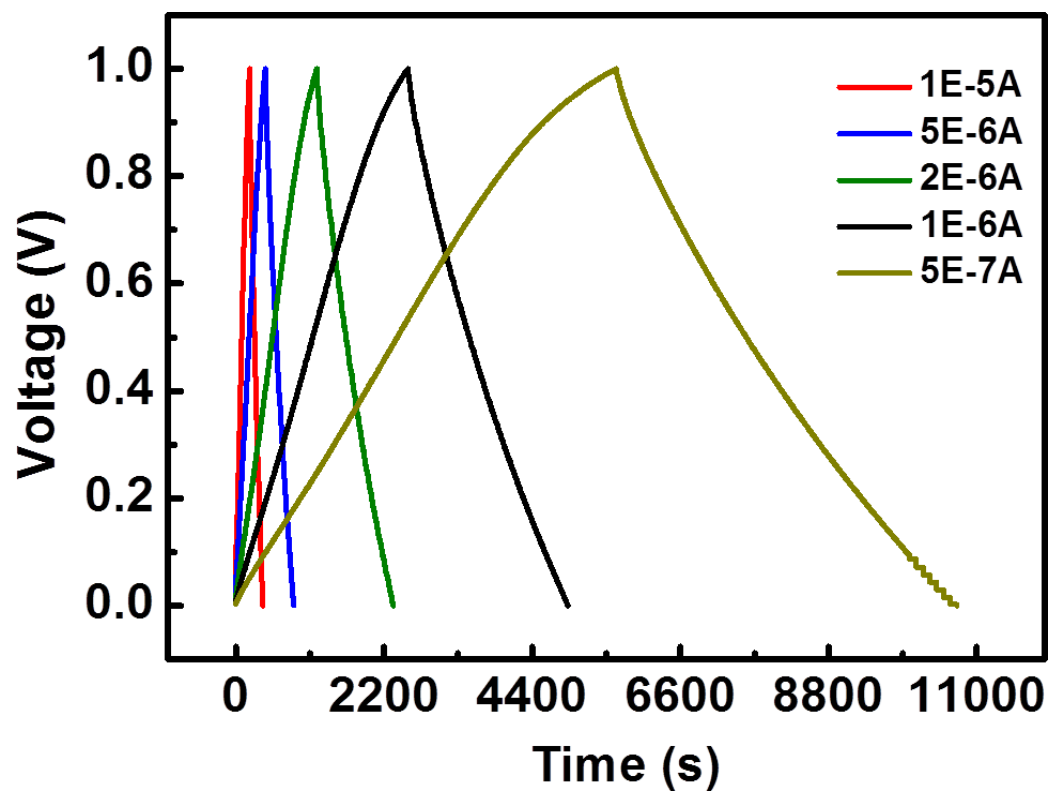


Figure S9. Galvanostatic charge-discharge curves of an EDLC wire based on the composite fiber with an OMC weight percentage of 87% at different currents.

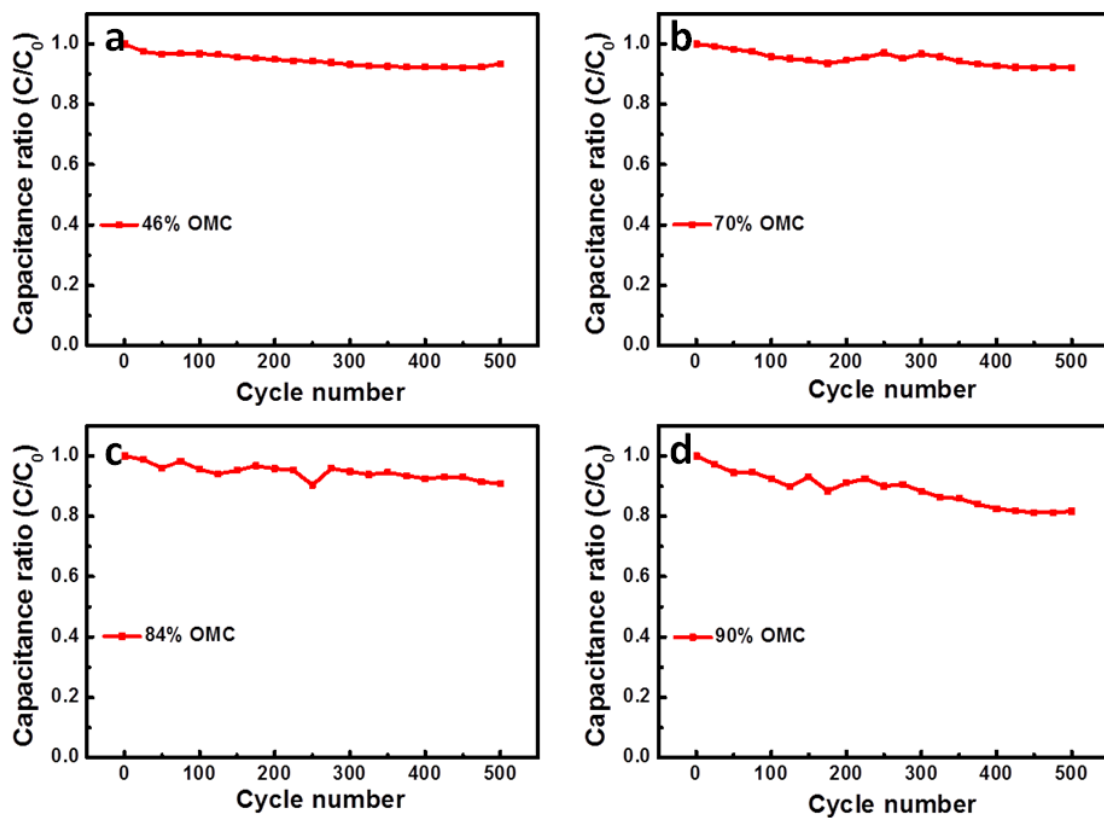


Figure S10. Dependence of capacitance ratio on cycle number for EDLC wires based on the composite fibers with different OMC weight percentages. **a**, **b**, **c**, and **d**. 46%, 70%, 84%, and 90%, respectively.