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Supplementary Information for

Wire-shaped Flexible Asymmetric Supercapacitor based on Carbon Fiber coated with Metal oxide & Polymer

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1. The areal capacitance of the Wire-shaped Fiber Asymmetric Supercapacitor (WFASC) can be calculated from the cyclic voltammetry curves via the following formulae:

$$C = A/(2 \times S \times \Delta U) \quad (1)$$

$$C_{\Delta S} = C/\Delta S = A/(2 \times S \times \Delta U \times \Delta S) \quad (2)$$

where C is the capacitance of the WFASC, A is the area of CV curve, S is the scan rate, ΔU is the potential window, $C_{\Delta S}$ is the areal capacitance, and ΔS is the area of the electrodes.

2. The areal capacitance of the WFASC can be calculated from the galvanostatic charge-discharge curves via the following formulae:

$$C = Q/\Delta U = I \times \Delta t/\Delta U \quad (3)$$

$$C_{\Delta S} = C/\Delta S = I \times \Delta t/(\Delta U \times \Delta S) \quad (4)$$

where C is the capacitance of the WFASC, I is the discharge current, Δt is the discharge time, ΔU is the potential window during the discharge process, $C_{\Delta S}$ is the areal capacitance, and ΔS is the area of the electrodes.

3. The energy density and power density of the WFASC can be calculated from the galvanostatic charge-discharge curves via the following formulae:

$$E = 0.5 \times C_{\Delta S} \times (\Delta U)^2 \quad (5)$$

$$P = E/\Delta t \quad (6)$$

where E is the energy density, $C_{\Delta S}$ is the areal capacitance, ΔU is the potential window, P is the areal power density and Δt is the discharge time.

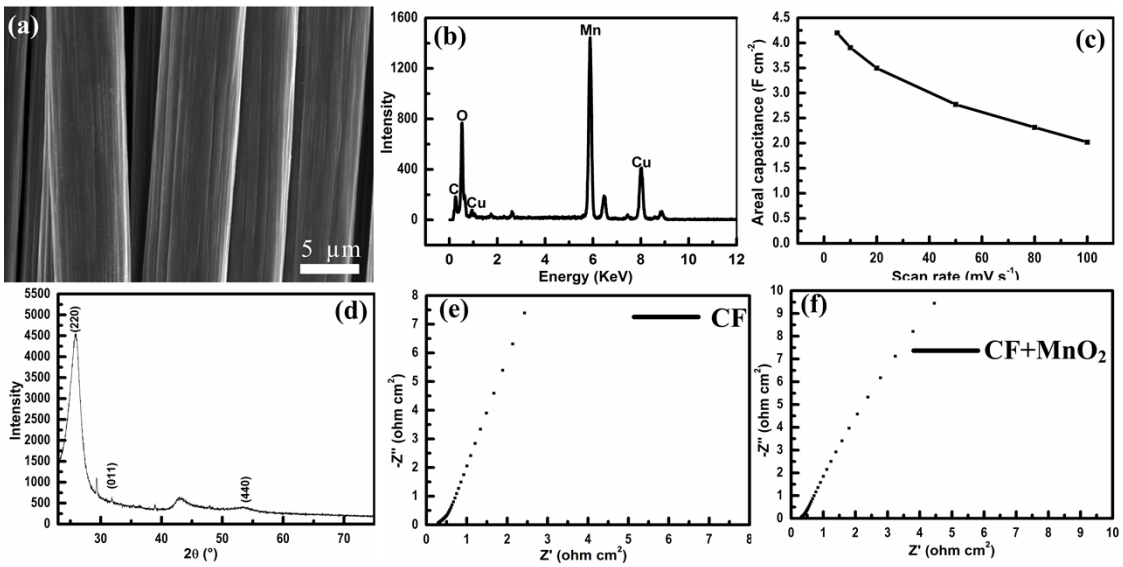

Fig. S1 (a) the SEM image of pure carbon fiber; (b) the EDX spectrum of MnO_2-carbon fiber; (c) areal capacitances of the positive electrode measured by the CV experiment with the scan rate from 5 mV s^{-1} to 100 mV s^{-1}; (d) the XRD of MnO_2-carbon fiber; (e) and (f) are EIS of pure carbon fiber and MnO_2-carbon fiber.

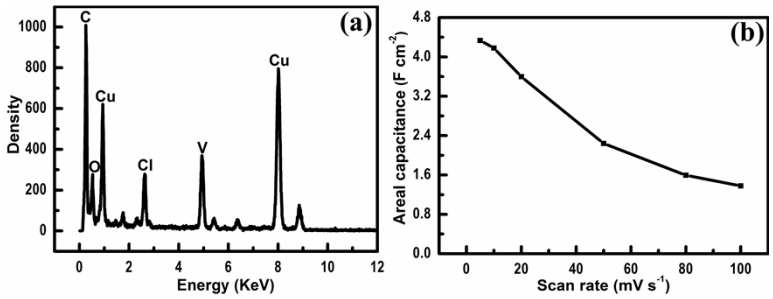

Fig. S2 (a) the EDX spectrum of V_2O_5-PANI-carbon fiber; (b) areal capacitances of the negative electrode measured by the CV experiment with the scan rate from 5 mV s^{-1} to 100 mV s^{-1}.

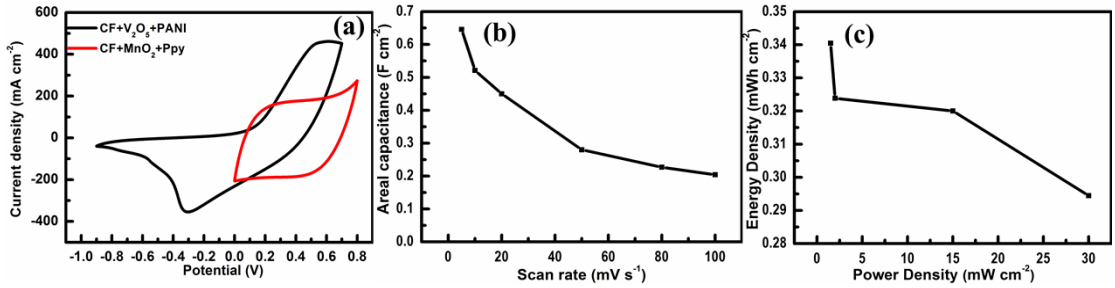

Fig. S3 (a) comparison of CV curves of negative and positive electrodes performed in a three-electrode cell; (b) areal capacitances of the WFASC measured by the CV experiment with the scan rate from 5 mV s^{-1} to 100 mV s^{-1}; (c) energy density and power density plot.