Supporting Information

Cotton Textile Enabled, All-Solid-State Flexible Supercapacitors

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Calculations

1. Specific capacitances derived from cyclic votalmmetry (CV) tests were calculated from Equation 1 as follows:

$$\mathrm{C}_{sp} = \frac{1}{mv(V_c - V_a)} \int_{V_a}^{V_c} I(V)dV \tag{1}$$

where C_{sp} (F/g), m (g), υ (V/s), V_c and V_a (V), and I (A) are the specific capacitance, the mass of the active material, scan rate, high and low potential limit during the CV tests, and the instant current on the CV curves, respectively.

2. Specific capacitances derived from galvanostatic (GV) tests were calculated from Equation 2 as follows:

$$\mathrm{C}_{sp} = \frac{It}{(\Delta V)m} \tag{2}$$

where C_{sp} (F/g), I (A), t (s), m (g) and V (V) are the specific capacitance, the discharge current, the discharge time, the mass of the active material, and the total potential window, respectively.

3. Energy density (E) and power (P) density derived from GV tests were calculated from the following equations:

$$\mathrm{E} = \frac{1}{2}CV^2 \tag{3}$$

$$\mathrm{P} = \frac{E}{t} \tag{4}$$

where E (Wh/kg), C (F/g), V (V), P (W/kg) and t (s) are the energy density, specific capacitance, potential window, power density, and discharge time, respectively.

4. For the constructed asymmetric and symmetric capacitors, specific capacitances derived from cyclic votalmmetry (CV) tests were calculated from Equation 5 as follows:

$$\mathrm{C}_{sp} = \frac{1}{mv(V_c - V_a)} \int_{V_a}^{V_c} I(V)dV \tag{5}$$

where C_{sp} (F/g), m (g), υ (V/s), Vc and Va (V), and I (A) are the specific capacitance, the total mass of the active material, scan rate, high and low potential limit during the CV tests, and the instant current on CV curves, respectively.

The specific capacitance derived from GV tests was calculated from Equation 6 as follows:

$$\mathrm{C}_{sp} = 4\mathrm{C} = \frac{4It}{(\Delta V)m} \tag{6}$$

where C_{sp} (F/g), I (A), t (s), m (g) and V (V) are the specific capacitance, the discharge current, the discharge time, the total mass of the active material, and the total potential window, respectively.

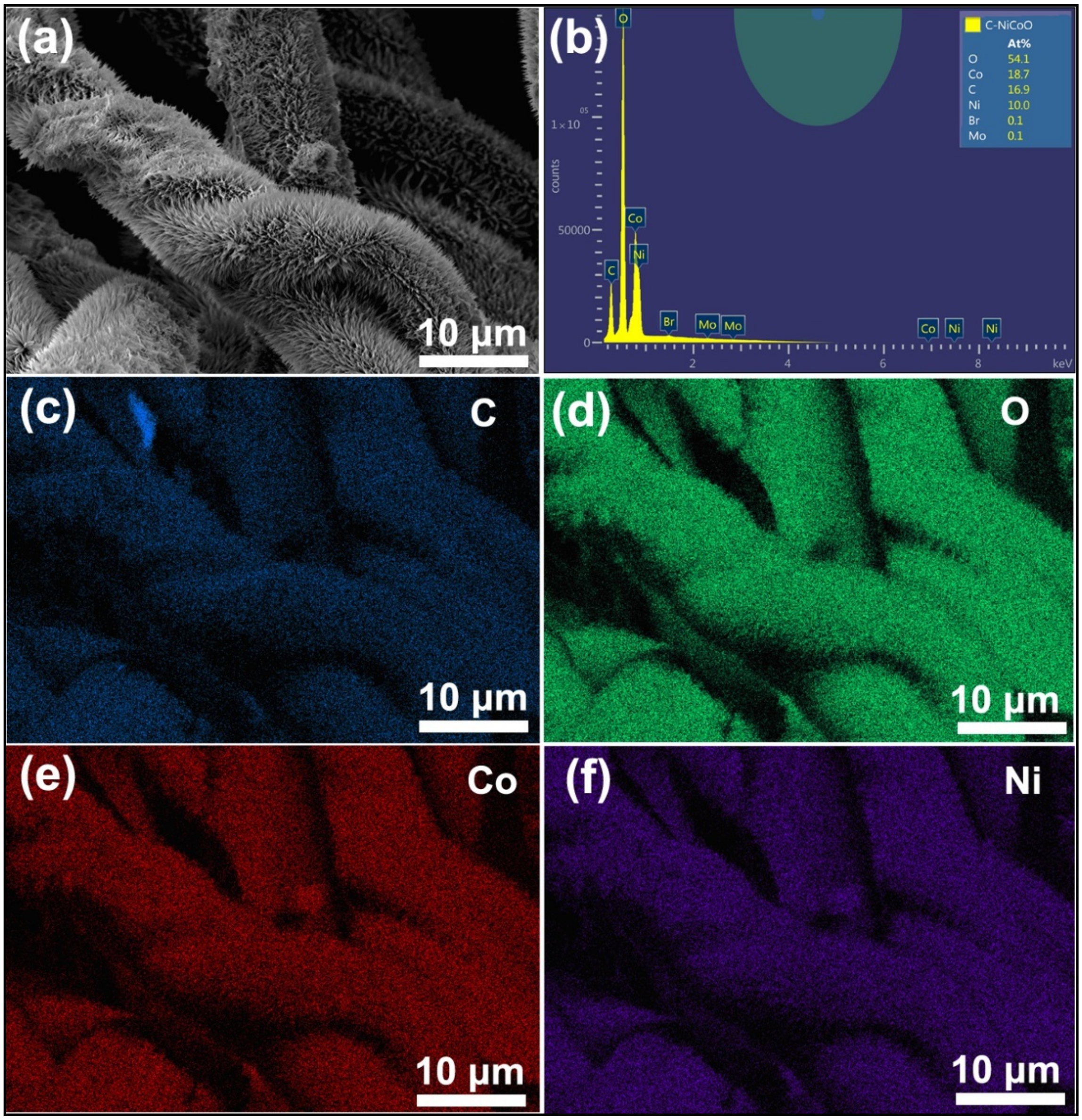

Fig. S1 EDS spectrum and element mapping images of C, O, Co and Ni elements of $NiCo_2O_4$ nanowire/ACT.

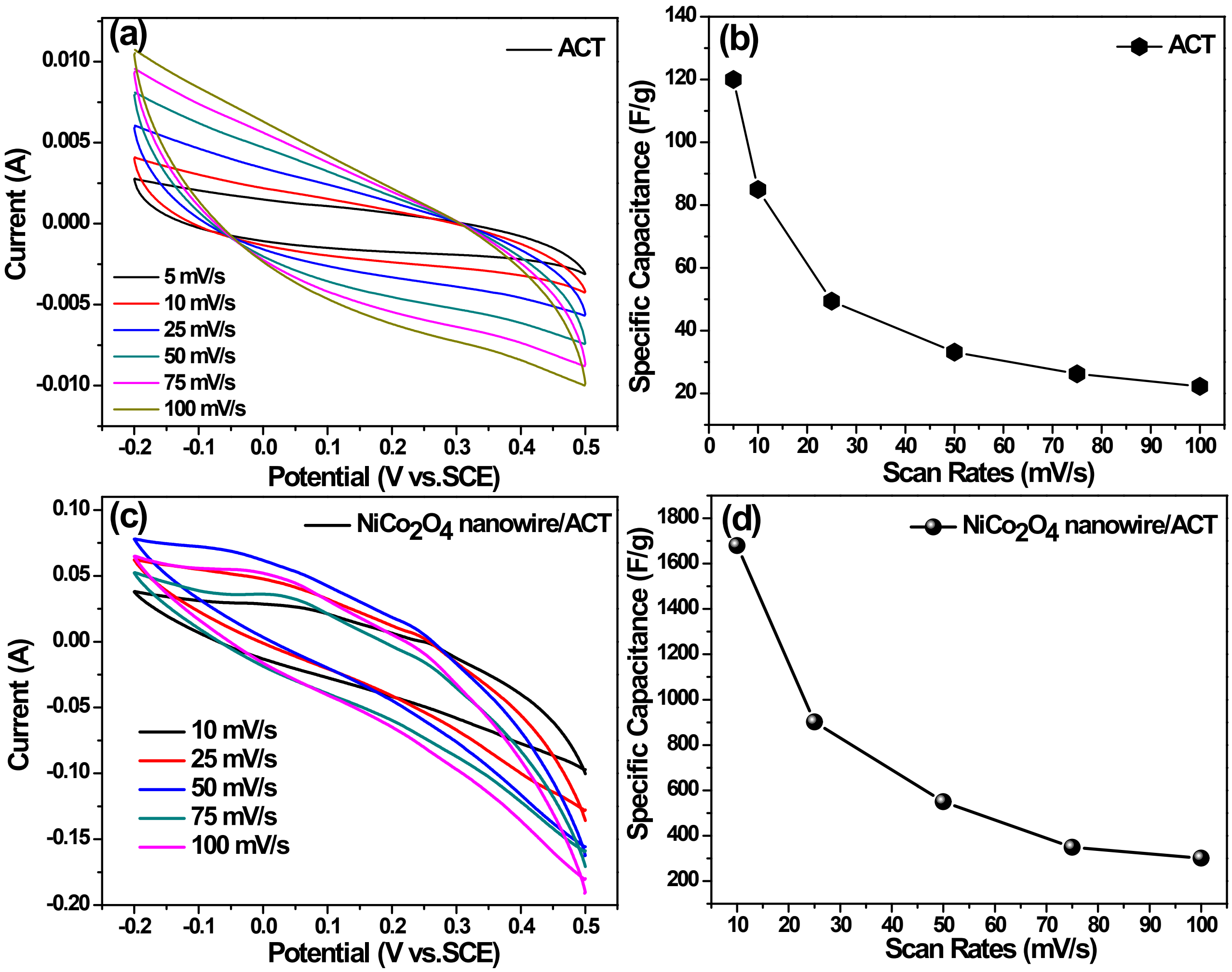

Fig. S2 (a) Cyclic voltammetry (CV) curves of ACT at different scan rates in 6 M KOH aqueous solution; (b) Specific capacitances of ACT at different scan rates derived from the CV curves; (c) CV curves of $NiCo_2O_4$ nanowire/ACT at different scan rates in 6 M KOH aqueous solution. (d) Specific capacitances of $NiCo_2O_4$ nanowire/ACT derived from the CV curves.

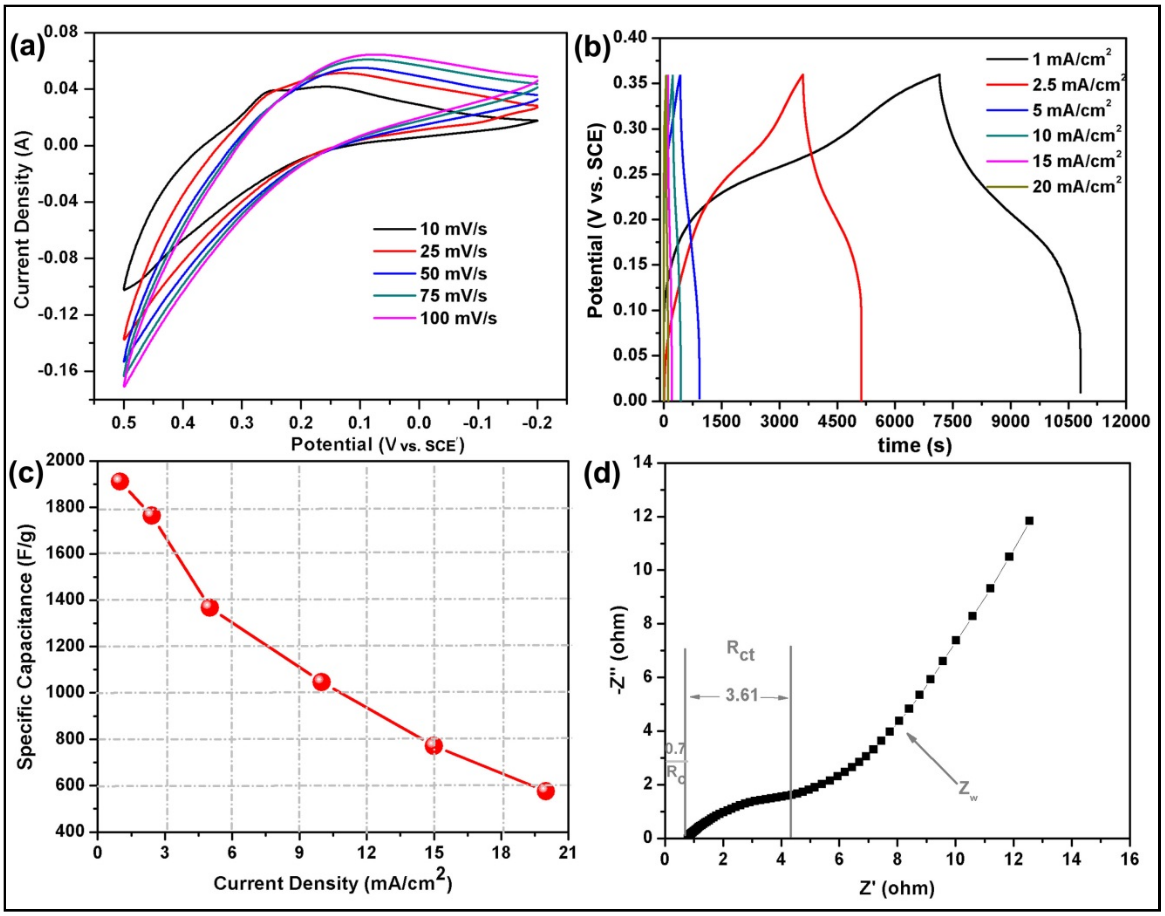

Fig. S3 (a) CV curves of $NiCo_2O_4$@$NiCo_2O_4$/ACT at different scan rates in 6 M KOH aqueous solution; (b) Galvanostatic (GV) constant-current charge/discharge curves of $NiCo_2O_4$@$NiCo_2O_4$/ACT in 6 M KOH aqueous solution at different current densities; (c) Specific capacitances of $NiCo_2O_4$@$NiCo_2O_4$/ACT in 6 M KOH aqueous solution at different current densities; (d) Nyquist plots of electrochemical impedance spectra of $NiCo_2O_4$@$NiCo_2O_4$/ACT in 6 M KOH aqueous solution in the frequency range of 100 kHz to 0.05Hz.

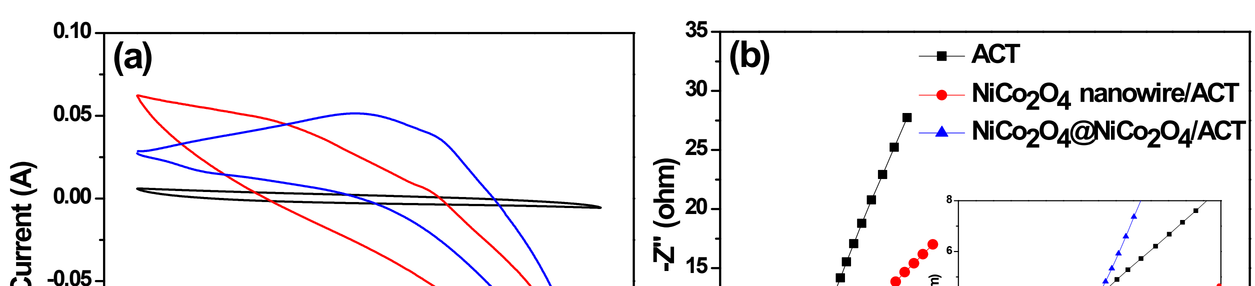

Fig. S4 (a) Comparative CV curves of ACT, $NiCo_2O_4$ nanowire/ACT and $NiCo_2O_4$@$NiCo_2O_4$/ACT at a scan rate of 25 mV/s in 6 M KOH aqueous solution; (b) Comparative Nyquist plots of electrochemical impedance spectra of ACT, $NiCo_2O_4$ nanowire/ACT and $NiCo_2O_4$@$NiCo_2O_4$/ACT in 6 M KOH aqueous solution within the frequency range from 100 kHz to 0.05 Hz.

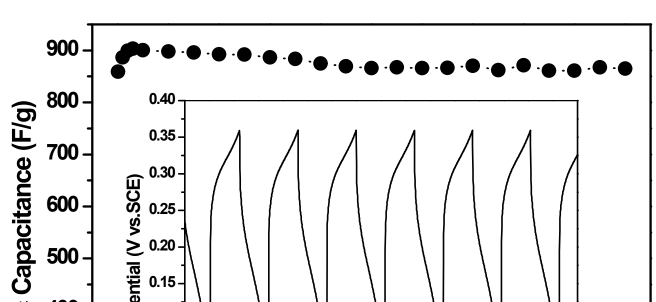

Fig. S5 Cycling performance of $NiCo_2O_4$@$NiCo_2O_4$/ACT in 6 M KOH aqueous solution at a current density of 20 mA/cm^2, inset is a part of the charge/discharge curve of $NiCo_2O_4$@$NiCo_2O_4$/ACT during the GV constant-current test.