*Supporting Information*

# Needle-like CoO Nanowires Grown on Carbon Cloth for Enhanced Electrochemical Properties in Supercapacitors

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## Experimental Section

All the chemicals were of analytical grade and were used without further purification. Before using, commercially available Carbon Cloth (CC, ca. 1 cm × 10 cm) was cut into the appropriate size, cleaned by ultrasonication with ethanol and distilled water several times, and then dried in an oven at 60 ºC for 2 h.

*Materials Synthesis.* In a typical process, 2 mmol of $Co(NO_3)_2 \cdot 6H_2O$, 4 mmol of $NH_4F$, 10 mmol of urea were dissolved in 35 mL deionized water under magnetically stirring for 30 min. The solution was transferred into a 40 mL

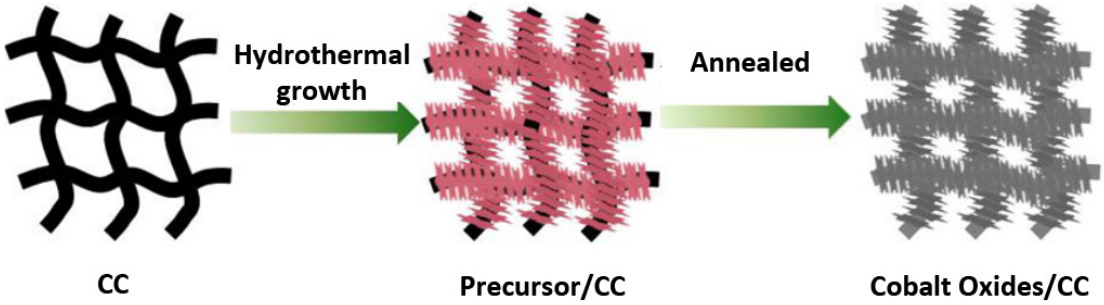
Teflon-lined stainless steel autoclave. Then, a piece of the pre-treated CC was vertically immersed in above solution. Hydrothermal synthesis was carried out at 100 °C for 12 h. After cooling to room temperature naturally, the precursor was ultrasonically cleaned for several times with deionized water and ethanol, dried at 60 ºC for 2 h. Finally, the precursor could be completely converted into needle-like CoO or $Co_3O_4$ nanowires supported on the CC by heat treatment at 450 °C in high-purity Ar gas ambient or at 350 ºC in air for 2 h, respectively. The mass loading of the CoO and $Co_3O_4$ nanowires on CC was around 1.9 and 2 mg $cm^{-2}$, respectively. Lamellar precursor could be prepared with the absence of $NH_4F$ during the hydrothermal process, which could be more readily calcined into rectangular CoO nanosheets supported on the CC at 450 °C for 2 h under argon flow. The mass loading of the CoO nanosheets on CC was around 1.2 mg $cm^{-2}$. Furthermore, CoO microspheres could be obtained without use of carbon cloth during the synthetic process.

*Materials Characterization.* The crystal structure of as-synthesized products were determined by X-ray diffraction (XRD) using a D/max2550 VB + X-ray diffractometer with Cu Ka radiation (λ = 1.5418 Å). The morphology and microstructures were characterized using field-emission scanning electron microscopy (FESEM; JEOL JSM-6700F, 5 kV), and transmission electron microscopy (TEM; JEOL, JEM-2010 HT).

*Electrochemical measurements.* The needle-like CoO nanowires/CC, Co3O4 nanowires/CC and CoO nanosheets/CC hybrd structures (~1 $cm^2$ in area) were directly acted as the working electrode without any ancillary materials. For electrochemical measurements of nanowire-assembled CoO microspheres, the working electrode is consisted of active material, carbon black, and polymer binder (polyvinylidene fluoride; PVDF) in a weight ratio of 80:10:10. The slurry was pasted to Ni foam and then dried at 120 °C overnight under vacuum. Electrodes were tested on interface 1000 Electrochemical Workstation in a three-electrode electrochemical cell using a 2 M KOH aqueous solution as electrolyte at room temperature. Ag/AgCl electrode and Pt wire were used as

reference and counter electrode, respectively. The specific capacitance is calculated according to the following equations: $C = I\Delta t/m\Delta V$, where $I$ is charge-discharge current, $\Delta t$ is the time for a full discharge, $m$ indicates the mass of the active material, and $\Delta V$ represents the voltage change after a full discharge.

## Adtional Figures




**Scheme S1** The process for the fabrication of cobalt oxides supported on the CC.

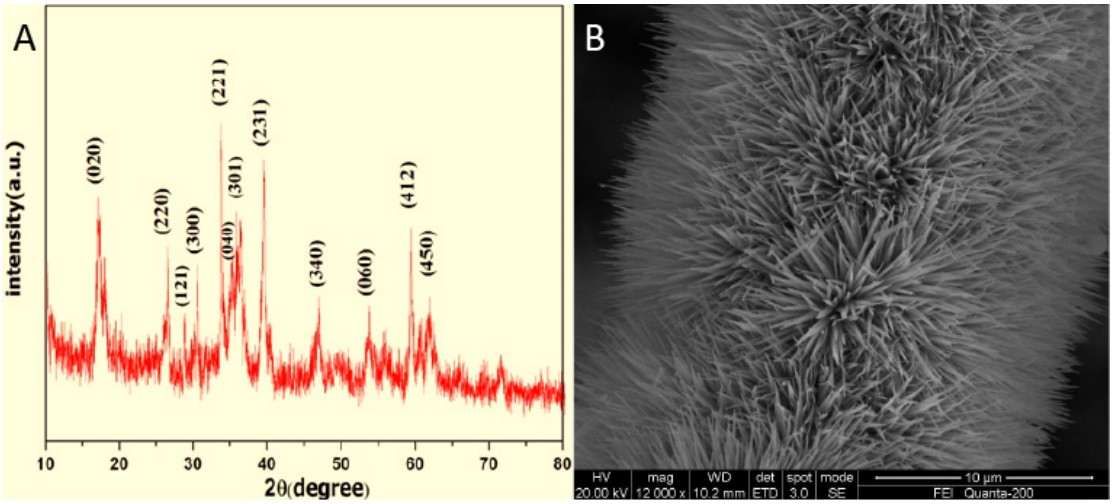



**Fig. S1** (A) XRD pattern of needle-like precursor scratched from the CC. (B) High-magnification SEM image of needle-like precursor supported on the CC.

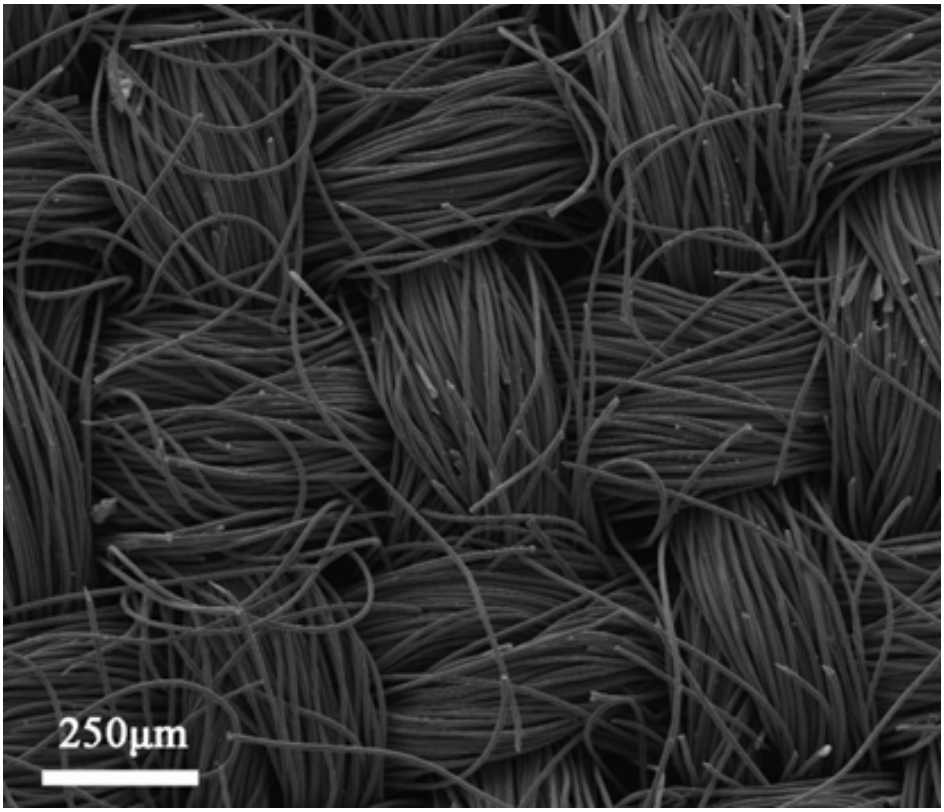



**Fig. S2** SEM images of the carbon textiles.

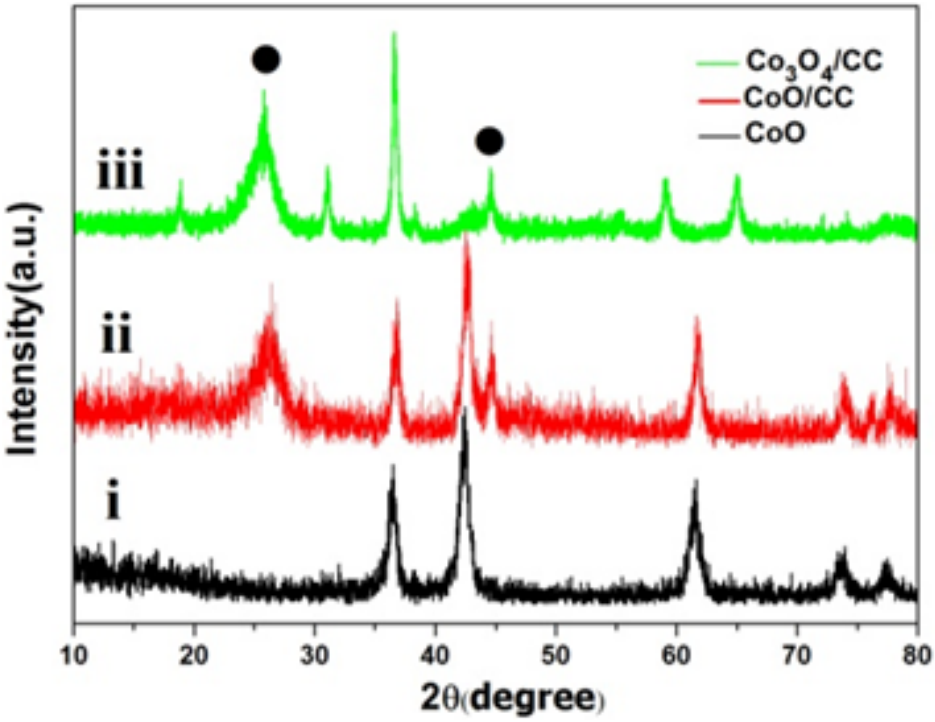



**Fig. S3**. XRD pattern of (i) $Co_3O_4$ nanowires/CC, (ii) CoO nanosheets/CC, and (iii) nanowire-assembled CoO microspheres.