Supporting information

High performance asymmetric supercapacitor based on *in-situ* prepared CuCo$_2$O$_4$ nanowires and PPy nanoparticles on two-ply carbon nanotube yarn

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Fig. S1. XPS spectra of CuCo$_2$O$_4$.

Fig. S2. FTIR spectra of the as-prepared CNT@PPy-500.
Fig. S3. (a-b) EIS curves of CNT@CuCo$_2$O$_4$ and CNT@PPy-500 electrode.

Fig. S4. Electrochemical properties of CNT@PPy-100 electrode.

Fig. S5. Electrochemical properties of CNT@PPy-1000 electrode.

Fig. S6. Electrochemical properties of CNT@PPy-2000 electrode.
Fig. S7. CV curves at 30 mV s\(^{-1}\) for different CNT@PPy electrodes.

![CV curves](image1)

Fig. S8. Areal capacitance of ACS at different scan rate.

![Areal capacitance](image2)

Fig. S9. (a) CV curves of two devices connected in series and parallel, (b) GCD of two devices connected in series and parallel.

![CV curves and GCD](image3)
Fig. S10. Electrochemical properties of CuCo$_2$O$_4$/PPy under different frequencies of dynamic bending conditions. The changes of bending angle $\theta$, distanced $d_{AB}$ and cell voltage versus time at low and high frequencies during one scan of CV at 50 mV s$^{-1}$. 