Supporting information

High performance asymmetric supercapacitor based on *in-situ* prepared $CuCo_2O_4$ nanowires and PPy nanoparticles on two-ply carbon nanotube yarn

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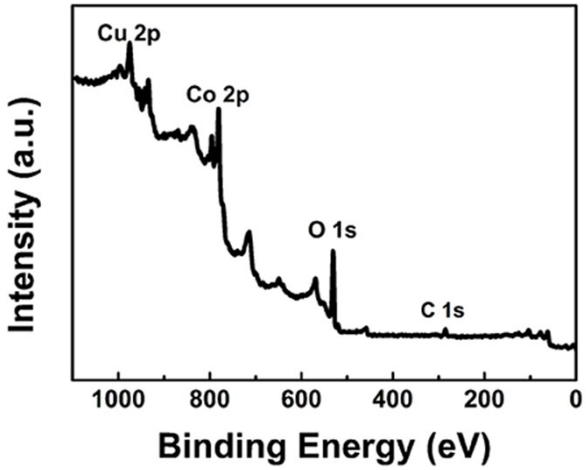

Fig. S1. XPS spectra of $CuCo_2O_4$.

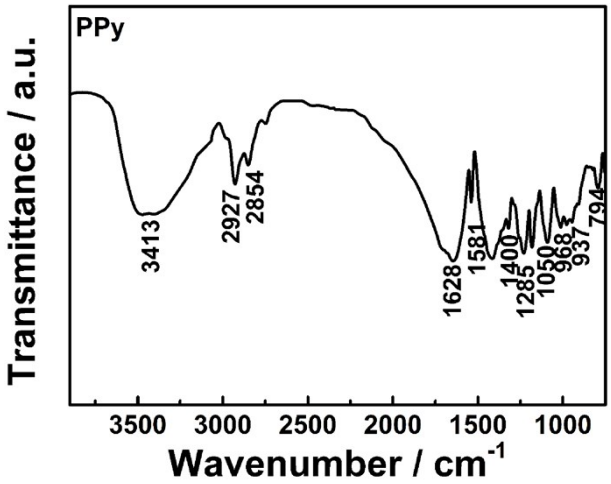

Fig. S2. FTIR spectra of the as-prepared CNT@PPy-500.

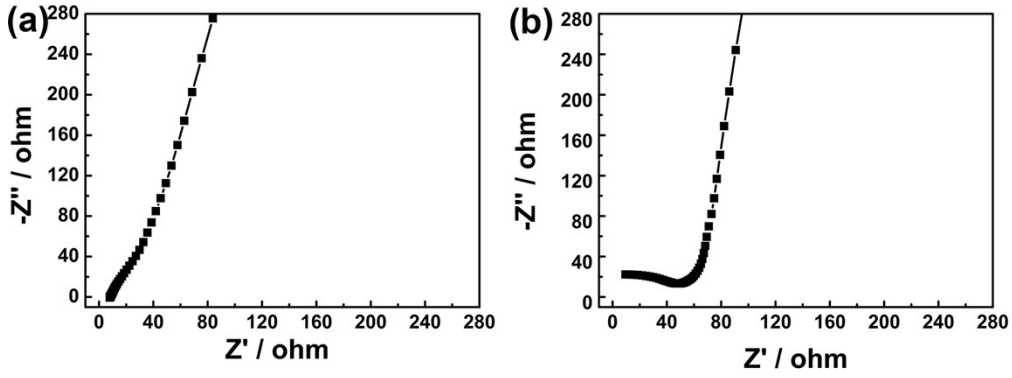

Fig. S3. (a-b) EIS curves of CNT@$CuCo_2O_4$ and CNT@PPy-500 electrode.

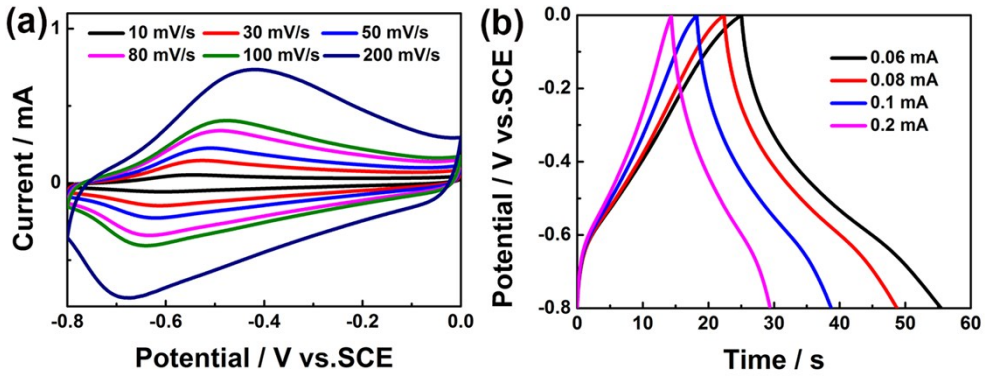

Fig. S4. Electrochemical properties of CNT@PPy-100 electrode.

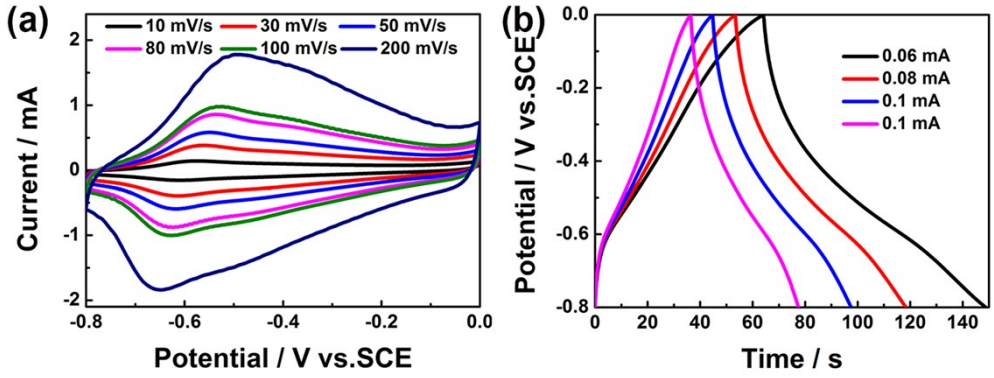

Fig. S5. Electrochemical properties of CNT@PPy-1000 electrode.

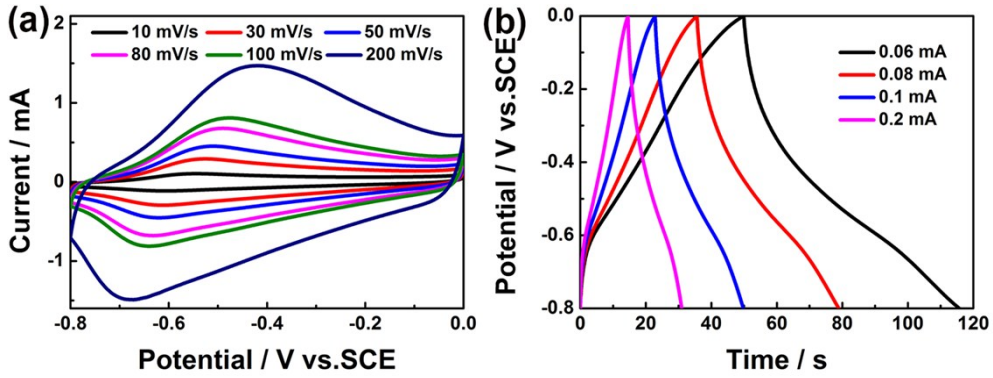

Fig. S6. Electrochemical properties of CNT@PPy-2000 electrode.

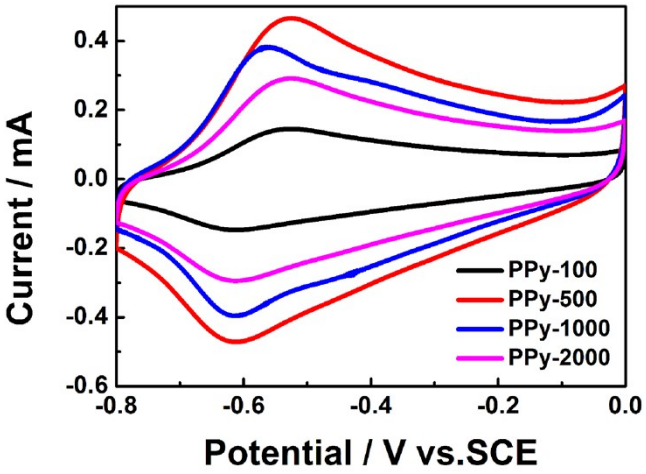

Fig. S7. CV curves at 30 mV s^{-1} for different CNT@PPy electrodes.

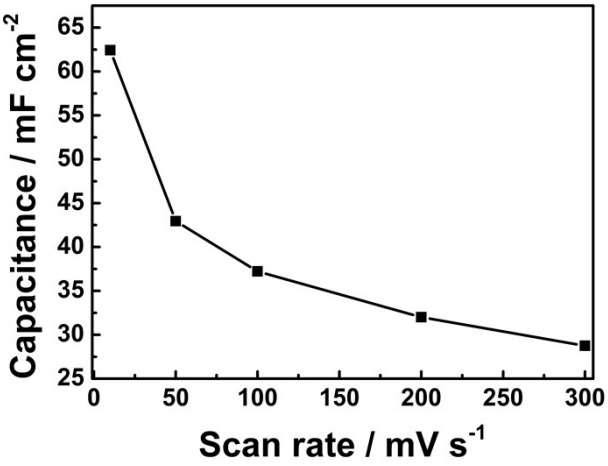

Fig. S8. Areal capacitance of ACS at different scan rate.

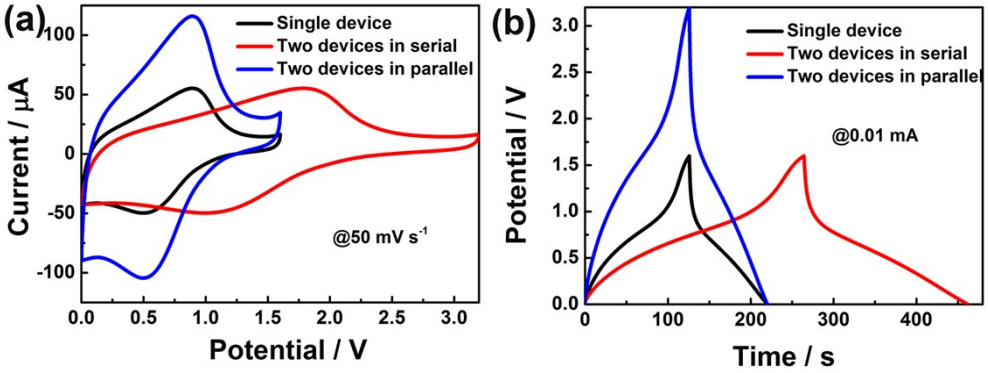

Fig. S9. (a) CV curves of two devices connected in series and parallel, (b) GCD of two devices connected in series and parallel.

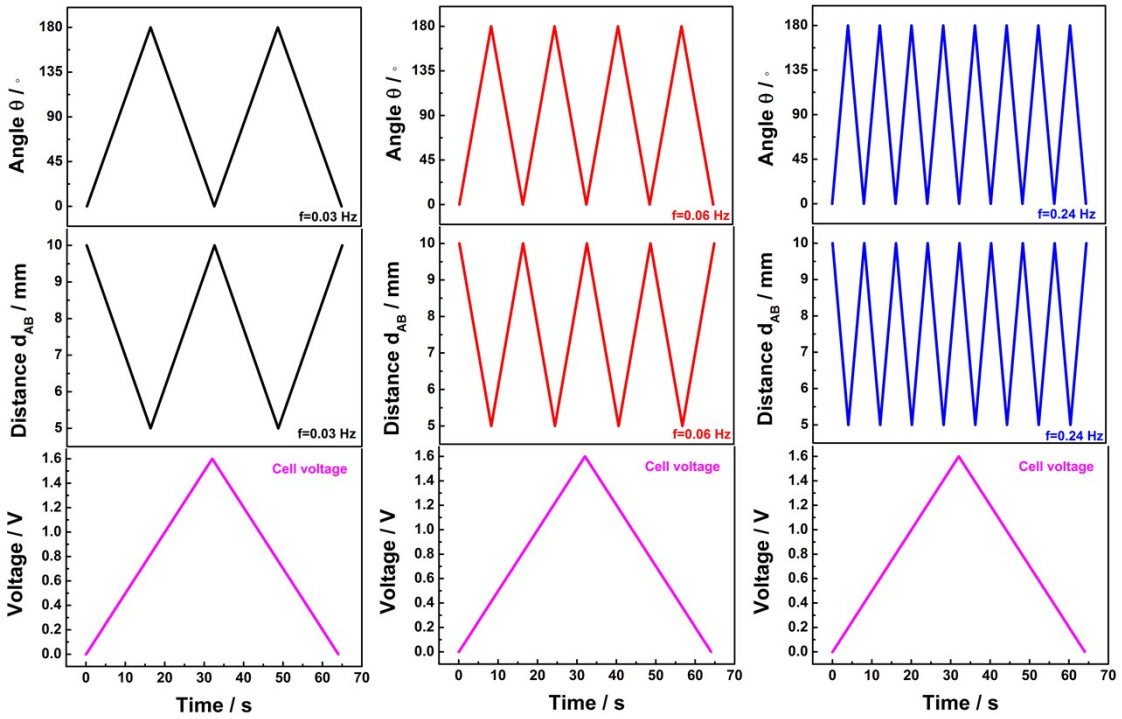

Fig. S10. Electrochemical properties of $CuCo_2O_4$//PPy under different frequencies of dynamic bending conditions. The changes of bending angle θ, distanced d_{AB} and cell voltage versus time at low and high frequencies during one scan of CV at 50 mV s^{-1}.