

## Supplementary Information for

### **Stretchable fluoroelastomer quasi-solid-state organic electrolyte for high-performance asymmetric flexible supercapacitor**

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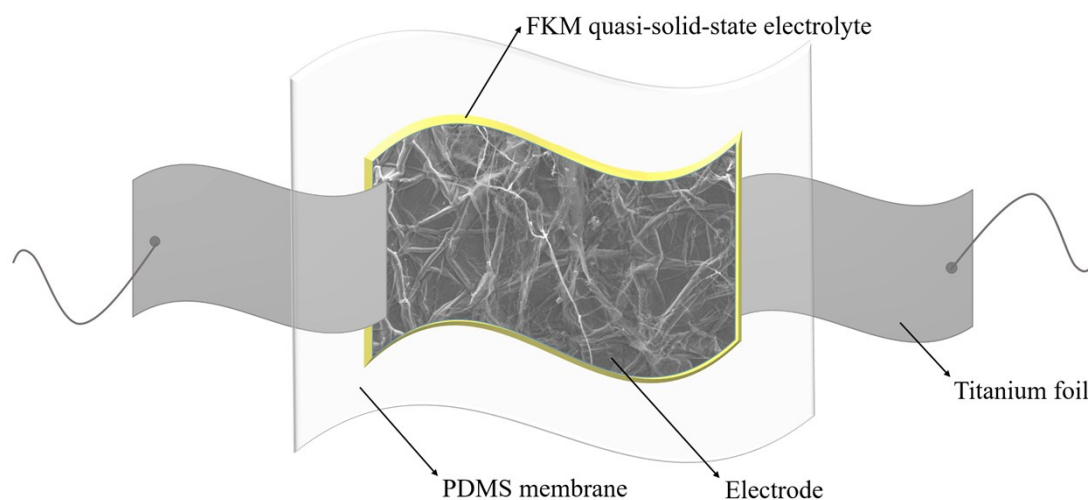
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EastChinaUniversity of Science and Technology, Shanghai 200237, P.R.China*

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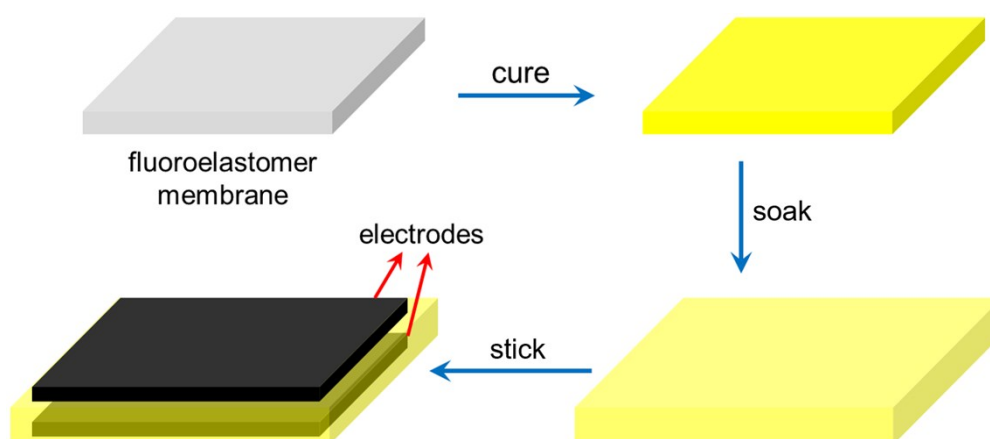
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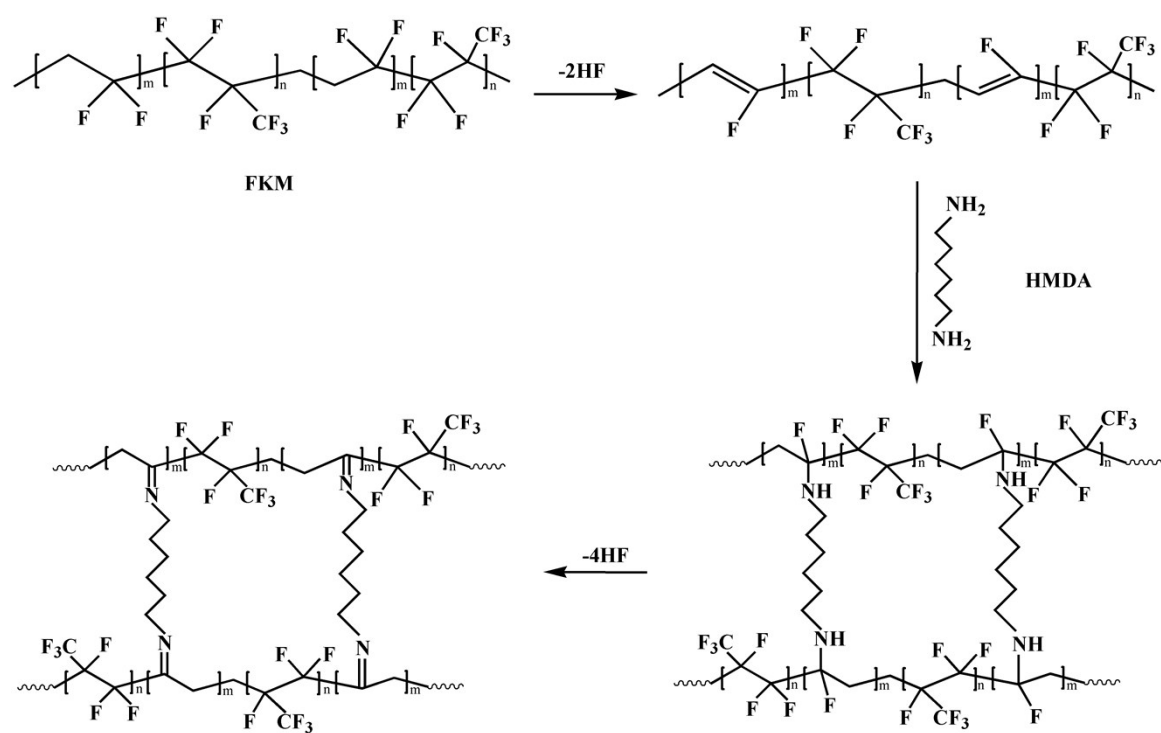
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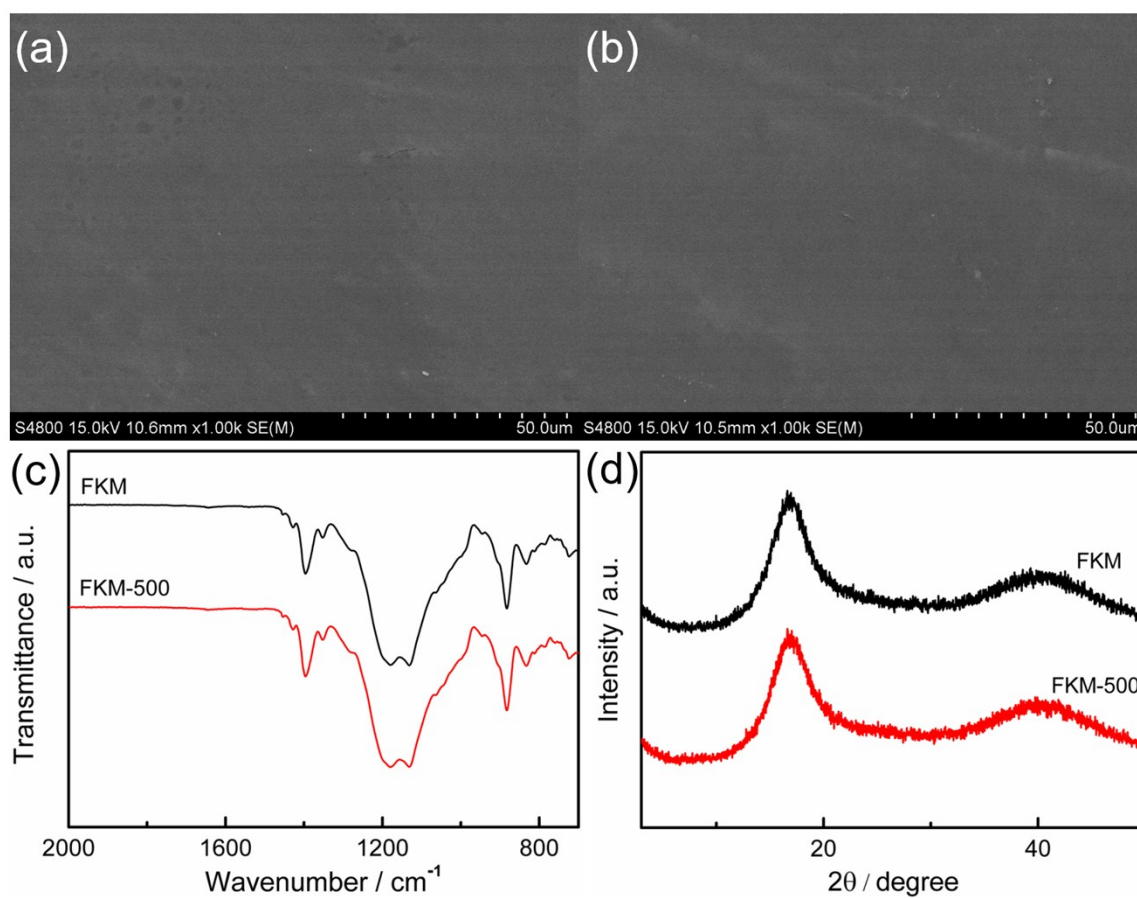
**Fig. S1.** Schematic configuration of CNT@PPy//FKM/Et<sub>4</sub>NBF<sub>4</sub>-AN//CNT@PDAA *o*AFSC (SC-1).



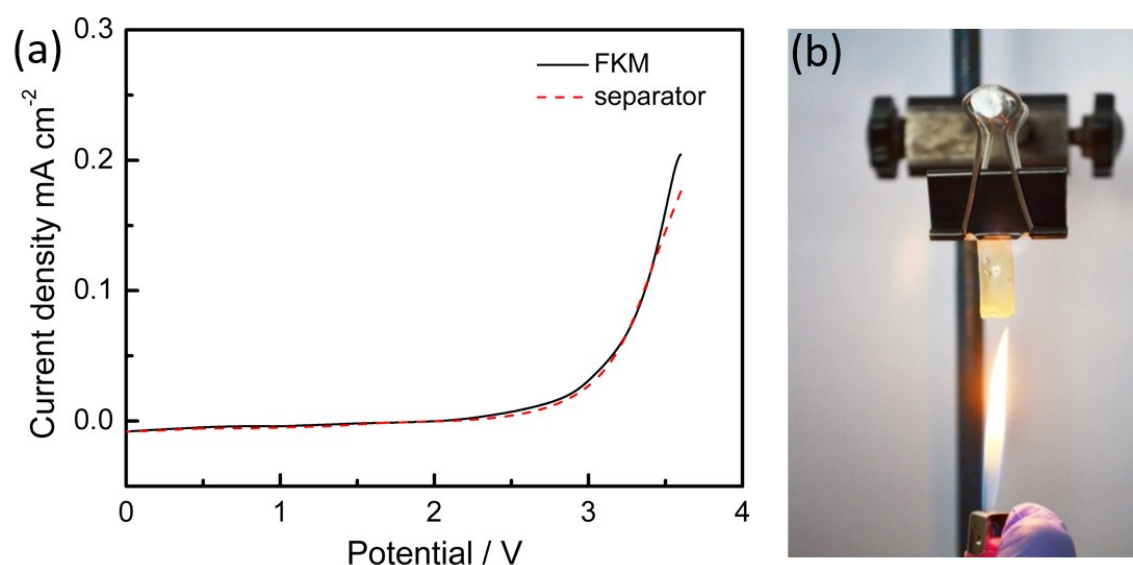
**Fig. S2.** Schematic diagram of the routine “cure-soak-stick” assembly process of CNT@PPy//FKM/Et<sub>4</sub>NBF<sub>4</sub>-AN//CNT@PDAA *o*AFSC (SC-2).



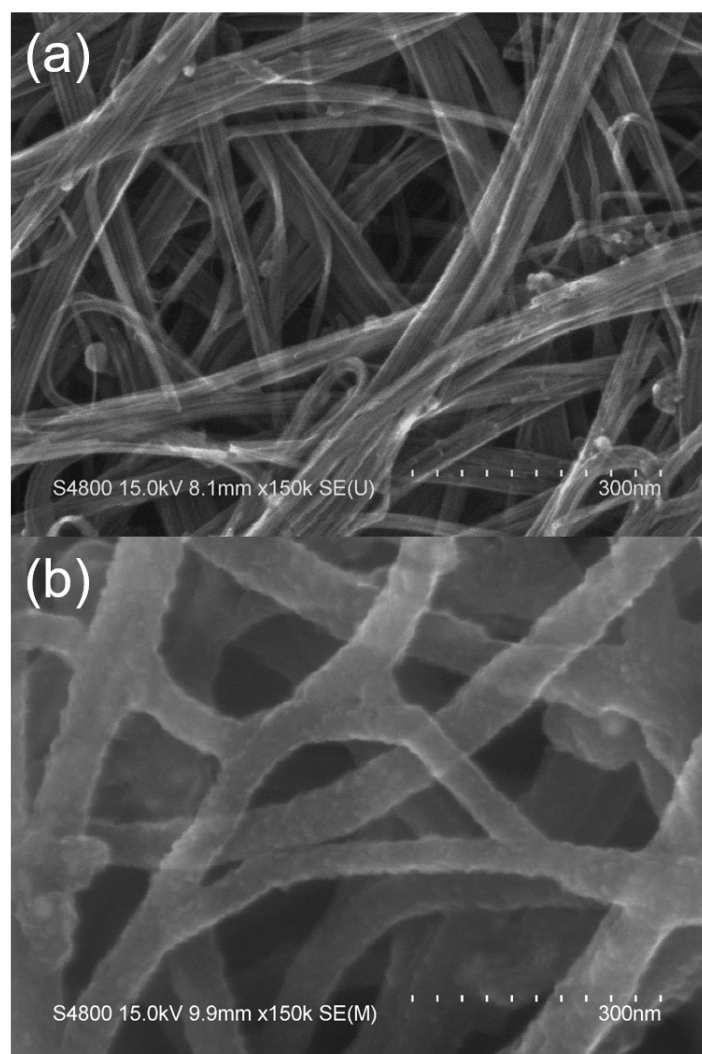
**Fig. S3.** Schematic diagram of the cross-linking mechanism between FKM and HMDA.



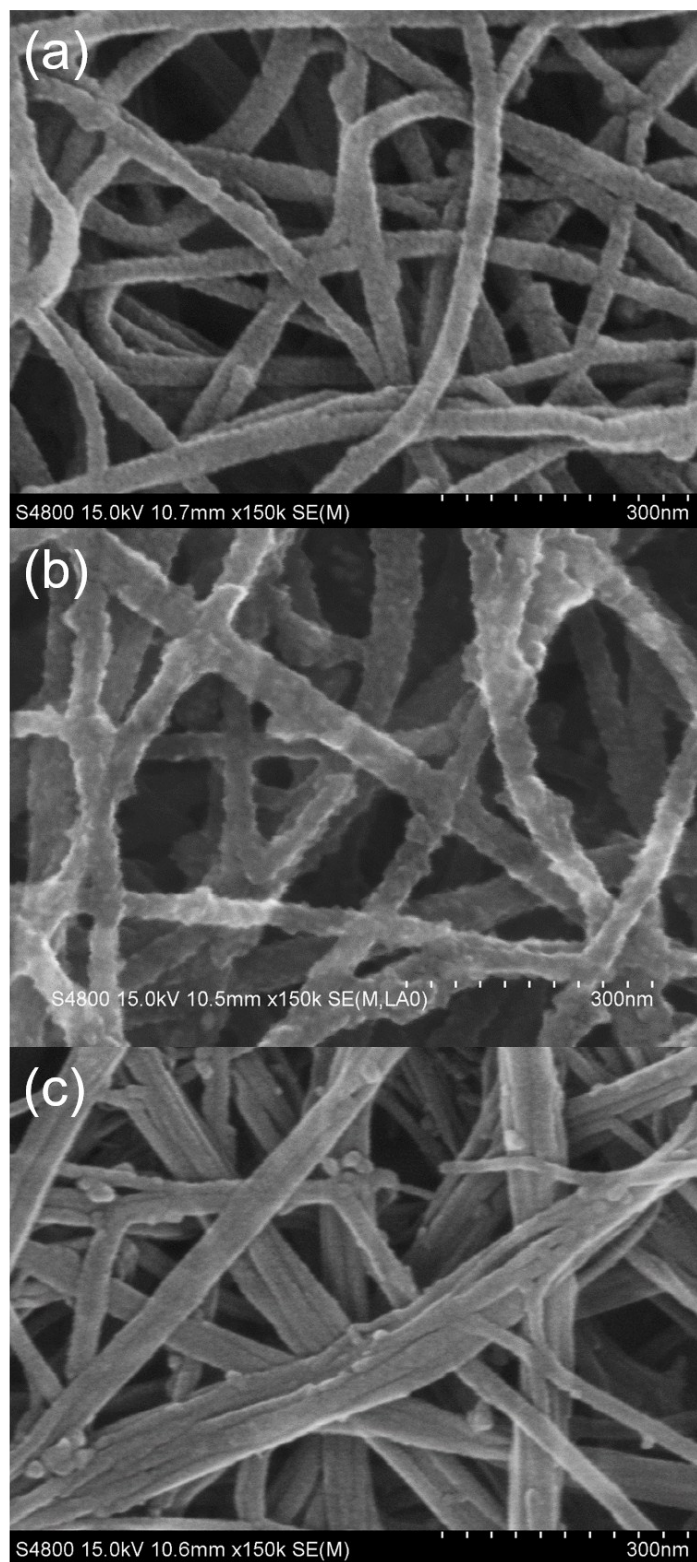
**Fig. S4.** FE-SEM images of FKM membranes with 0.5% HMDA (a) before and (b) after 500 cycles of stretching. (c) ATR-FTIR spectra and (d) XRD patterns of the FKM membranes with 0.5% HMDA before (FKM) and after 500 cycles of stretching (FKM-500)



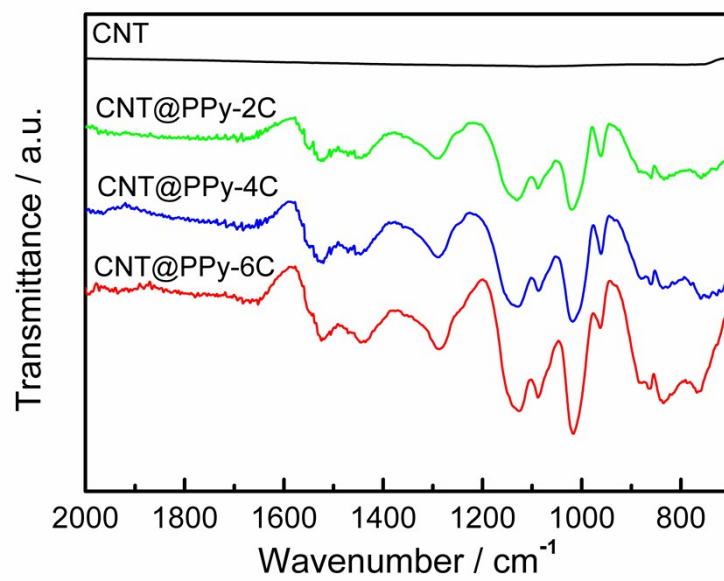
**Fig. S5.** (a) Linear sweep voltammograms of FKM/Et<sub>4</sub>NBF<sub>4</sub>-AN quasi-solid-state organic electrolyte and separator with Et<sub>4</sub>NBF<sub>4</sub>-AN electrolyte using stainless steel as working electrodes at 5 mV s<sup>-1</sup>. (b) The flammability test of FKM/Et<sub>4</sub>NBF<sub>4</sub>-AN quasi-solid-state organic electrolyte.



**Fig. S6.** FE-SEM images of (a) CNT paper and (b) CNT@PDAA

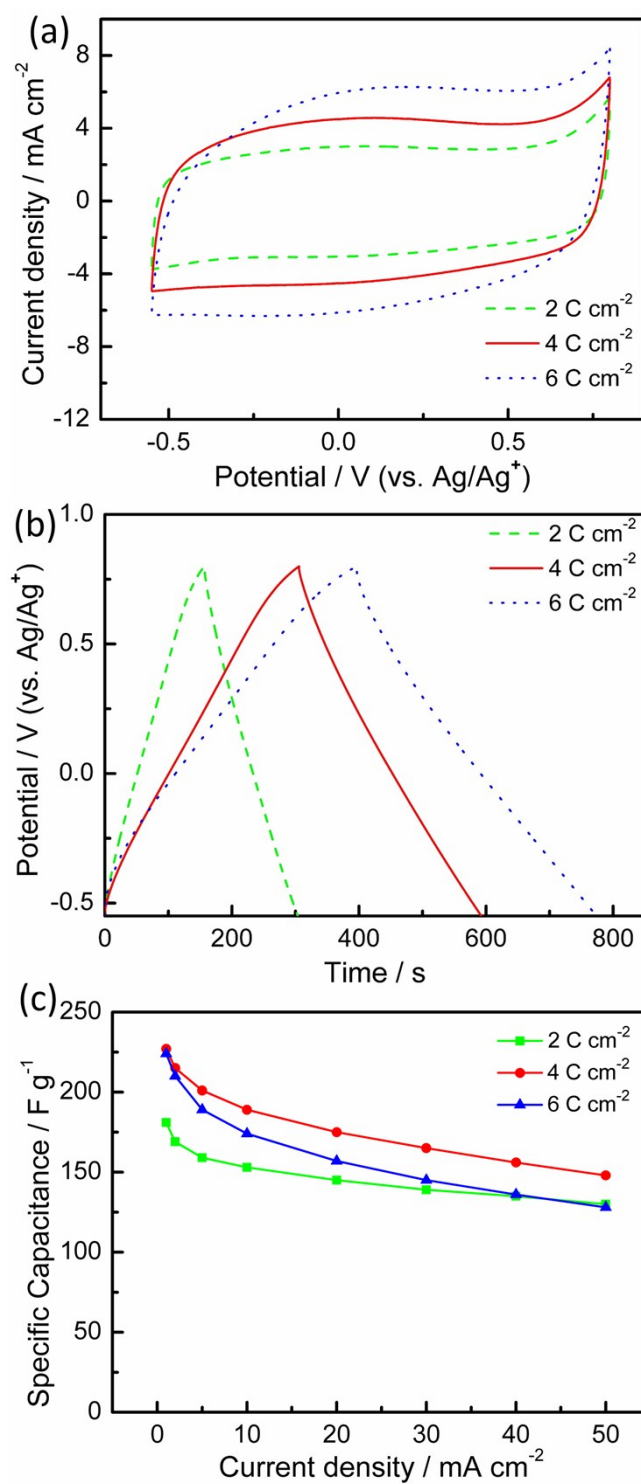


**Fig. S7.** FE-SEM images of CNT@PPy films grown for (a)  $2 \text{ C cm}^{-2}$ , (b)  $4 \text{ C cm}^{-2}$ , and (c)  $6 \text{ C cm}^{-2}$

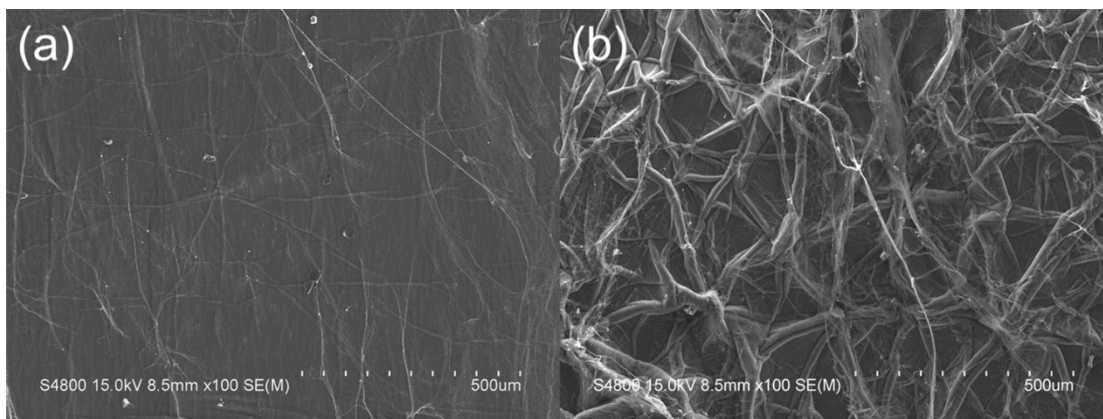


**Fig. S8.** ATR-FTIR spectra of pure CNT paper and CNT@PPy grown for 2, 4, 6 C cm<sup>-2</sup>

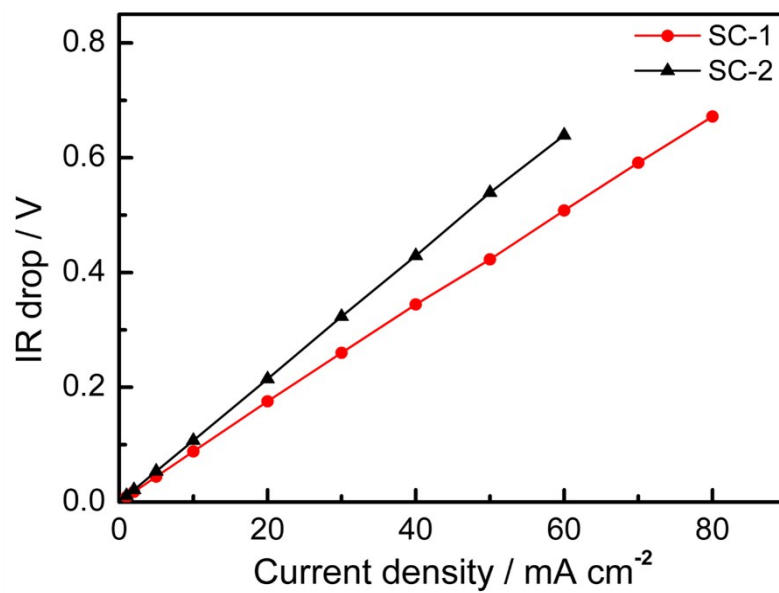




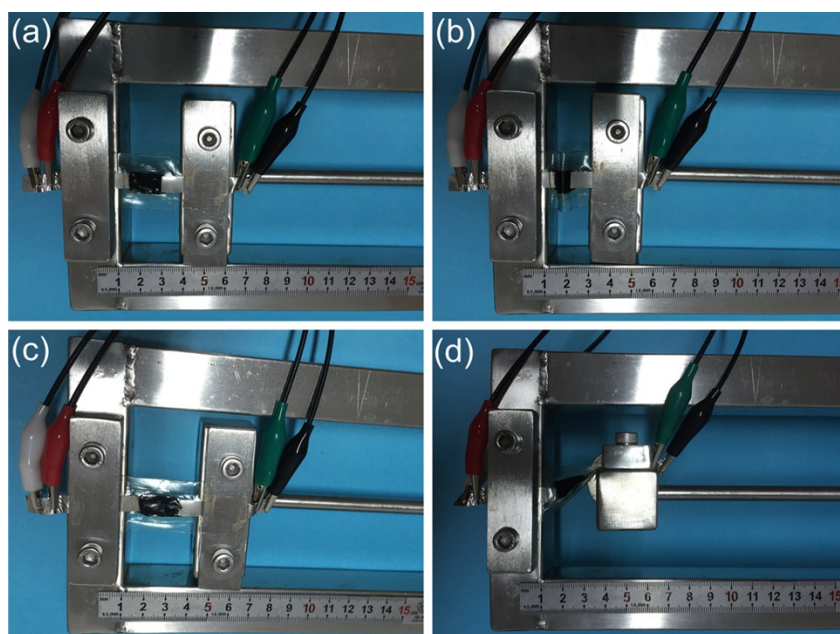
**Fig. S9.** (a) Cyclic voltammograms at 20 mV s<sup>-1</sup>, (b) Galvanostatic charge/discharge curves at 2 mA cm<sup>-2</sup> and (c) specific capacitance as a function of current densities from 1 to 50 mA cm<sup>-2</sup> of CNT@PPy film electrodes with different polymerization charge densities in three-electrode mode.



**Fig. S10.** FE-SEM images of the film electrode in the assembly of SC-1: (a) the initially flat film form, (b) crumpled structure after the film is relaxed.



**Fig. S11.** IR drop as a function of current densities for CNT@PPy//FKM/Et<sub>4</sub>NBF<sub>4</sub>-AN//CNT@PDAA oAFSCs.



**Fig. S12.** Digital photos of CNT@PPy//FKM/Et<sub>4</sub>NBF<sub>4</sub>-AN//CNT@PDAA oAFSCs (SC-1) at (a) normal, (b) bended, (c) stretched and (d) twisted states.