Supporting Information

A Self-Supported Graphene/Carbon Nanotube Hollow Fiber for Integrated Energy Conversion and Storage

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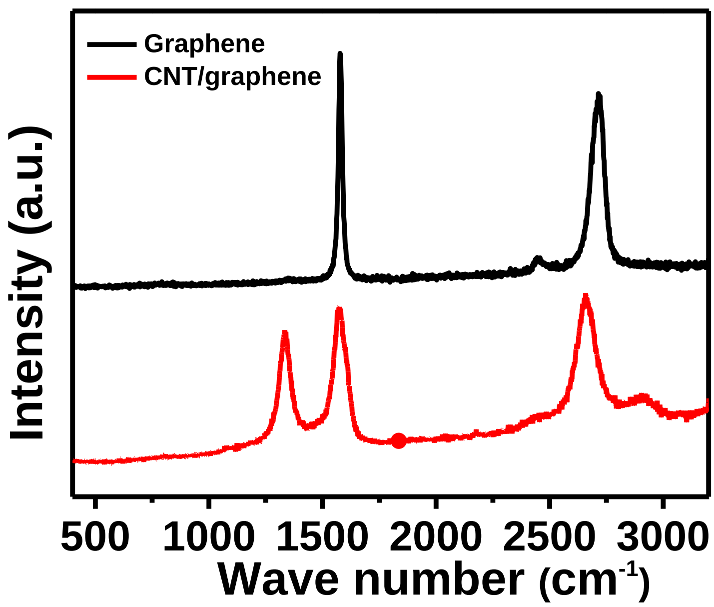

Fig. S1 Raman spectra of as-grown graphene (black line) and G/CNTs (red line) on Ni wires.

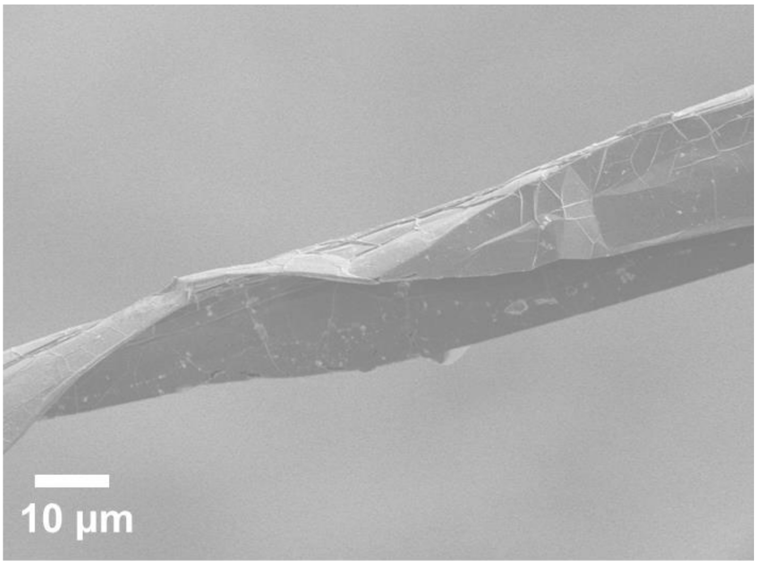

Fig. S2 SEM image of graphene ribbon formed after shrinking of graphene tube.

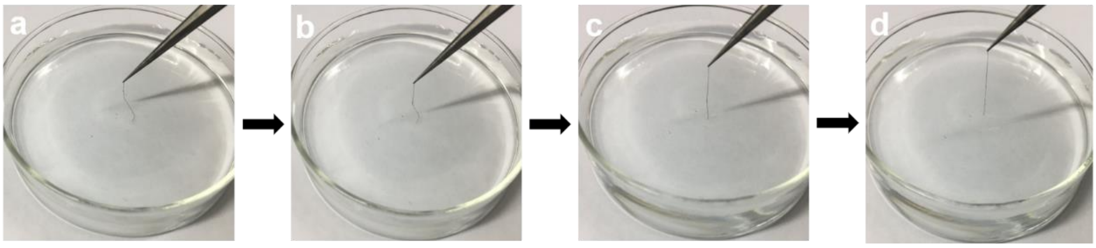

Fig. S3 Digital photographs of an etched G/CNTs hollow fiber drawn out from water.

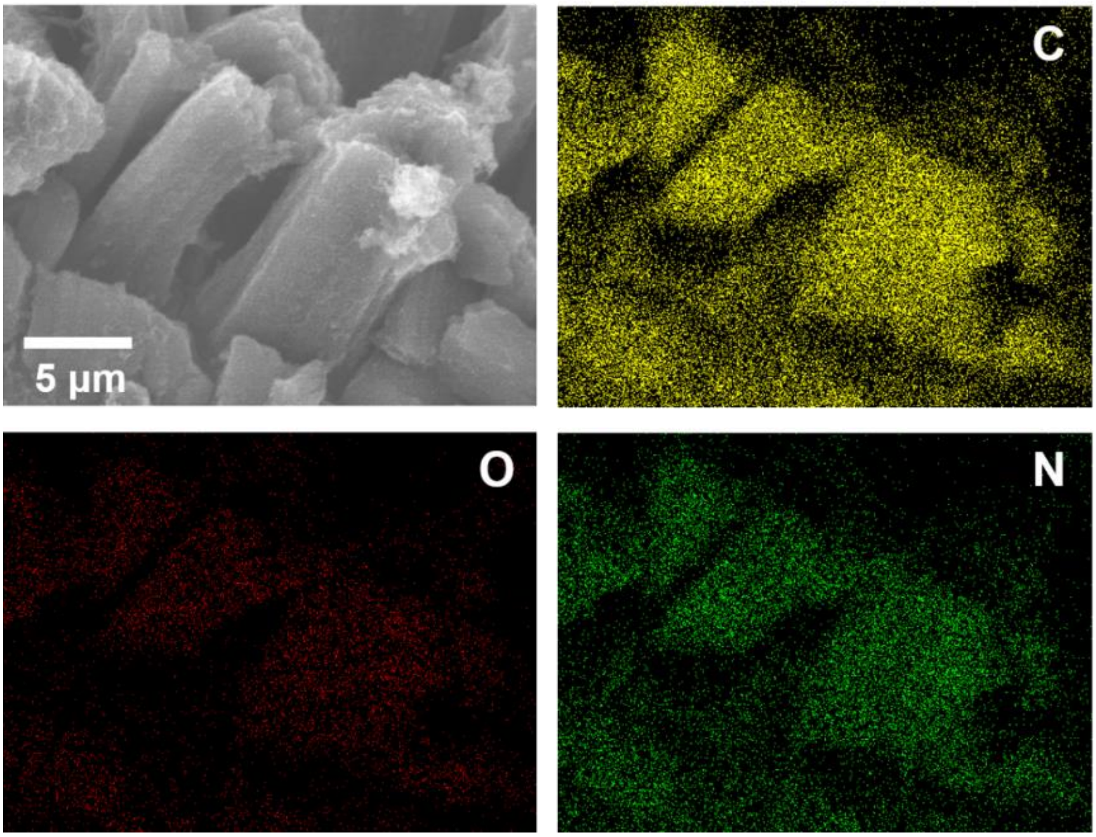

Fig. S4 EDX element mapping of G/CNTs/PANI hollow fiber.

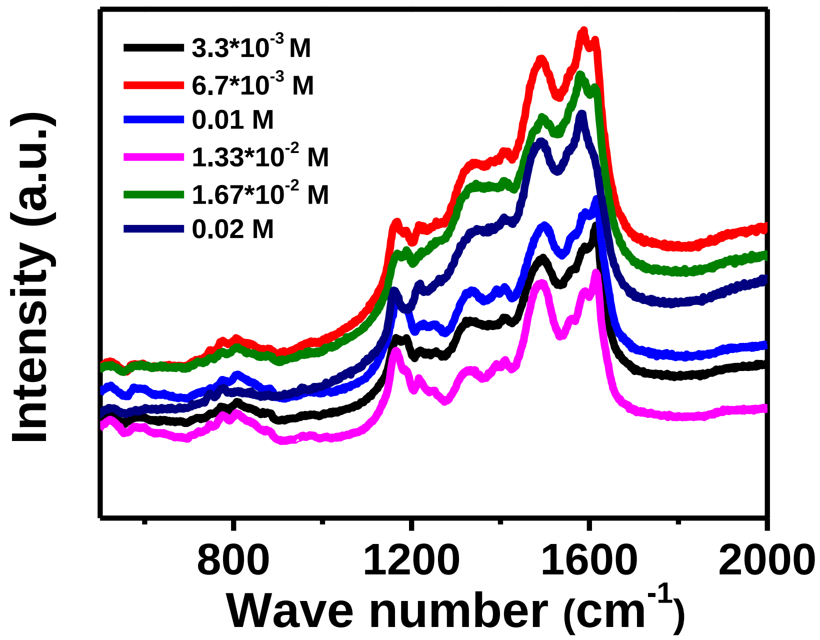

Fig. S5 Raman spectra of G/CNTs/PANI hollow fibers synthesized by using precursor with different aniline contents.

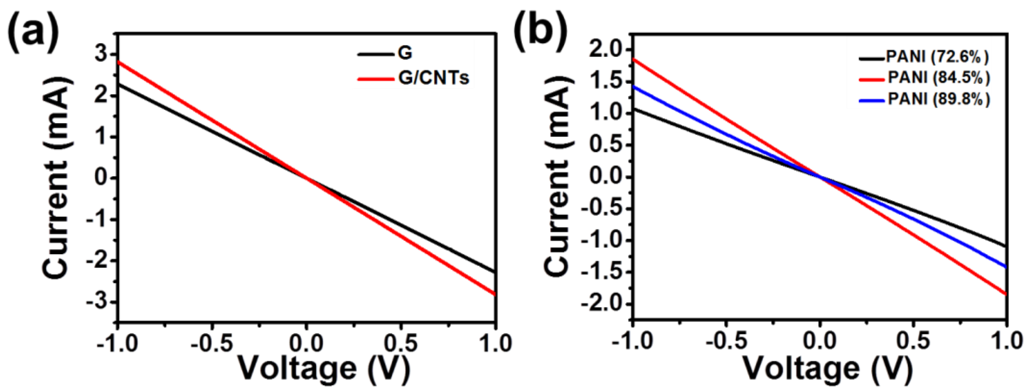

Fig. S6 a,b I-V curves of graphene ribbon, G/CNTs fiber (a), and G/CNTs/PANI fibers with different mass loading of PANI (b).

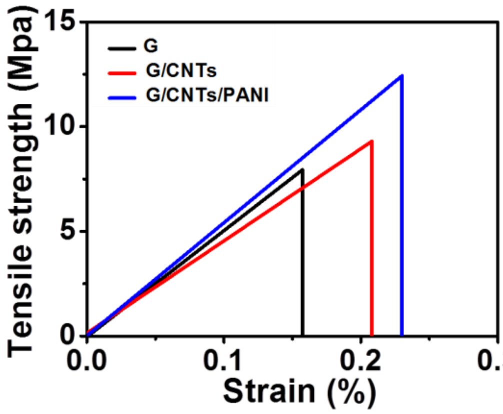

Fig. S7 Tensile strength-strain curves of graphene ribbon, G/CNTs fiber and G/CNTs/PANI fiber.

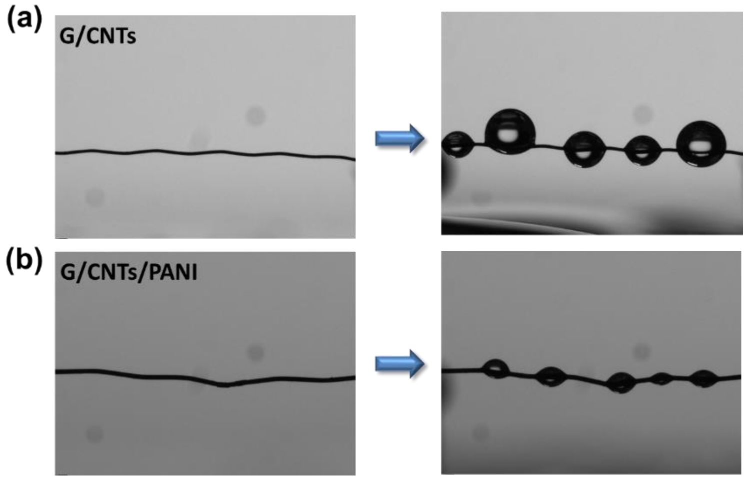

Fig. S8 Photographs of water droplets on G/CNTs fiber (a) and G/CNTs/PANI electrodes (b).

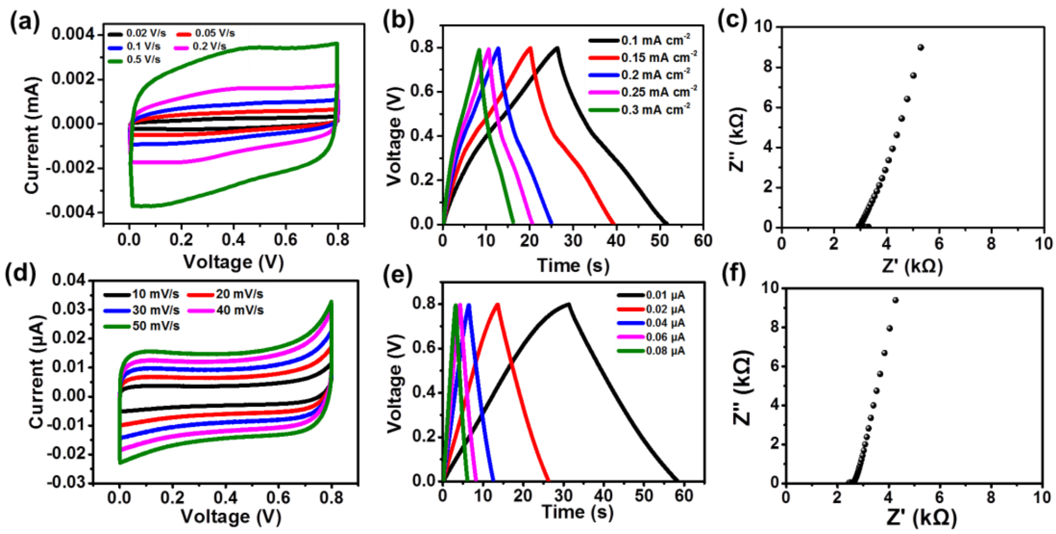

Fig. S9 **a** CV curves of a fiber-shaped supercapacitor at scan rates range from 0.05 V s^{-1} to 0.5 V s^{-1}. **b** GCD curves of the supercapacitor under different current density. **c** Nyquist plot of the supercapacitor within frequency from 10^{-2} to 10^{5} Hz. **d** CV curves of a fiber-shaped supercapacitor at scan rates range from 0.01 V s^{-1} to 0.05 V s^{-1}. **e** GCD curves of the supercapacitor under different current densities. **f** Nyquist plot of the supercapacitor within frequency from 10^{-2} to 10^{5} Hz.

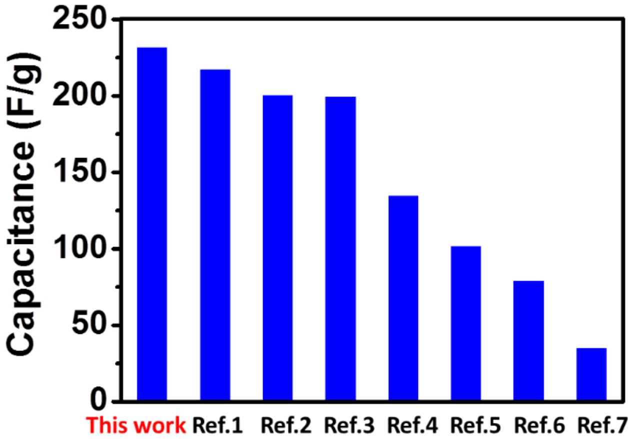

Fig. S10 Comparison of gravimetric capacitance of our supercapacitors with other reported supercapacitors based on CNT/PANI electrodes [1-7].

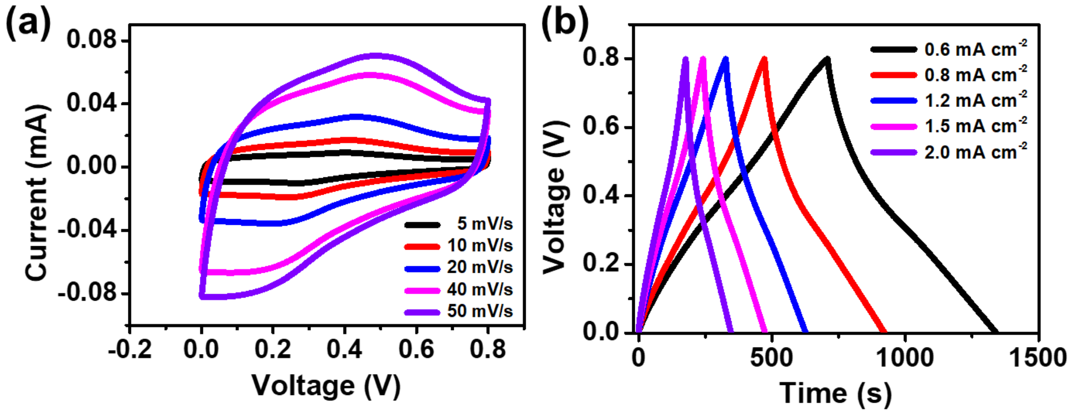

Fig. S11 CV curves and GCD curves of fiber supercapacitor based on G/CNTs/PANI hollow fiber with PANI mass loading of 84.5%.

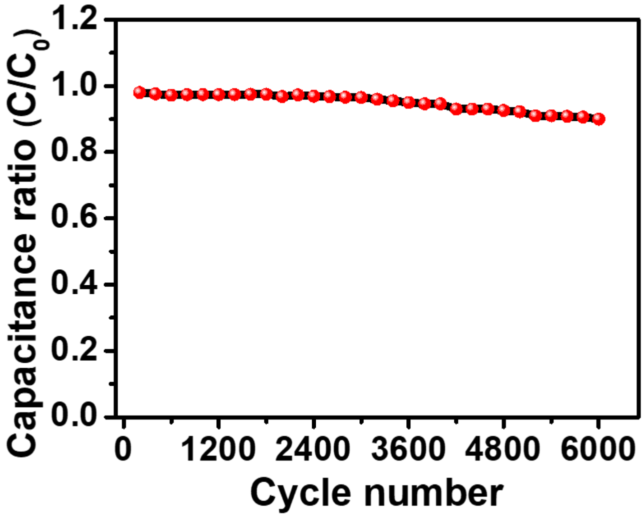

Fig. S12 Cyclic performance of the fiber shaped supercapacitor.

Table S1. Comparison of our fiber shaped supercapacitor with other reported results.

Device shape (state of electrolyte)	Configuration	Specific capacitance (mF cm^{-2})	Reference
fiber (gel)	Graphene/CNTs/PANI	**472**	**This work**
fiber (gel)	CNT/PANI array	37	[8]

fiber (gel)	CNT/PPy//CNT/MnO_2	60.435	[9]
fiber (gel)	CNT/graphene	4.97	[10]
fiber (gel)	rGO/PEDOT:PSS	304.5	[11]
fiber (gel)	rGO-Ni-polyester	72.1	[12]
fiber (liquid)	PANI/ Stainless steel	41	[13]
fiber (gel)	ppy/CNT	69	[14]
fiber (gel)	PEDOT@MnO_2// C@Fe_3O_4	127	[15]
fiber (gel)	RGO /CNT@CMC	177	[16]

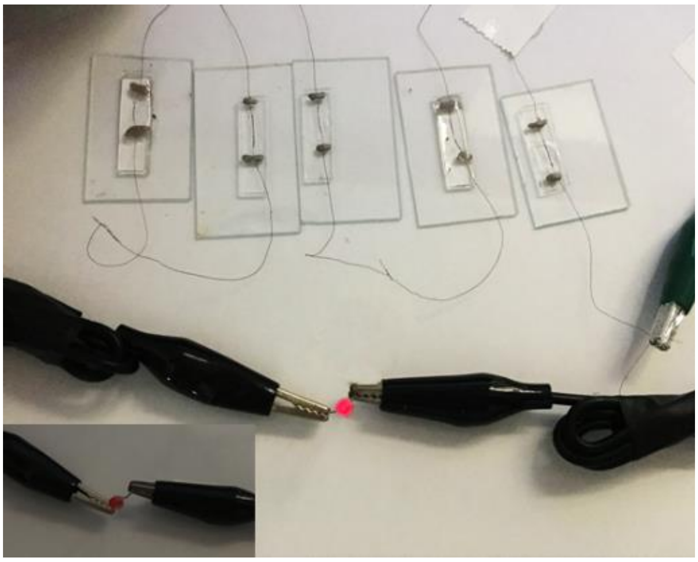

Fig. S13 Digital photograph of five fiber supercapacitors connected in series to power a LED. The insert shows an LED without being powered.

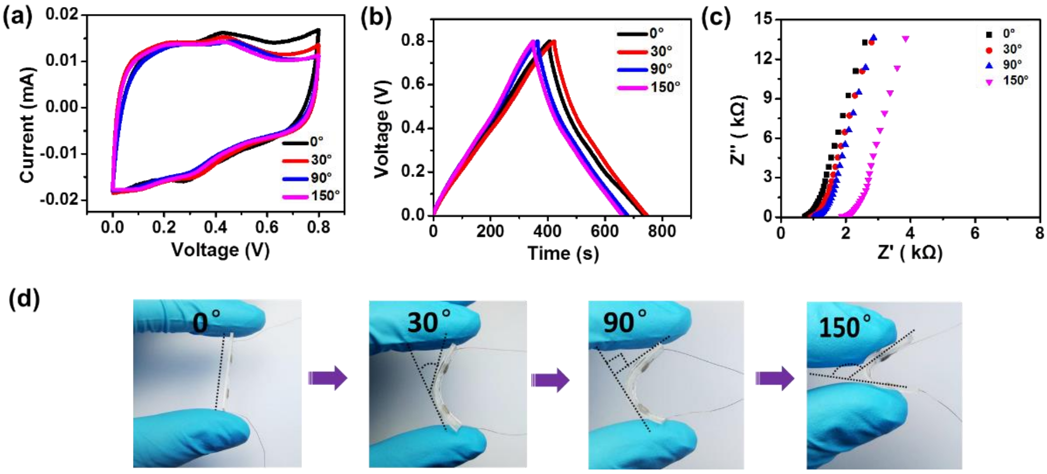

Fig. S14 a CV curves (10 mV s^{-1}), **b** GCD curves (1 mA cm^{-2}) and **c** Nyquist curves (10^{-2}-10^{5} Hz) of a fiber-shaped supercapacitor under different bending angles. **d** Digital photographs of a fiber-shaped supercapacitor under different bending states (0°, 30°, 90° and 150°).

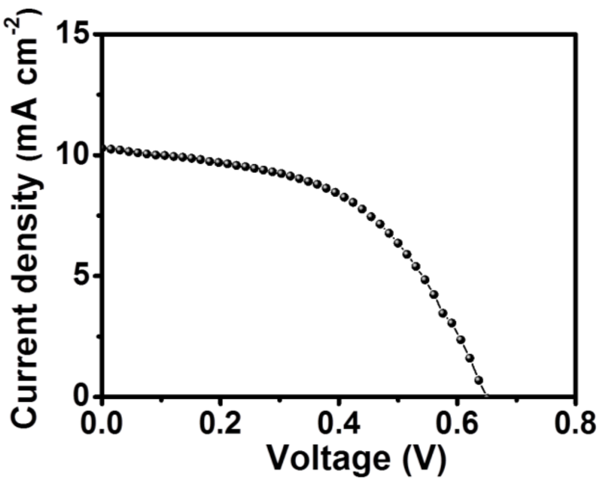

Fig. S15 *J*-*V* curve of a DSSC by using Pt wire as the counter electrode.

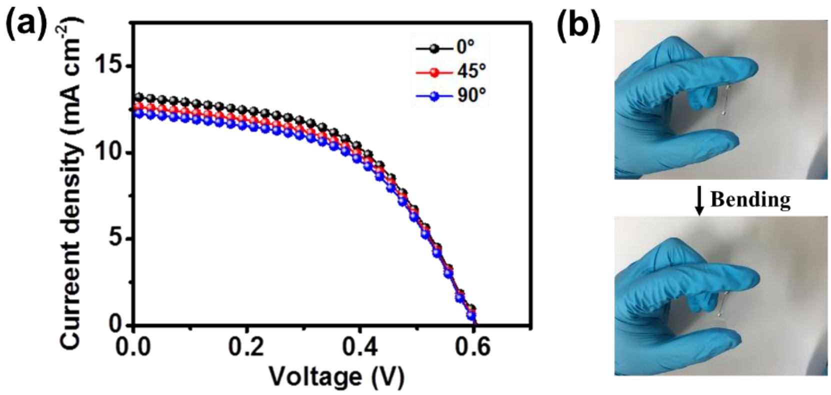

Fig. S16 *J-V* curves and digital photographs of a fiber-shaped DSSC on an elastic substrate under different bending states.

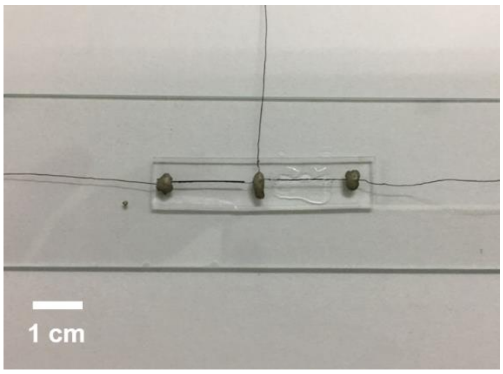

Fig. S17 Digital photograph of an integrated energy conversion and storage device.

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