Construction of Microfluidic-Oriented Polyaniline Nanorod arrays /Graphene Composite Fibers towards Wearable Micro-Supercapacitors

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Supplementary Table S1. EIS molding data. Parameter values from curve-fitting of the impedance results shown in Figure 3e by using the equivalent circuit described in Figure S7.

	R_0/Ω	$C_1/\mu F\ s^{n1-1}$	n_1	R_1/Ω	Zw/Ω	$C_2/\mu F$	n_2
G fiber	**286.6**	**0.18xe^{-3}**	**0.89**	**14.5**	**5.3**	**1.6**	**0.90**
PNA/G fiber	**263.7**	**0.23xe^{-3}**	**0.82**	**9.8**	**9.5**	**4.5**	**0.91**

Supplementary Table S2. The energy densities of different fibers based micro-supercapacitors.

	Electrode material	Energy density (μWh cm^{-2})	References
1	RGO	0.17	[1]
2	Ni@MnO_2	1.04	[2]
3	CNT@Co_3O_4	1.2	[3]
4	N-doped CNT	1.3	[4]
5	RGO+CNT	3.84	[5]
6	G/PPy	9.7	[6]
7	GCP-35@CMC	14.5	[7]
8	Our work	37.2	

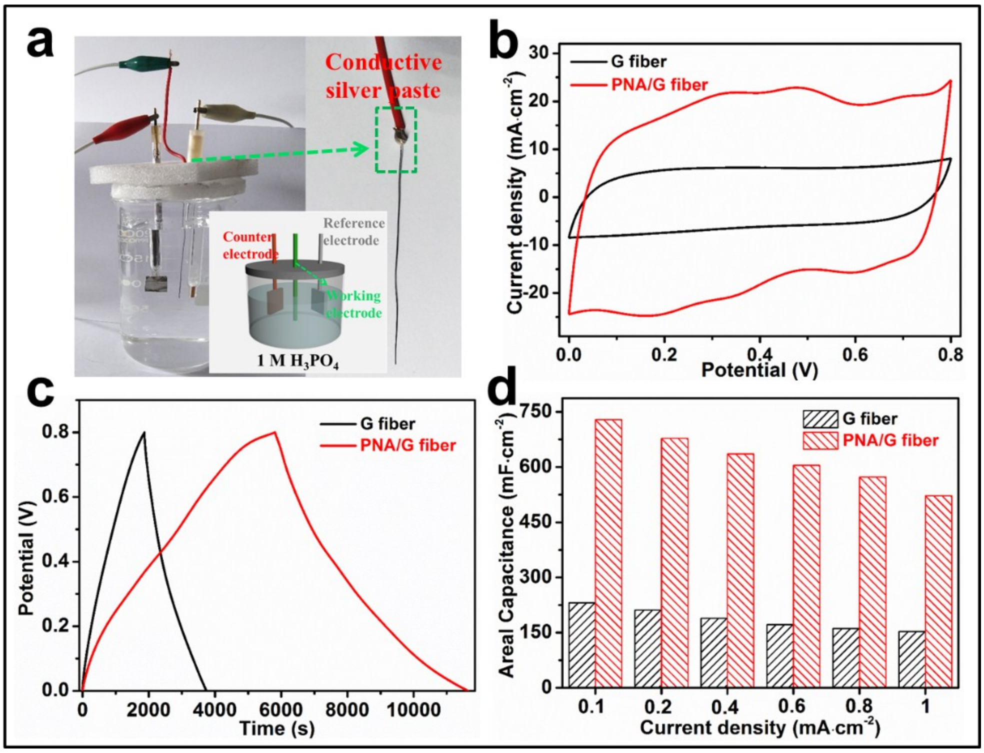

Fig. S1. Electrochemical performance testing in a three-electrode system in 1M H_3PO_4 aqueous solution. a) Photo of three-electrode system. The insert is schematic illustration of three-electrode system. b) CV curves of G and PNA/G fibers under the scan rates 50 mV s^{-1}. c) Charge–discharge curves of G and PNA/G fibers at current density of 0.1 mA cm^{-2}. d) The areal capacitance comparison diagram between G fiber and PNA/G fiber.

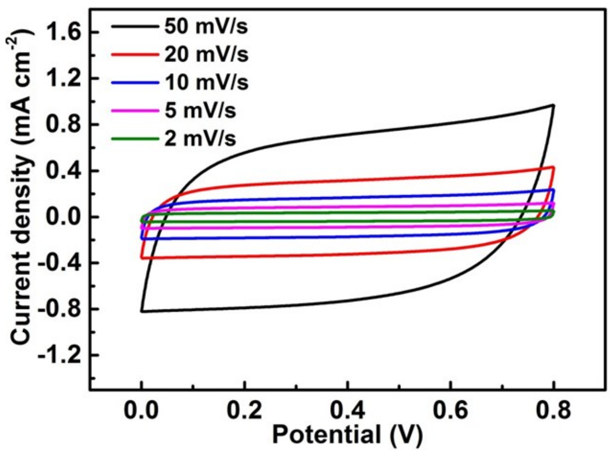

Fig. S2. Cyclic voltammetry of pure graphene fiber at different scan rates in H_3PO_4/PVA gel electrolyte.

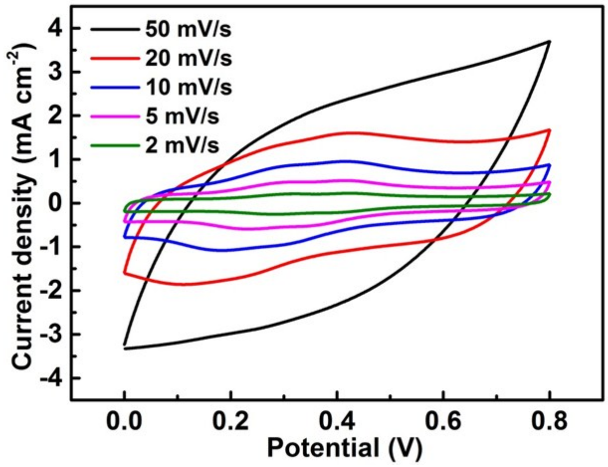

Fig. S3. Cyclic voltammetry of PNA/G composite fiber at different scan rates in H_3PO_4/PVA gel electrolyte.

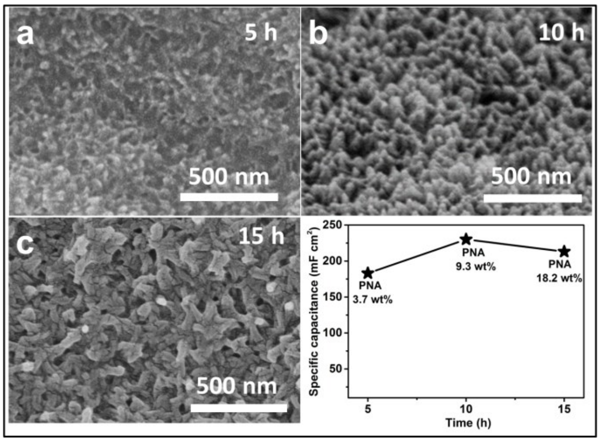

Fig. S4. The surface SEM images of PNA/G fiber at different polymerization times and the specific capacitances of PNA/G fiber in H3PO4/PVA gel electrolyte at different PNA contents after different polymerization times.

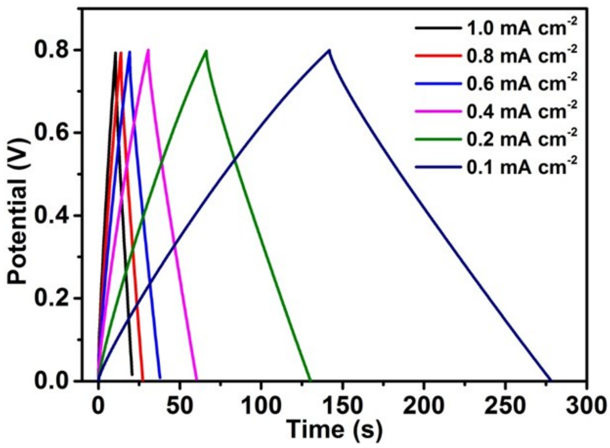

Fig. S5. Charge-discharge curves of pure graphene fiber at different current densities in H_3PO_4/PVA gel electrolyte.

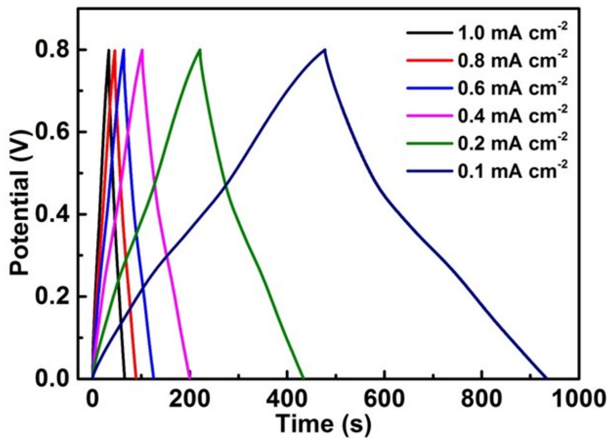

Fig. S6. Charge-discharge curves of PNA/G composite fiber at different current densities in H_3PO_4/PVA gel electrolyte.

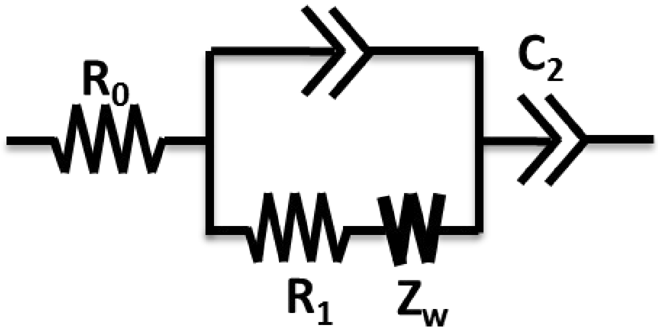

Fig. S7. The equivalent circuit model of micro-supercapacitors.

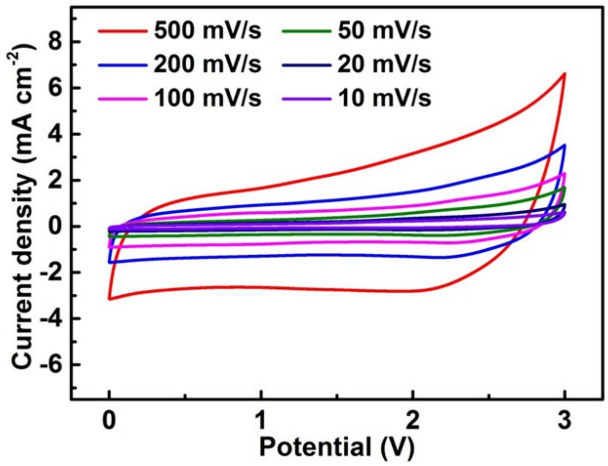

Fig. S8. Cyclic voltammetry of pure graphene fiber at different scan rates in EMITFSI/PVDF-HFP gel electrolyte.

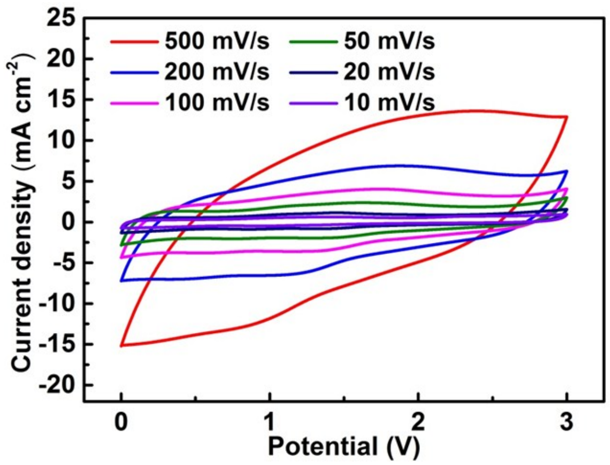

Fig. S9. Cyclic voltammetry of PNA/G composite fiber at different scan rates in EMITFSI/PVDF-HFP gel electrolyte.

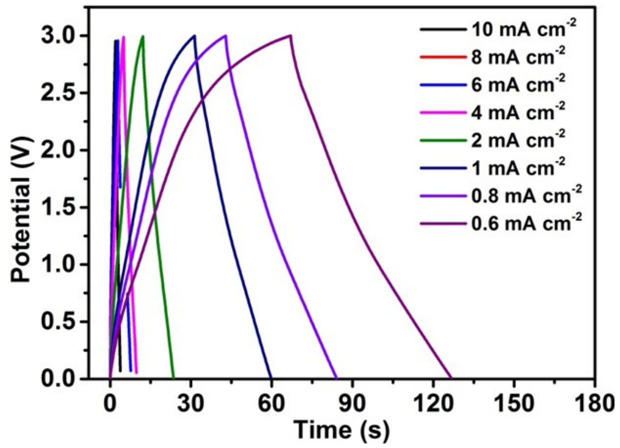

Fig. S10. Charge-discharge curves of pure graphene fiber at different current densities in EMITFSI/PVDF-HFP gel electrolyte.

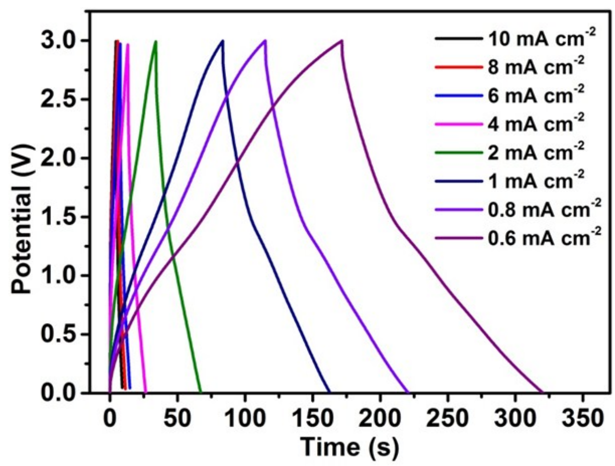

Fig. S11. Charge-discharge curves of PNA/G composite fiber at different current densities in EMITFSI/PVDF-HFP gel electrolyte.

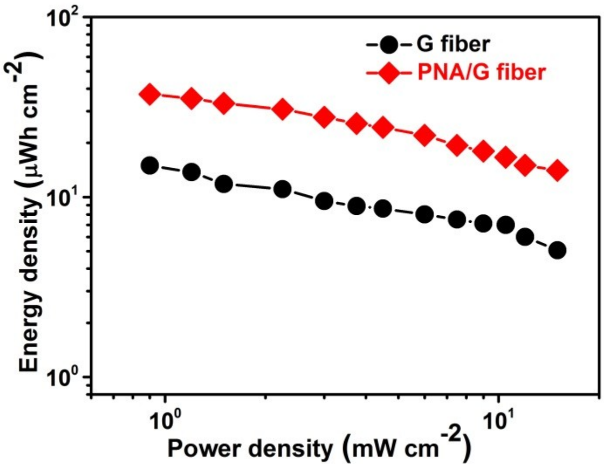

Fig. S12. Energy density versus power density of micro-SCs

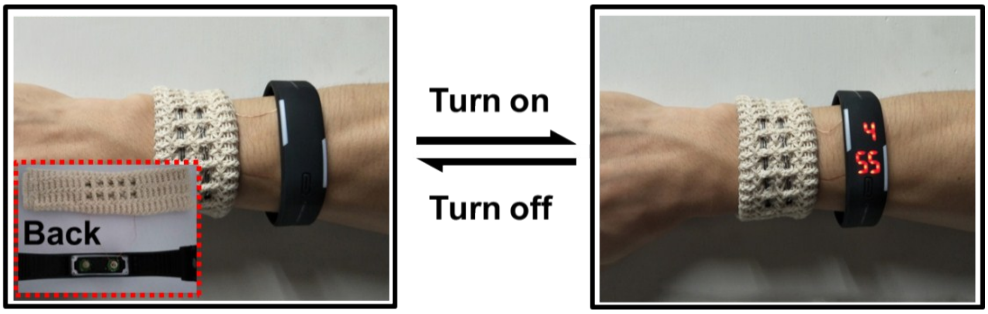

Fig. S13. Photographs of two micro-SCs assembled in parallel to power smart watch. The inset is the back of device.

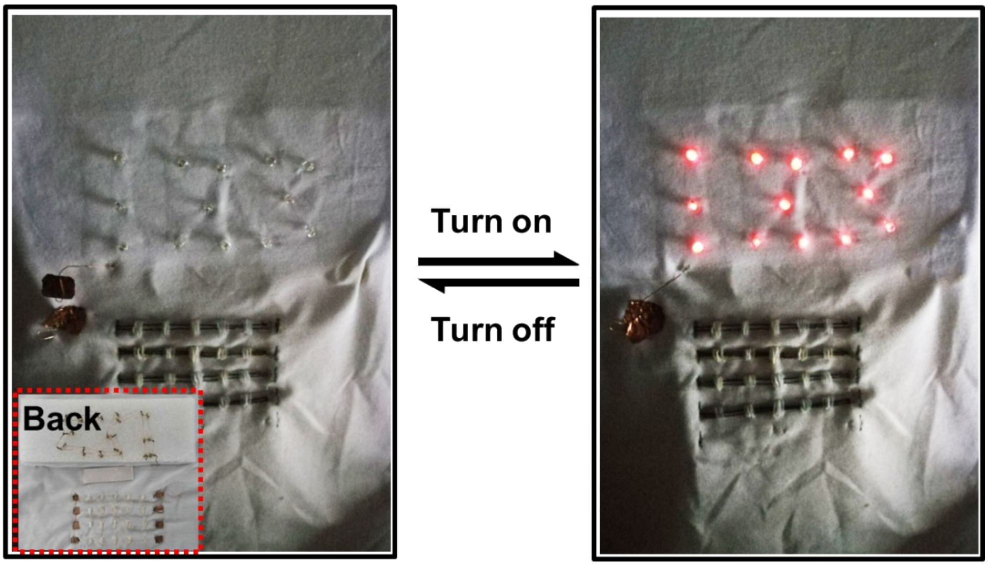

Fig. S14. Photographs of four micro-SCs woven into cloth to light up 13 constructed LEDs “123” logo. The inset is the back of device.

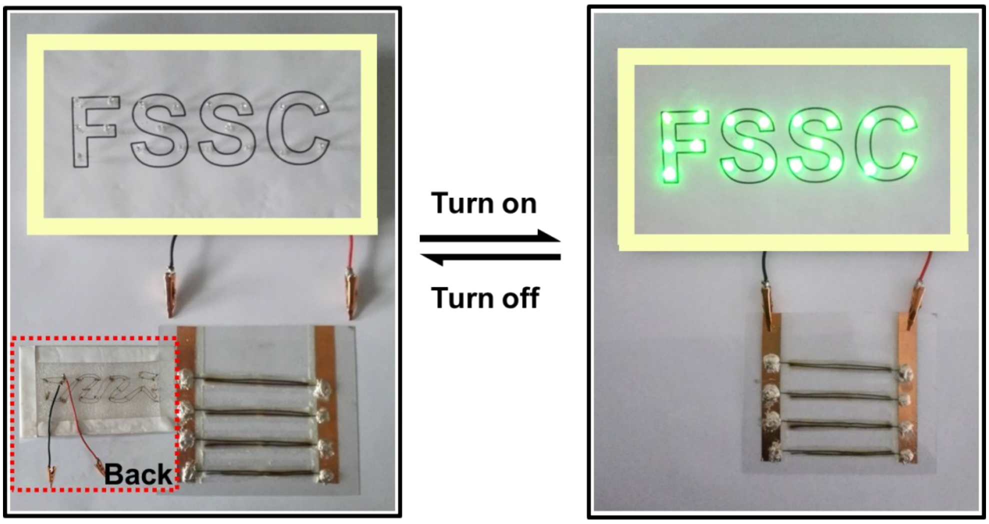

Fig. S15. Photographs of four micro-SCs assembled in parallel to power 19 LEDs constructed “FSSC” logo. The inset is the back of device.

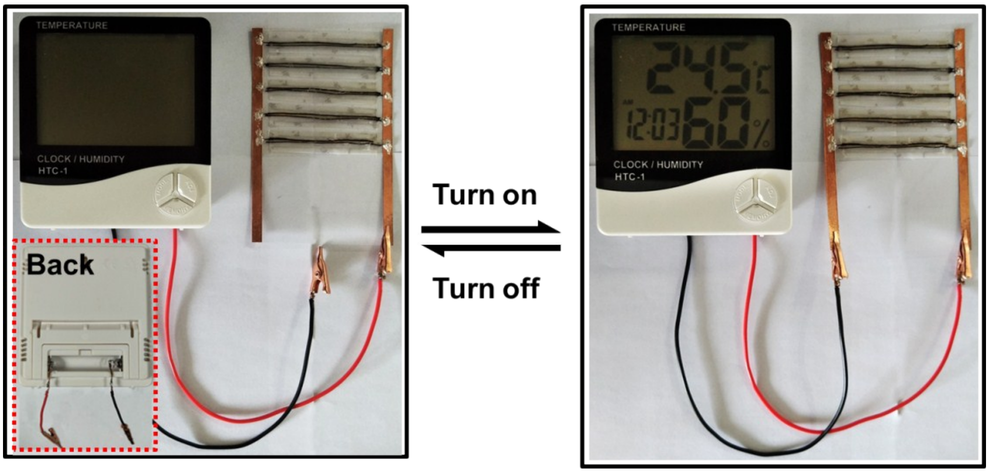

Fig. S16. Photographs of five micro-SCs integrated on polyethylene terephthalate (PET) substrate to drive large-scale monochrome display. The inset is the back of device.

Notes and references

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