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Supporting Information

Facile Fabrication of a Highly-Conductive Hydrogel through Filling with Polyiodide

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S1: the polyiodide solution was fabricated as follows: 0.1 mL HI (57%) was added to 5 mL H_2O, then keep under daylight until the color of the solution remain unchanged. Finally, a brown solution was obtained.

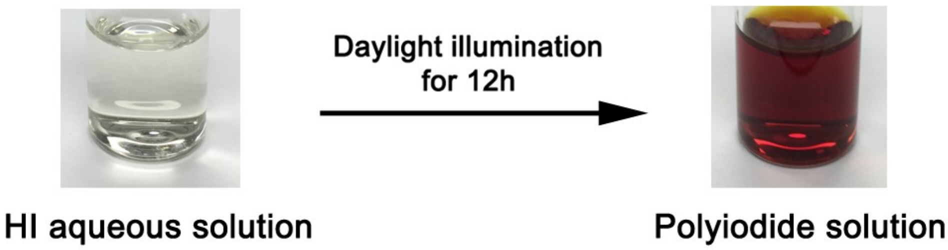

Figure S1. Digital photograph of the HI (0.15 M) and polyiodide aqueous solutions.

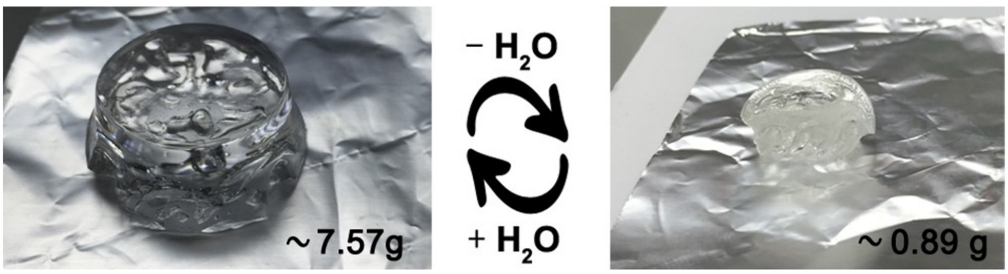

Figure S2. Digital photographs of the PAM hydrogel (7.57 g) and its dehydrated (0.89 g) form can be switched under several turns of dehydrate and hydrate. Even if the hydrogel is dehydrated, it can be rehydrated quickly.

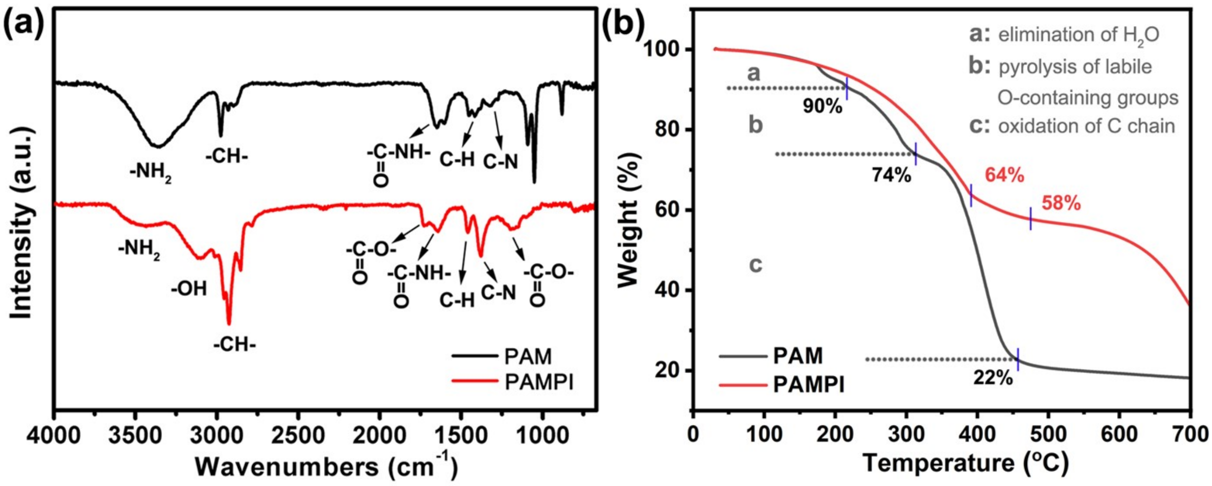

Figure S3. (a) FT-IR spectra and (b) TGA diagrams of PAM and PAMPI, respectively.

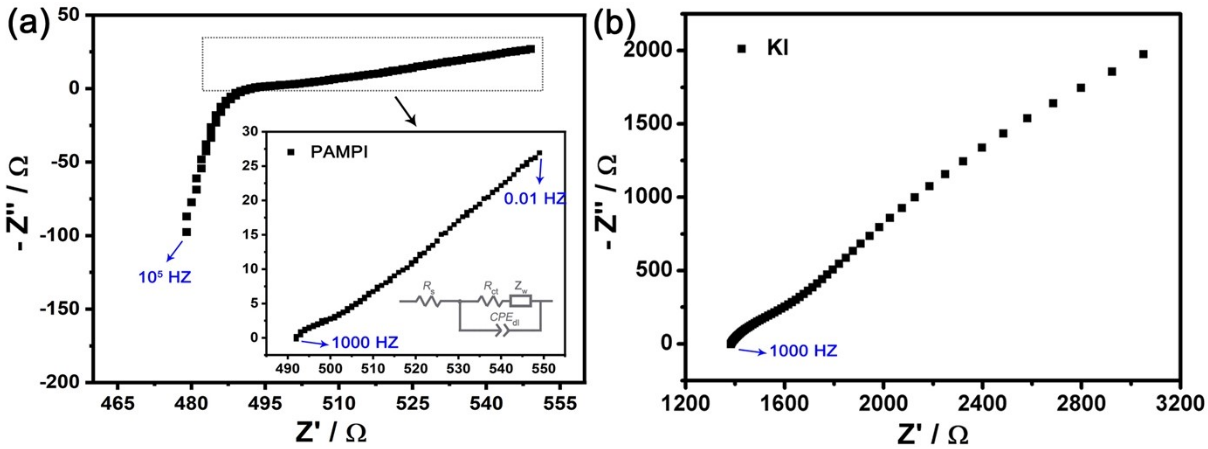

Figure S4. EIS plots of (a) PAMPI (Inset is the local enlargement at the frequency region 1000~0.01 Hz and the corresponding equivalent circuit), and (b) PAM/KI hydrogel .

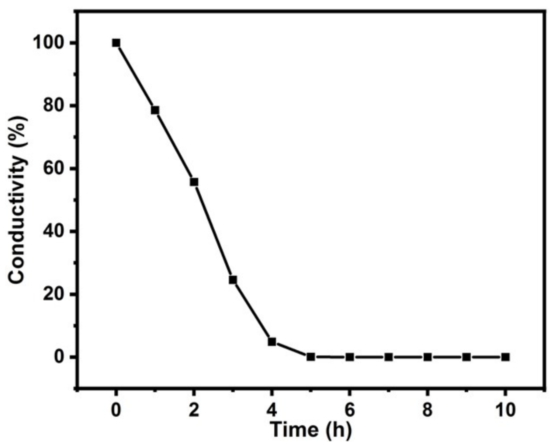

Figure S5. The relationship between the conductivity and the exposure time of PAMPI in the air.

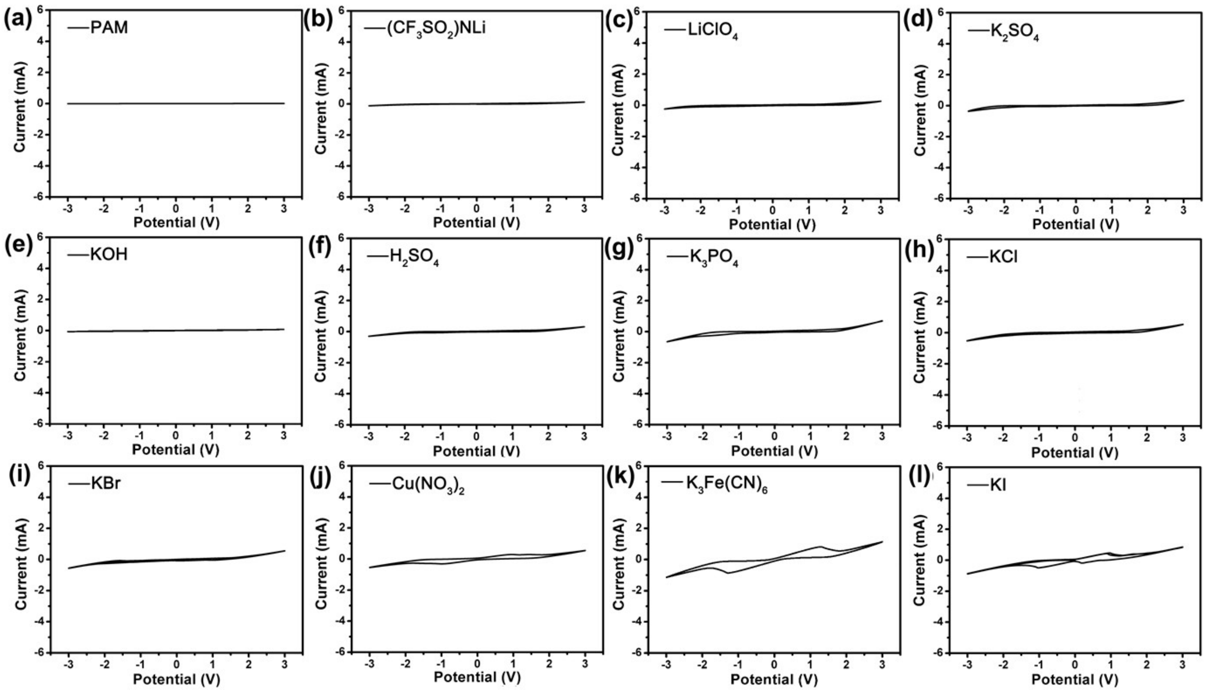

Figure S6. Stable cyclic voltammogram curves of the PAM hydrogel wires filled with or without electrolytes in a two-electrode configuration from -3 V~ 3 V (scan rate: 100 mV/s).

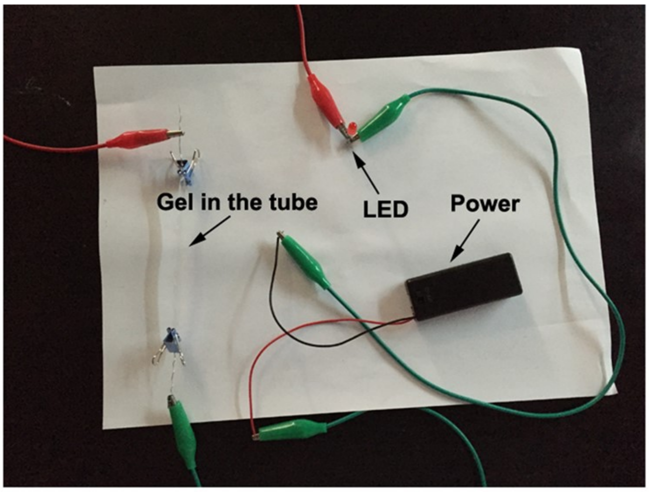

Figure S7. Digital photograph of the hydrogel wire device used to transmit current to illuminated diode bulbs.

Movie S1. The PAMPI hydrogel wire was used to transmit current to light the diode bulb.

Movie S2. The PAM/$K_3Fe(CN)_6$ hydrogel wire was used to transmit current to light the diode bulb.

Movie S3. The PAM/KI hydrogel wire was used to transmit current to light the diode bulb.

Table S1. Comparison of the Specific Capacitance of Micro-sized Carbon Fiber-Based Electrodes

Gels	Conductive factors	Max conductivity (S cm^{-1})	Ref.
PAAM-PVP	LiCl	0.02	[1]
PACMO/PC	LiTFSI	0.00079	[2]
PNIPAM-clay-PDAEA	Clay	0.002	[3]
PVA/TTSBI	Fe^{3+}	0.00216	[4]
PNIPAM	MXene	0.01092	[5]
PVA-PDA	GO	0.0027	[6]
PAM-*co*-PAA	CNTs	0.082	[7]
PDA–PPy–PAM	PPY	0.12	[8]
P(AAm-*co*-HEMA)	PANI	0.0824	[9]
Gelator	Polyiodide	0.011	[10]
PAM	*Polyiodide*	*0.15*	*This work*

Reference:

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