Supporting Information

Facile and fast preparation of stretchable, self-adhesive, moisturizing, antifreezing and conductive tough hydrogel for wearable strain sensors

Yanxia Chao[a], Ying Li[a], Huibin Wang[a], Nan Wang[a], Tao Wang[b,*], Zhuangzhuang Chu[a], Zhuohong Yang[a,*], Yang Hu[a,c,*]

[a]*Key Laboratory for Biobased Materials and Energy of Ministry of Education, College of Materials and Energy, South China Agricultural University, Guangzhou 510642, China*

[b]*Research Institute of Materials Science, South China University of Technology, Guangzhou 510640, China*

[c]*Key Laboratory of Polymer Processing Engineering (South China University of Technology), Ministry of Education, Guangzhou 510640, China*

*** Corresponding Authors:**

Tao Wang, Zhuohong Yang, Yang Hu

Tel.: +86 020 87344836

E-mail address: fetwang@scut.edu.cn (T. Wang); yangzhuohong@scau.edu.cn (Z.H. Yang); huyang0303@scau.edu.cn (Y. Hu)

Table S1 The formulation of the hydrogels

Sample	AM (g)	PEI (g)	LiCl (g)	SF (mL)	MBAA (g)	APS (g)	H_2O (mL)
PS_5L_0	3.6	0.4	0	5	0.007	0.1	7
PS_5L_1	3.6	0.4	1	5	0.007	0.1	7
PS_5L_2	3.6	0.4	2	5	0.007	0.1	7
PS_5L_3	3.6	0.4	3	5	0.007	0.1	7
PS_0L_2	3.6	0.4	2	0	0.007	0.1	12
$PS_{2.5}L_2$	3.6	0.4	2	2.5	0.007	0.1	9.5
PS_5L_2	3.6	0.4	2	5	0.007	0.1	7
$PS_{7.5}L_2$	3.6	0.4	2	7.5	0.007	0.1	4.5

Table S2 Comparison between this work and recently reported work in terms of maximal tensile strain, adhesive strength, antifreezing temperature and gauge factor.

Sample	Maximal strain (%)	Adhesive strength (kPa)	Temperature range (^oC)	Gauge factor
[1]$CA_{x:1}$–3M Ca^{2+}	78	-	-50 to 25	0.225 (0-60)
[2]PDA-CF-PAAm	700	23.99	Room temperature	2.67 (0-200)
[3]GHP	1600	8	-40 to 25	1 (100-600) 2 (600-1000)
[4]THP	1400	31	Room temperature	1.05 (100-200)
[5]PBST	>1000	8	Room temperature	1.66 (0-650)
[6]PGN	570.7	-	-20	1.96 (0-100) 4.01 (100-300)
[7]PVA-TA-EGaIn	<350	-	-10	2.59 (0-50)
PSL (This work)	719	72.52	-40 to 25	1.61 (100-200) 2.47 (200-400) 3.18 (400-600)

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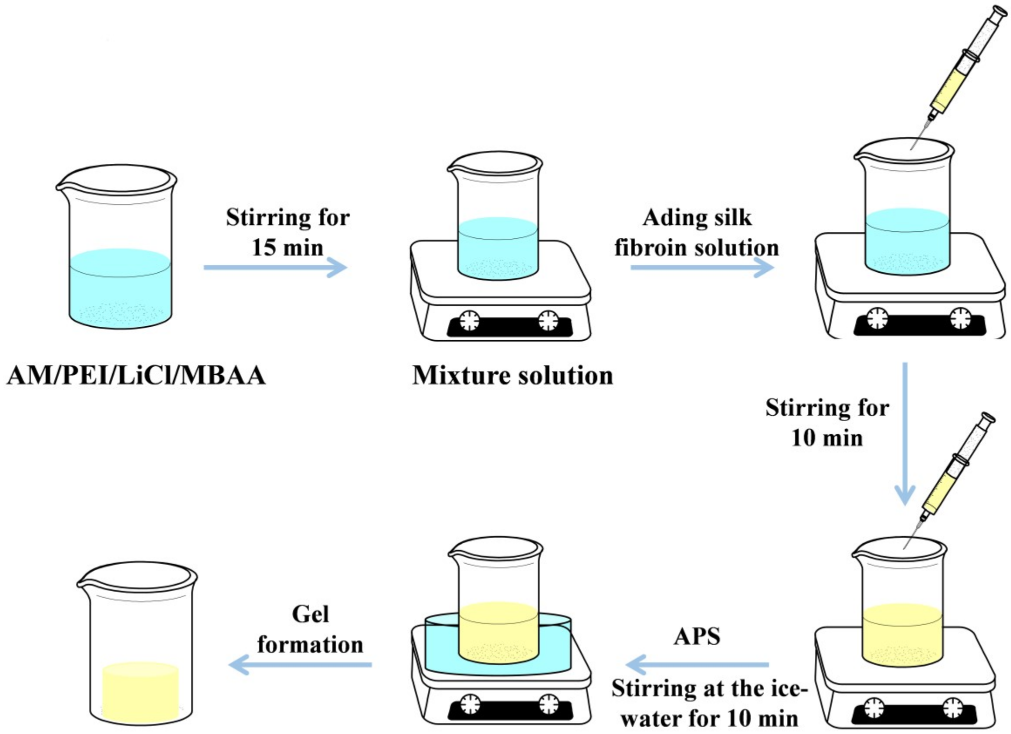

Fig. S1 The experimental flow chart for the preparation of PSL hydrogels.

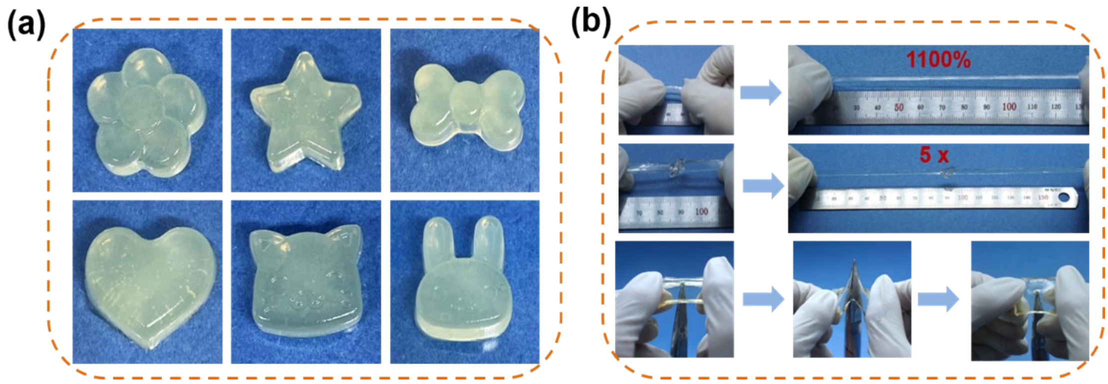

Fig. S2 (a) The free mouldable properties of PS_5L_2 hydrogels. (b) The photographs of PS_5L_2 hydrogels with the tensile, knotting tensile and perforation test.

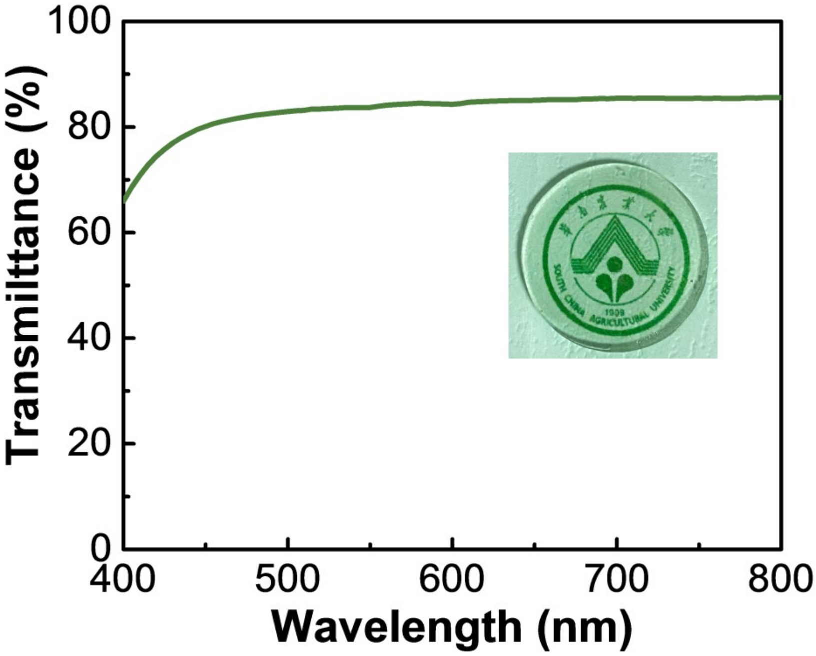

Fig. S3 Optical transmittance of PSL hydrogel versus wavelength.

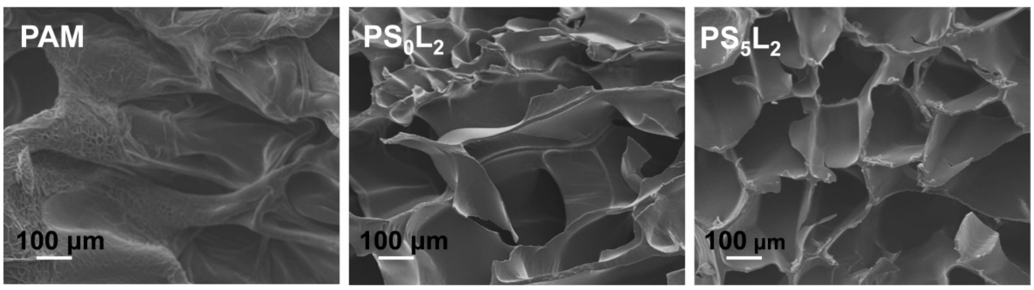

Fig. S4 SEM images of the lyophilized PAM, PS_0L_2 and PS_5L_2 hydrogels.

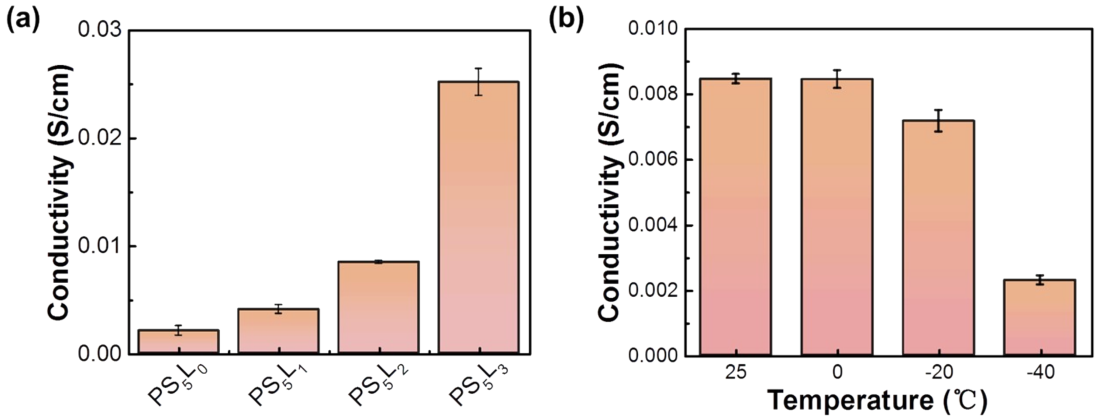

Fig. S5 Electrochemical performance of PSL hydrogels. (a) Conductivity of PSL hydrogels prepared with different LiCl concentrations at 25 °C. (b) Conductivity of PS_5L_2 hydrogels over the temperature range from 25 to -40 °C.

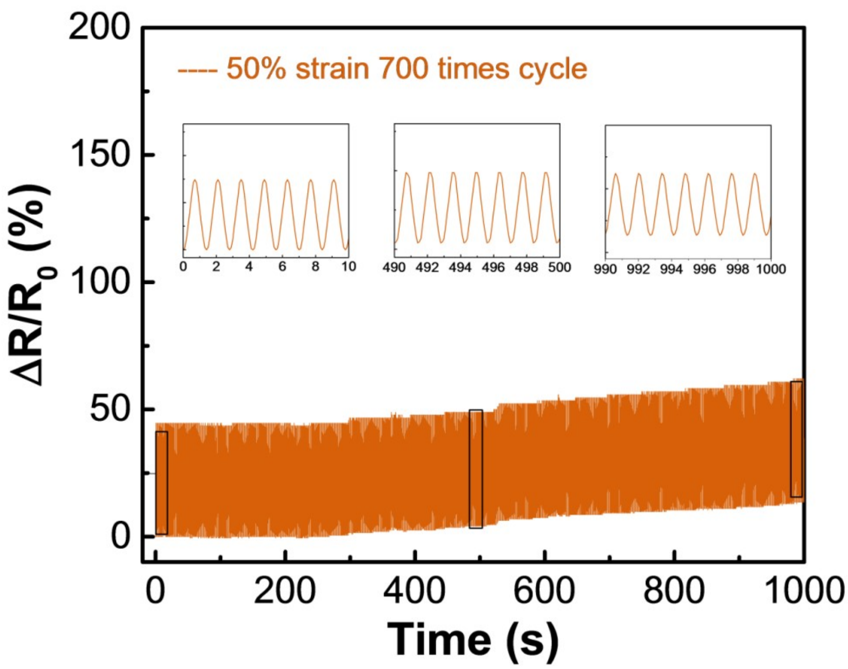

Fig. S6 $\Delta R/R_0$ of the cyclic strain response of the PS_5L_2 hydrogel-based sensor at 50% strain for 700 cycles, the insets show the enlargement of indicated local data.

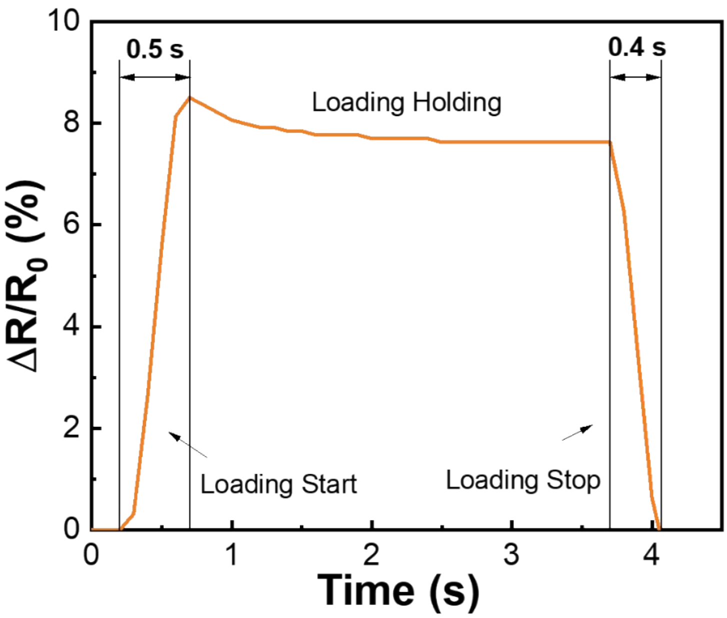

Fig. S7 Response times of PS_5L_2 hydrogels upon loading and unloading of blowing behavior.

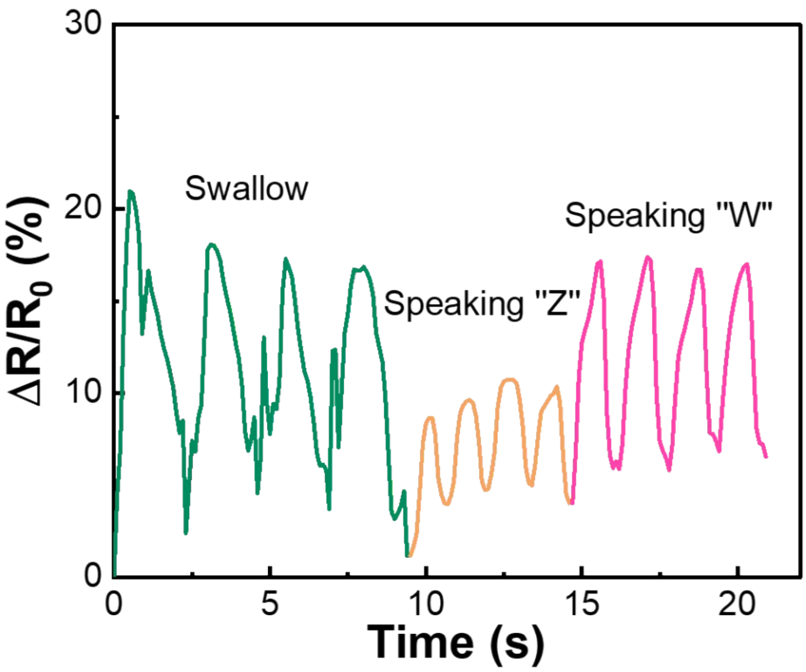

Fig. S8 Relative change in resistance response to swallowing and speaking “Z” and “W”.