Supporting Information for

A conductive hydrogel with excellent self-adhesion, sensitivity, and stability for wearable strain sensors to monitor human motion

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Table S1. The compositions of the PAA/CS-DOPA/Zn^{2+} hydrogels.

Sample	AA (g)	CS-DOPA (g)	MBA (mg)	$ZnCl_2$ (g)	APS (g)	H_2O (g)
PAA	2.5	0	3	0.3	0.025	7.5
PAA/CS-$DOPA_{0.5}$/Zn^{2+}	2.5	0.05	3	0.3	0.025	7.5
PAA/CS-$DOPA_1$/Zn^{2+}	2.5	0.1	3	0.3	0.025	7.5
PAA/CS-$DOPA_{1.5}$/Zn^{2+}	2.5	0.15	3	0.3	0.025	7.5
PAA/CS-$DOPA_{1.75}$/Zn^{2+}	2.5	0.175	3	0.3	0.025	7.5
PAA/CS-$DOPA_2$/Zn^{2+}	2.5	0.2	3	0.3	0.025	7.5
PAA/CS-$DOPA_{2.5}$/Zn^{2+}	2.5	0.25	3	0.3	0.025	7.5
PAA/CS-$DOPA_3$/Zn^{2+}	2.5	0.3	3	0.3	0.025	7.5

Table S2. Absorbance at 290 nm for various concentrations of DOPA standard solutions

Concentration of L-DOPA (mg/ml)	Absorbance
0.075	0.59
0.11	0.736
0.135	0.843
0.145	0.891
0.165	1.023

Table S3. Percentage of elements C, N, and O in PAA and PCDZ. (SEM)

	PAA			PCDZ		
Element	Wt %	Wt % sigma	At %	Wt %	Wt % sigma	At %
C	55.99	0.09	62.89	52.70	0.23	59.71
N	0	0.25	0.00	0.47	0.36	0.45
O	44.01	0.09	37.11	46.83	0.2	39.84

Table S4. Percentage of C1s, N1s, O1s and Zn2p in PAA and PCDZ. (XPS)

PAA			PCDZ		
Name	Start BE	Atomic %	Name	Start BE	Atomic %
C1s	284.17	70.14	C1s	284.31	55.49
N1s	401.06	2.51	N1s	401.38	3.06
O1s	531.69	27.35	O1s	532.07	36.46
Zn2p		0	Zn2p	1022.55	4.99

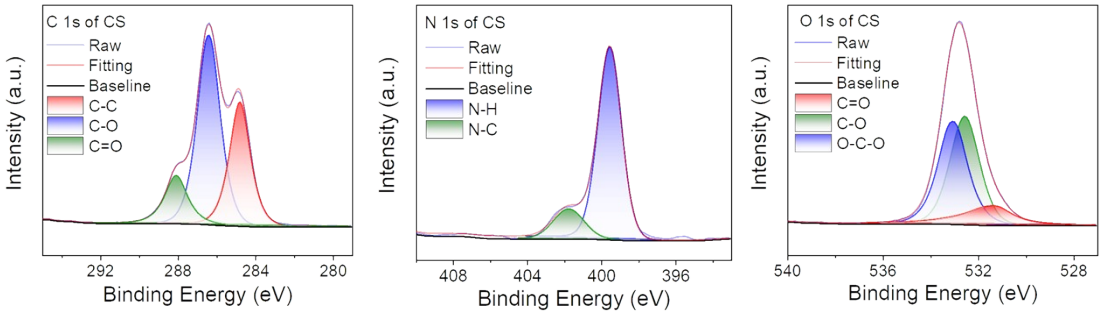

Fig. S1. XPS spectra of C1s N1s and O1s of CS.

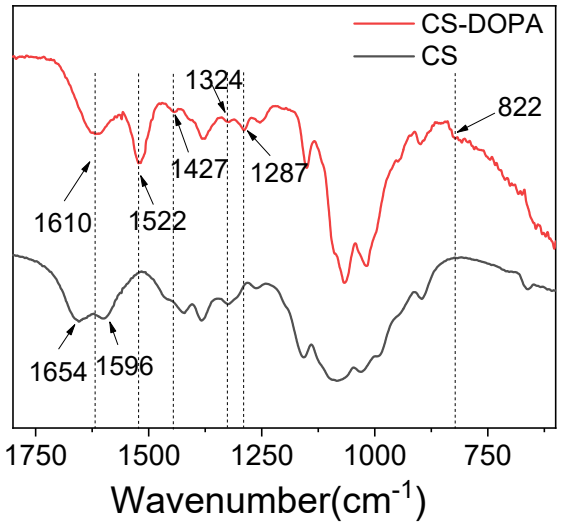

Fig. S2. FT-IR spectra of CS-DOPA.

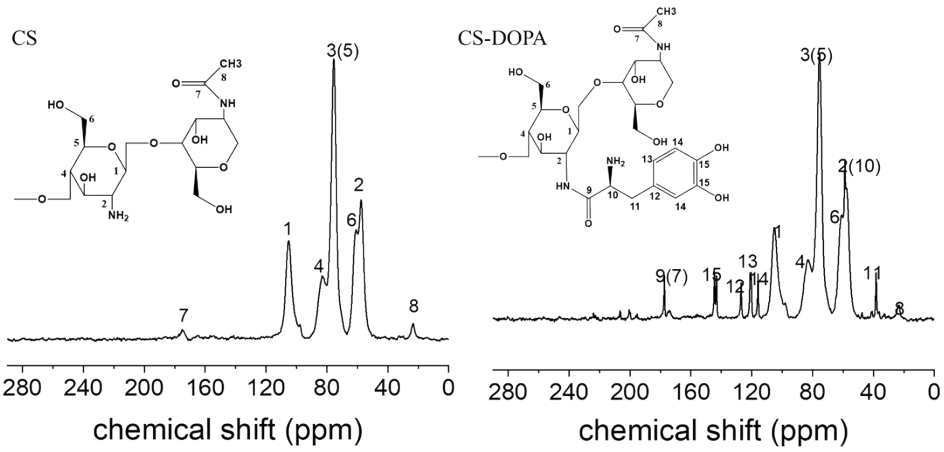

Fig. S3. solid-state ^{13}CNMR and ^{1}HNMR spectra of CS and CS-DOPA.

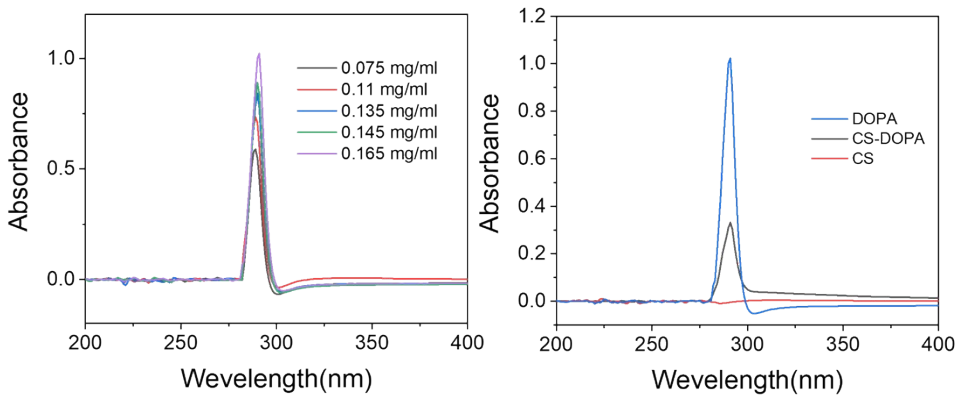

Fig. S4. UV-vis spectra for varying CS-DOPA concentrations and UV-vis spectra for CS, CS-DOPA, and DOPA at 16 mg/ml.

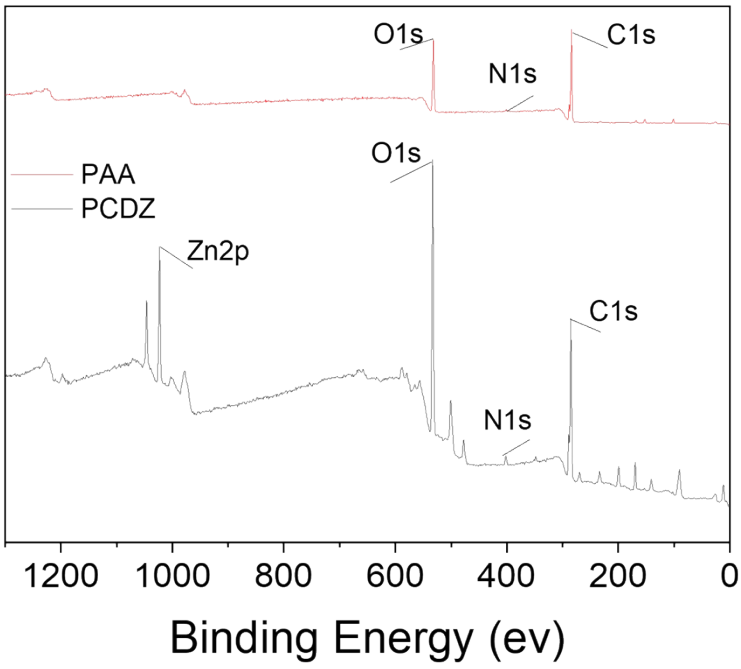

Fig. S5. X-ray photoelectron spectroscopy (XPS) of PAA and PCDZ.

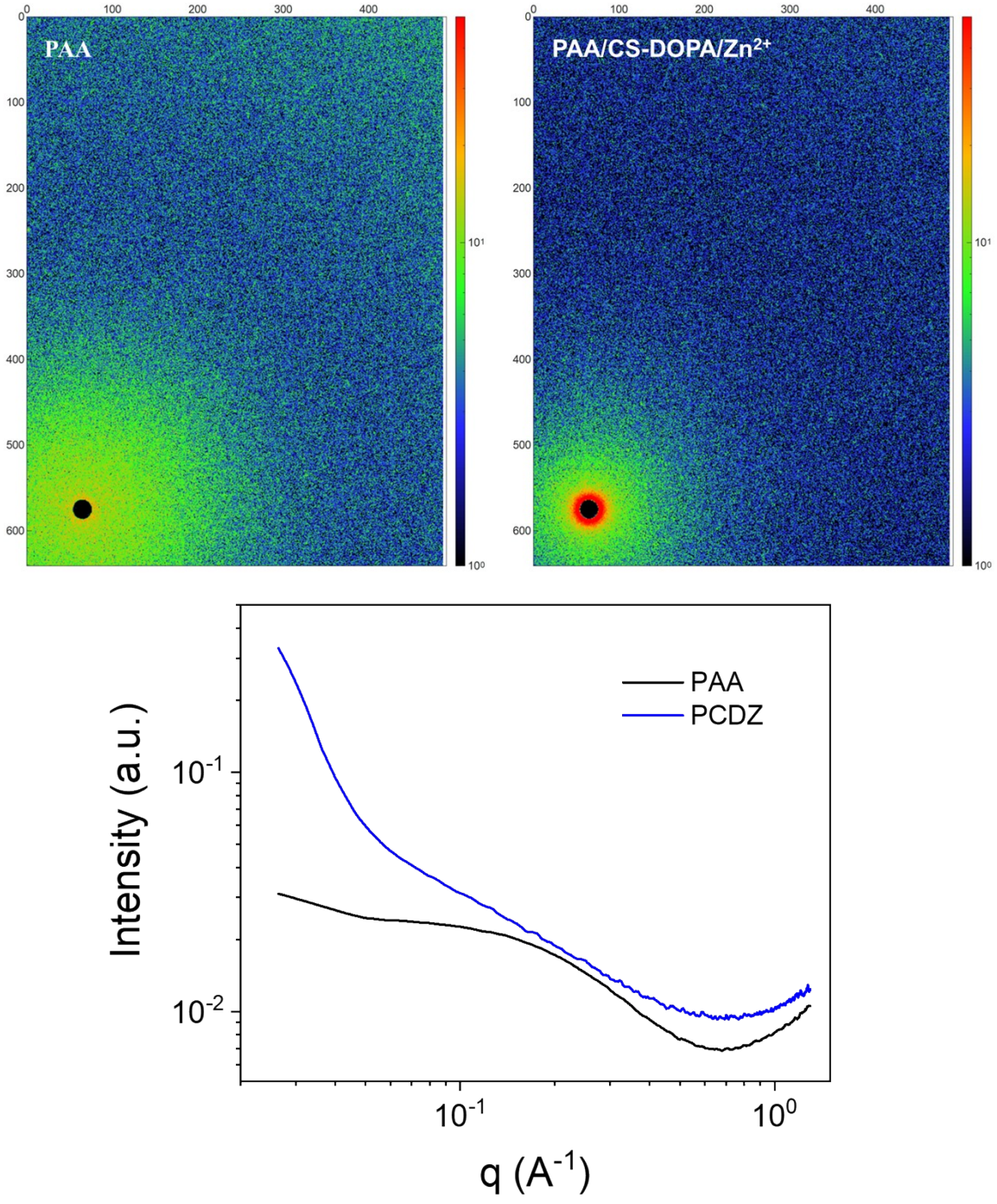

Fig. S6. 2D SAXS and SAXS profiles of PAA and PCDZ hydrogels

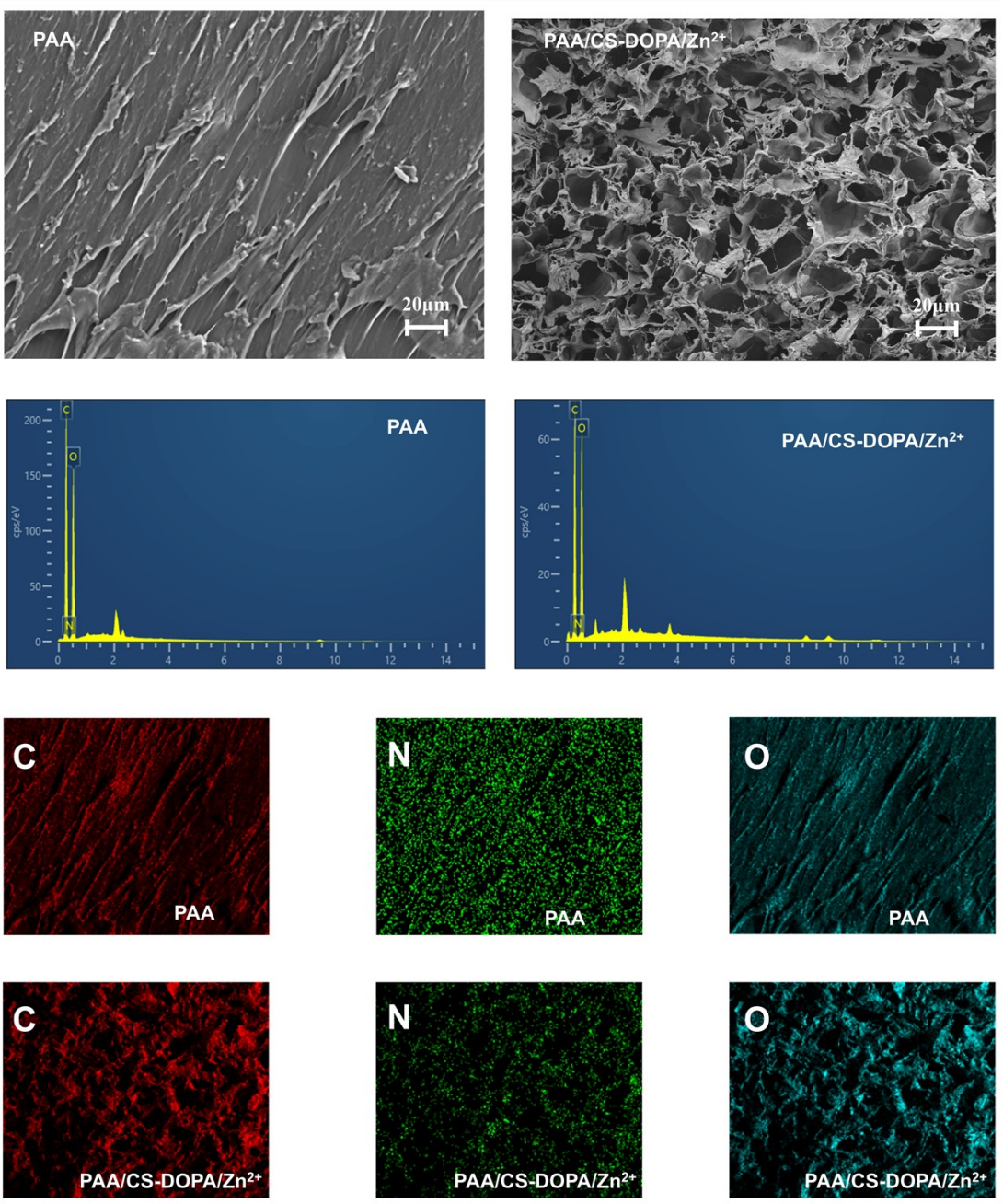

Fig. S7. The SEM and EDS of PAA and PCDZ, and its corresponding C, N and O EDS mappings.

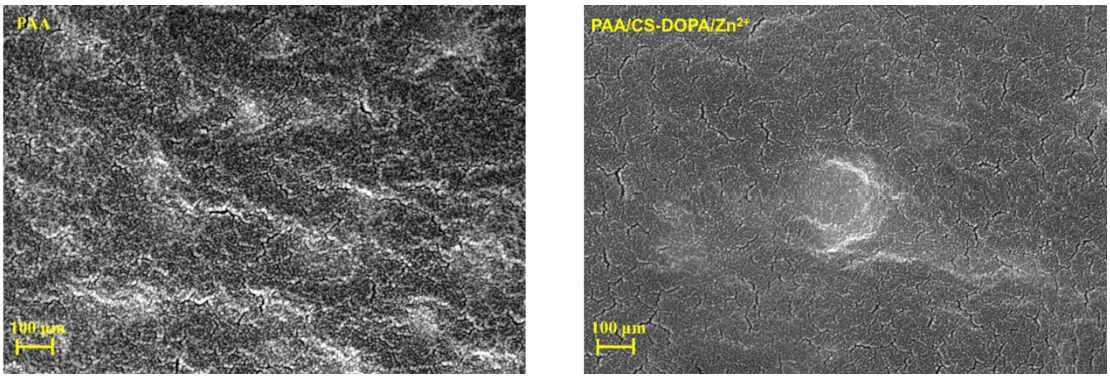

Fig. S8. The FESEM of PAA and PCDZ

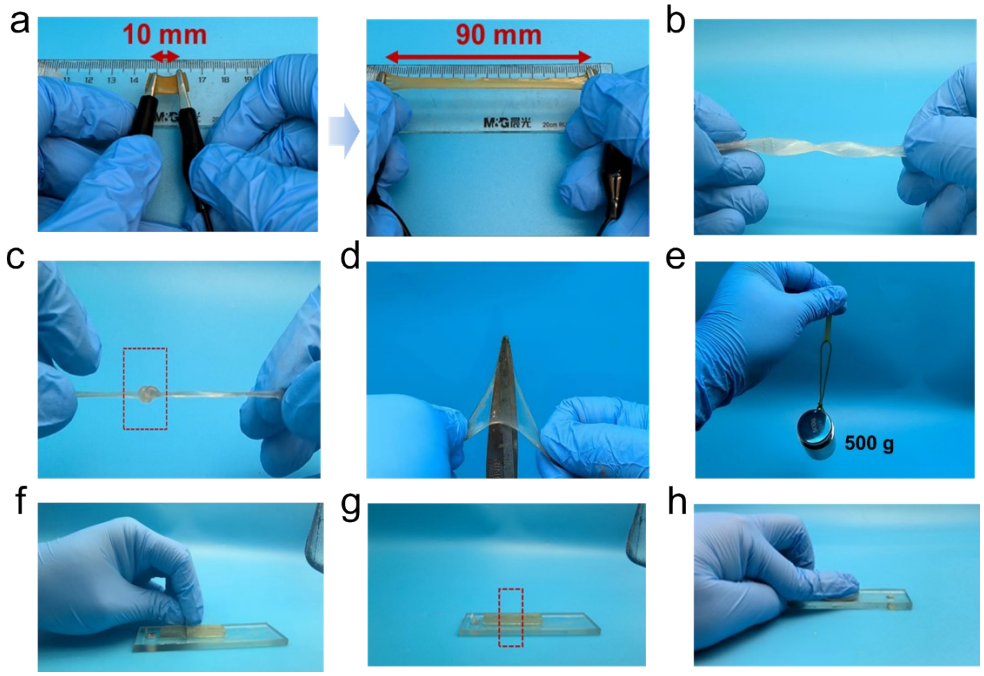

Fig. S9. Pictures of PCDZ hydrogels (a) stretching, (b) twisting, (c) knotting, (d) puncturing, (e) lifting a weight of 500g, (f) being pressed by a razor blade, (g) springing back and (h) compression.

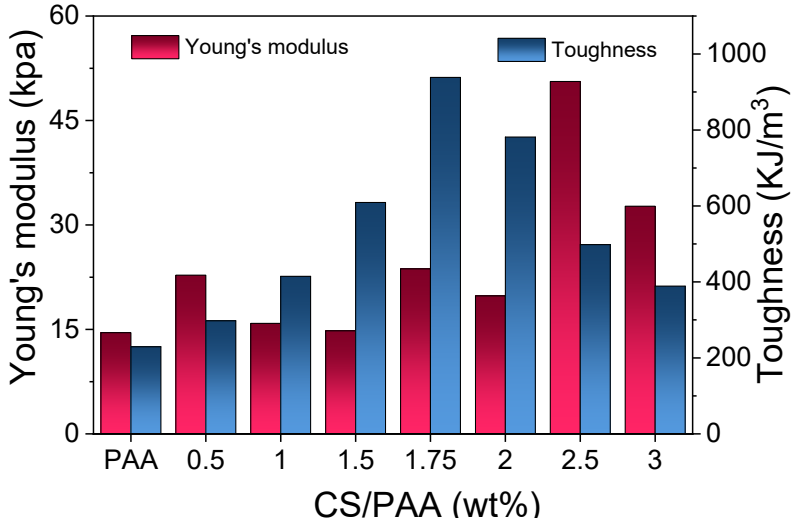

Fig. S10. Young modulus and toughness of PCDZ hydrogels with different CS-DOPA

contents.

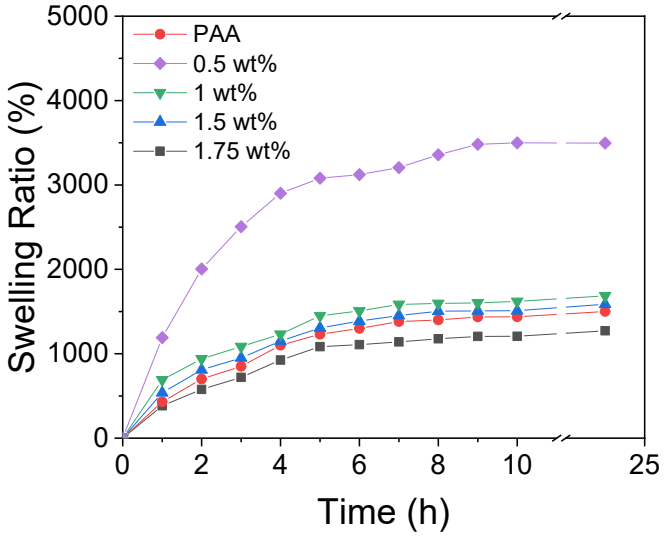

Fig. S11. Swelling curves of hydrogels with different CS-DOPA contents.

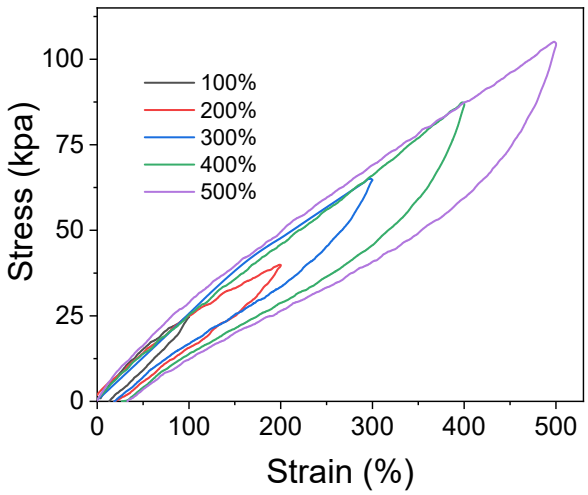

Fig. S12. Continuous tensile loading-unloading curves of hydrogels at different strains during stretching.

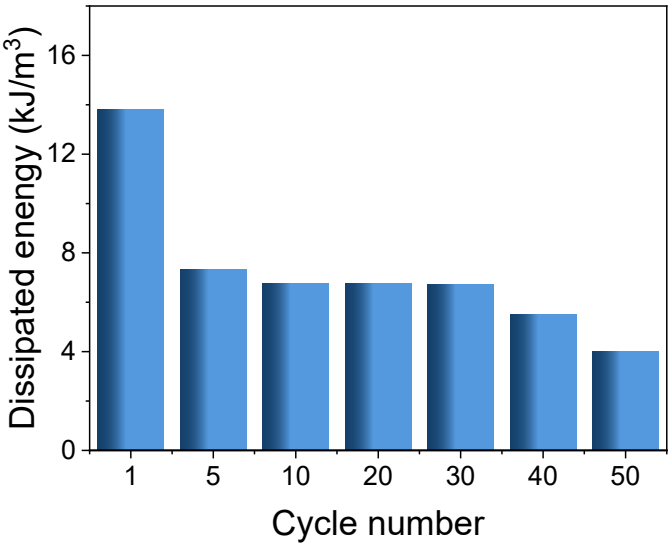

Fig. S13. Dissipated energy of hydrogels at various strains during the stretching process.

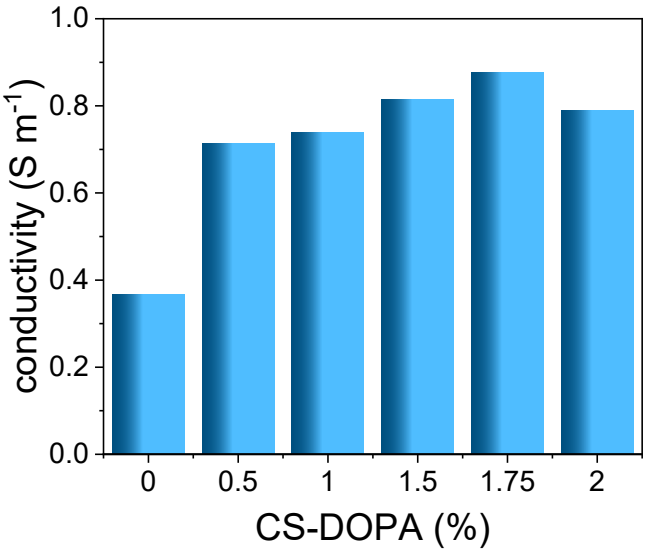

Fig. S14. Conductivity of hydrogels with different CS-DOPA contents.

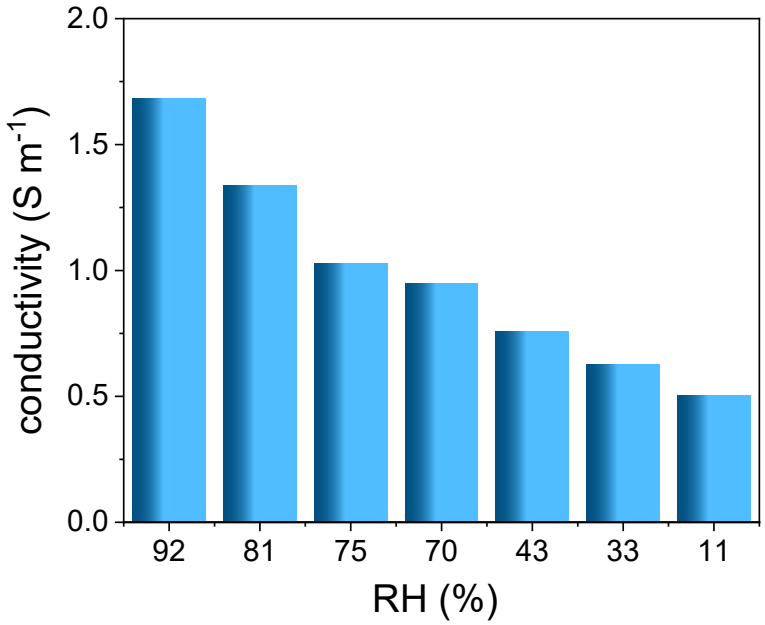

Fig. S15. Conductivity of hydrogels at various humidity levels.

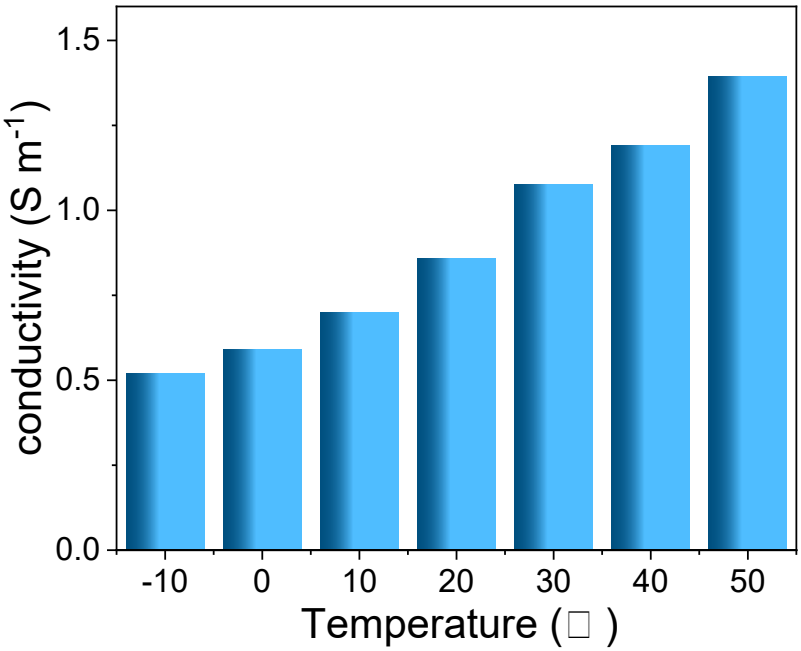

Fig. S16. Conductivity of hydrogels at varying temperatures.

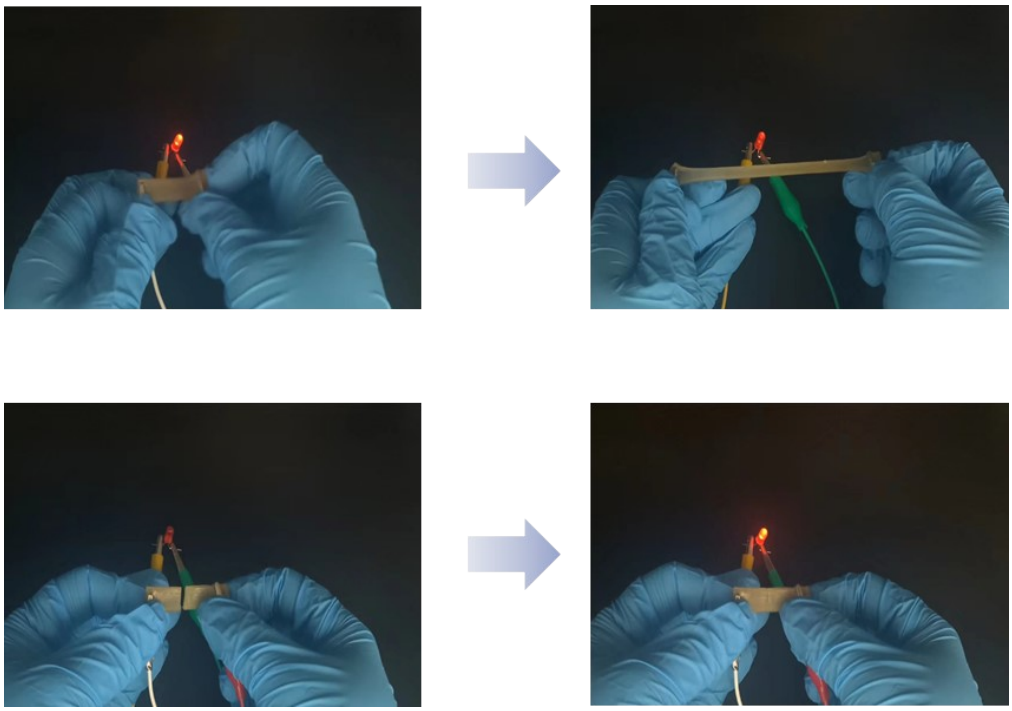

Fig. S17. Illustrates the brightness variation of an LED bulb during the stretching process, as well as the restoration of brightness after cutting and reconnecting the LED bulb.

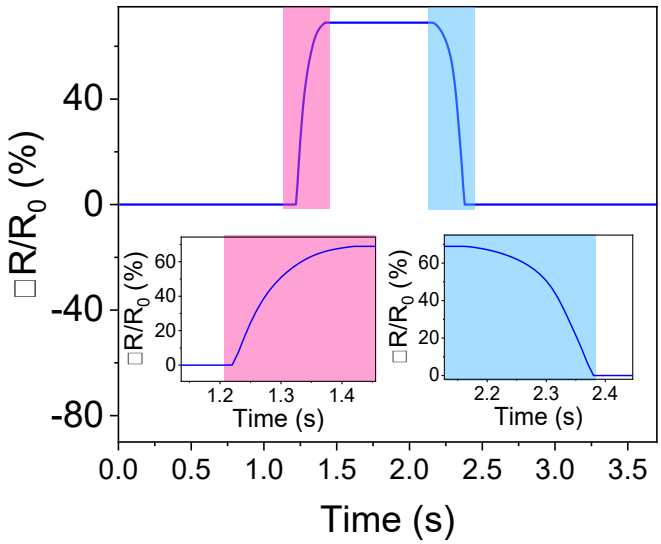

Fig. S18. Response time and recovery time of the hydrogel.