Supporting Information

A damping hydrogel with high water retention and strong adhesion for precise bioelectric signals detection

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Movie S1
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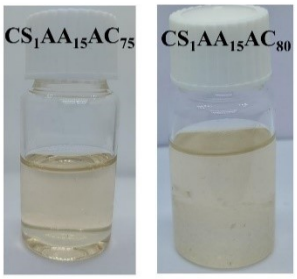

Fig. S1: Optical photographs of precursor solutions at CS:H_2O:AA:AC ratios of 1:5:15:75 and 1:5:15:80, respectively.

Fig. S2: Schematic representation of the preparation strategy.

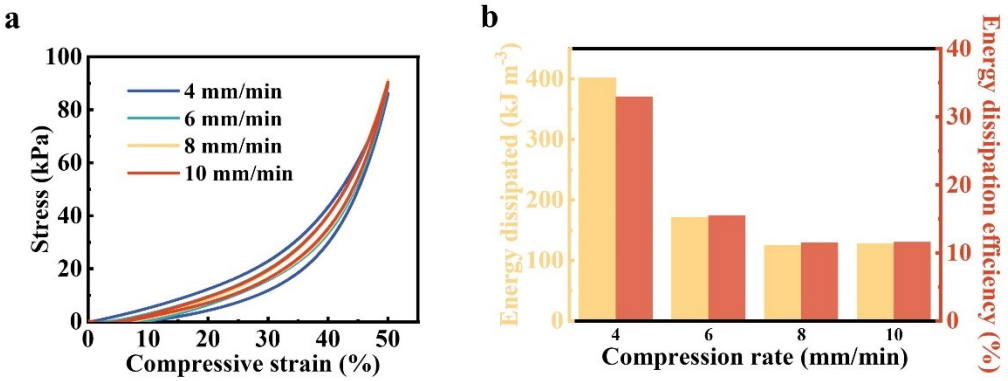

Fig. S3: (a) Loading-unloading test of $CS_1AA_{15}AC_{75}$ hydrogel at different compression rates (b) Calculation of energy dissipated at different compression rates of $CS_1AA_{15}AC_{75}$ hydrogel at 50% strain vs. energy dissipation efficiency.

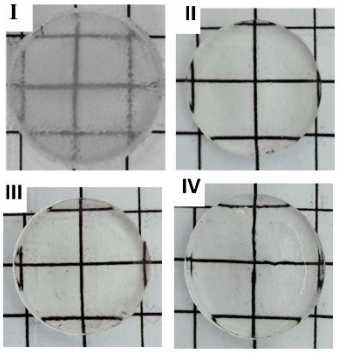

Fig. S4: Optical photograph of (I) CS_1AA_{15} (II) $CS_1AA_{15}AC_{25}$ (III) $CS_1AA_{15}AC_{50}$ (IV) $CS_1AA_{15}AC_{75}$ hydrogel transparency.

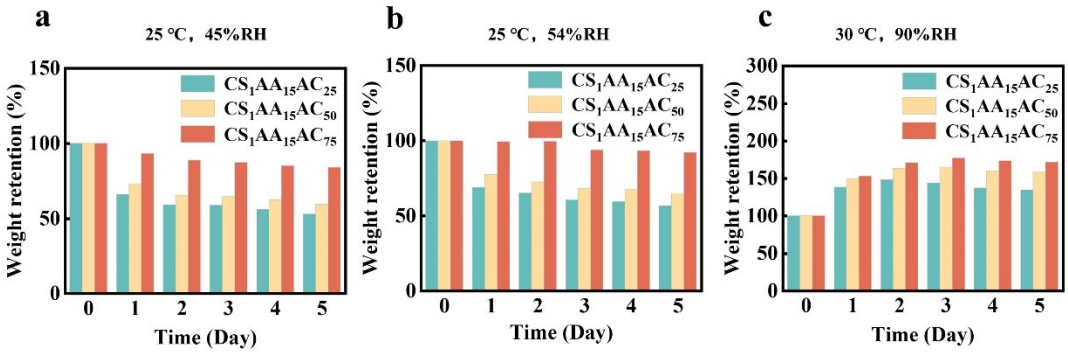

Fig. S5: Moisture loss of hydrogels with different AC contents during 5 days of storage at (a) 25 ℃, 45% RH (b) 25 ℃, 54% RH (c) 30 ℃ and 90% RH.

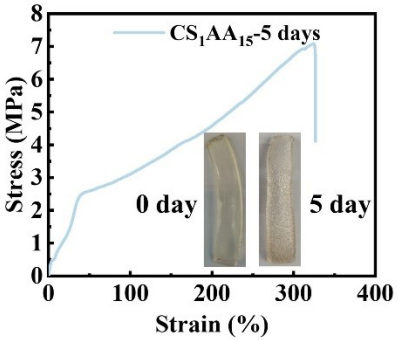

Fig. S6: Stress-strain curves of CS_1AA_{15} hydrogel stored at 25 ℃ and 54% RH for 5 days.

Fig. S7: Load-unload test of $CS_1AA_{15}AC_{75}$ hydrogel at different compression rates after 5 days of storage.

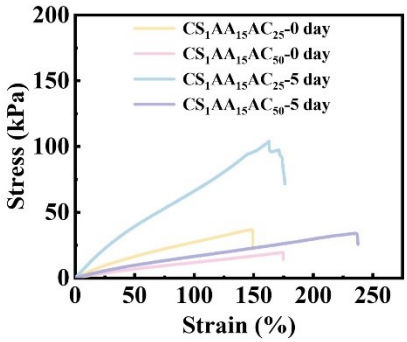

Fig. S8: Stress-strain curves of $CS_1AA_{15}AC_{25}$, $CS_1AA_{15}AC_{50}$ hydrogels initial and stored at 25 ℃ and 54% RH for 5 days

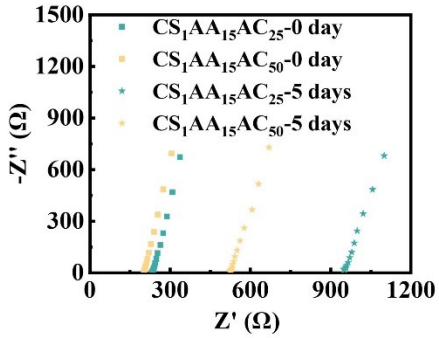

Fig. S9: Impedance of $CS_1AA_{15}AC_{25}$, $CS_1AA_{15}AC_{50}$ hydrogels initial and stored at 25 ℃ and 54% RH for 5 days.

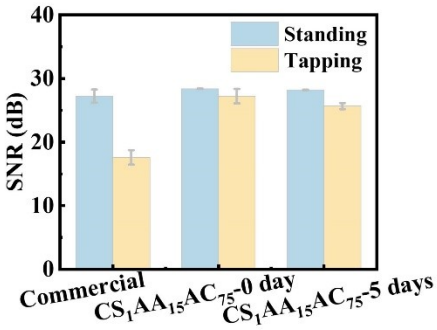

Fig. S10: SNR of commercial 3M electrode and electrode added $CS_1AA_{15}AC_{75}$ hydrogel with different storage times for detecting ECG signals

Table S1: Comparison between the CS/AA/AC hydrogel and other conductive hydrogels

Materials	Conductivity (S cm^{-1})	Modulus (kPa)	Adhesion (kPa)	Damping performance	Refs.
CTA	6.2×10^{-3}	200	113	No	1
PEDOT:PSS+PAA+Fe^{3+}	0.15	800	9.6	No	2
Co/Ni MOF-PGO-DMAPS-HEA	1.08	36.6	31.3	No	3
p(EA-*co*-DAC)/STPP	0.002	800	83	No	4
PEDOT:PSS+Laser treatment	600	5.7×10^{4}	/	No	5
ISF-PSPH	8.5×10^{-4}	20	6.5	No	6
CS/AA/AC	9.5×10^{-4}	17.35	93.42	Yes	**This work**

Table S2: Comparison between the CS/AA/AC hydrogel and other hydrogel electrode

Materials	Water retention	Adhesion (kPa)	Resistance to motion artifacts	Refs.
PGGPE	Yes	25.52	Yes	7
PAS/PD-IPN hydrogel	Yes	/	Yes	8
In-situ biogel	No	1000	Yes	9
CS/AA/AC	Yes	93.42	Yes	This work

Supplementary References:

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