Supporting Information

Thermo-adaptive gelatin-based hydrogel skin patch with switchable mechanics and adhesion for on-demand wearable sensing

Yuling Wu[a], Yibin Lin[a], Xiaoqing Su[a], Jiakai Feng[a], Yuxin Wu[a], Simin Zhang[a], Duoqu Chen[a], Wenjing Lin[a,b]*, Xiaofeng Lin[a,b], Guobin Yi[a,b,c]*

[a]*School of Chemical Engineering and Light Industry, Guangdong University of Technology, Guangzhou 510006, China*

[b]*Guangdong Provincial Laboratory of Chemistry and Fine Chemical Engineering Jieyang Center, Jieyang 515200, China*

[c]*School of Advanced Manufacturing, Guangdong University of Technology, Jieyang 522000, China*

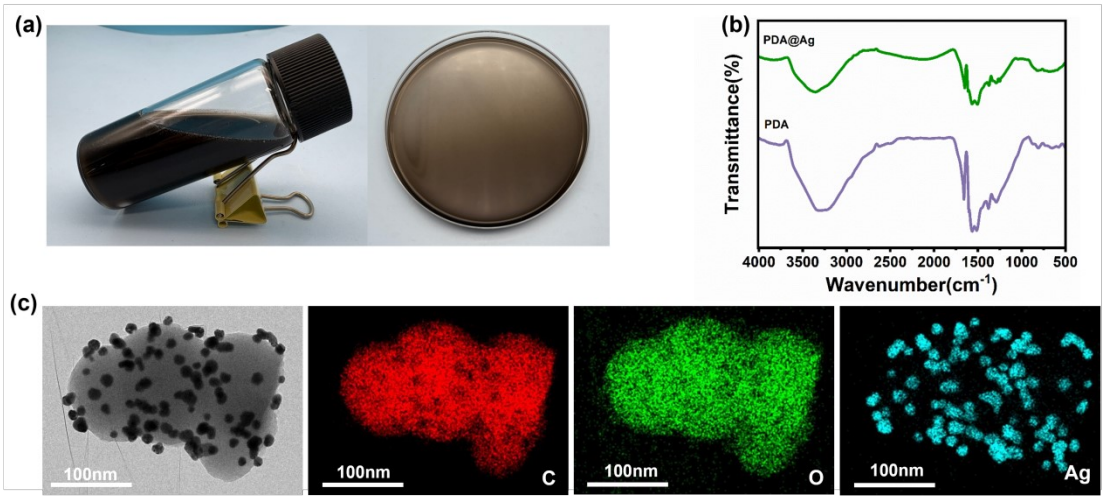

Figure S1. (a)Photograph of the hydrogel precursor solution and 10 mL precursor solution uniformly dispersed in a Petri dish. (b) FTIR spectra of PDA@Ag and PDA. (c)TEM image of PDA@Ag NPs, Element mappings of C ,O and Ag.

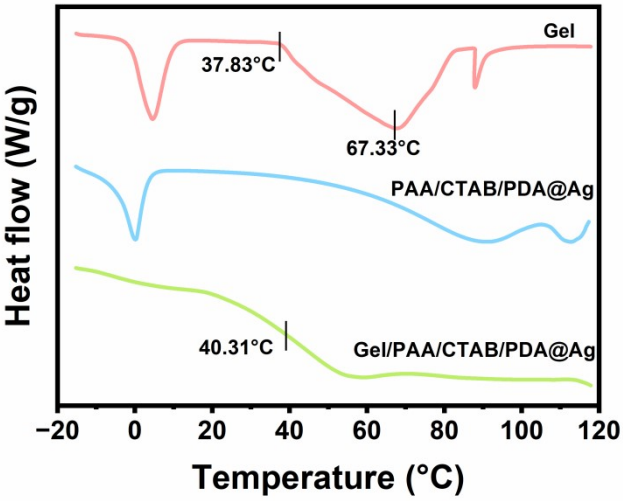

Figure S2. DSC curves of pure Gel, PAA/CTAB/PDA@Ag, and Gel/PAA/CTAB/PDA@Ag hydrogels

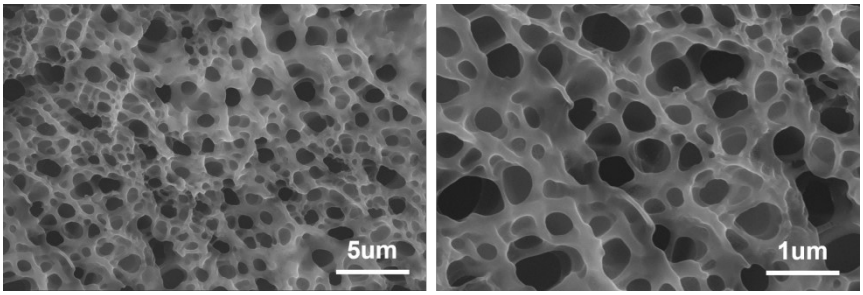

Figure S3. SEM images of the Gel/PAA/PDA@Ag/CTAB hydrogel at 5 μm and 1 μm.

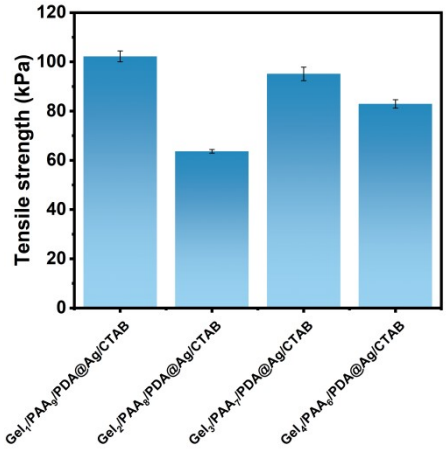

Figure S4. Histogram of tensile strength of Gel/PAA/PDA@Ag/CTAB hydrogel under different mass ratios of Gel to PAA (1:9, 2:8, 3:7, 4:6).

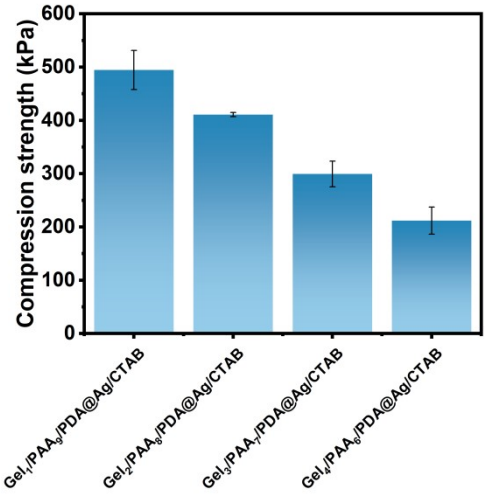

Figure S5. Histogram of compressive strength of Gel/PAA/PDA@Ag/CTAB hydrogel at different mass ratios of Gel to PAA (1:9, 2:8, 3:7, 4:6).

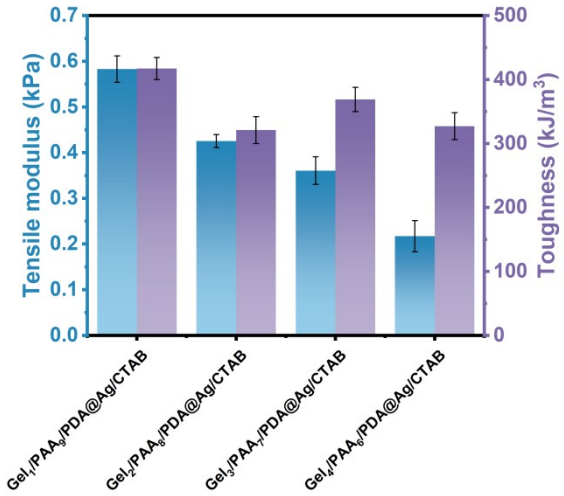

Figure S6. Histogram of tensile modulus and toughness of Gel/PAA/PDA@Ag/CTAB hydrogel at different mass ratios of Gel to PAA (1:9, 2:8, 3:7, 4:6).

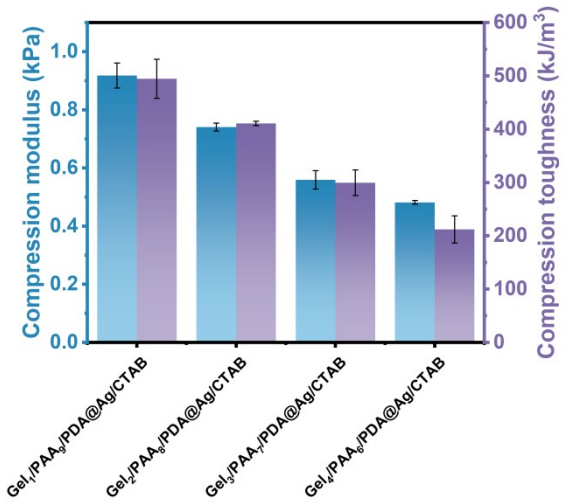

Figure S7. Histogram of compressive modulus and toughness of Gel/PAA/PDA@Ag/CTAB hydrogel at different mass ratios of Gel to PAA (1:9, 2:8, 3:7, 4:6).

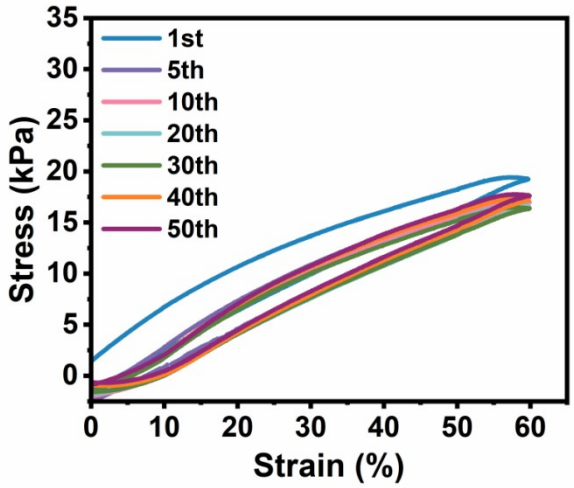

Figure S8. Loading-unloading curves of Gel_3/PAA_7/PDA@Ag/CTAB hydrogel for 50 cycles under 60% compressive strain at 25℃.

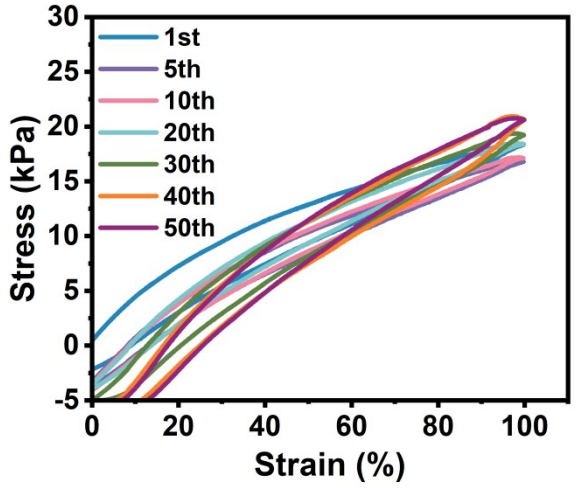

Figure S9. Loading-unloading curves of Gel_3/PAA_7/PDA@Ag/CTAB hydrogel for 50 cycles under 100% compressive strain at 25℃.

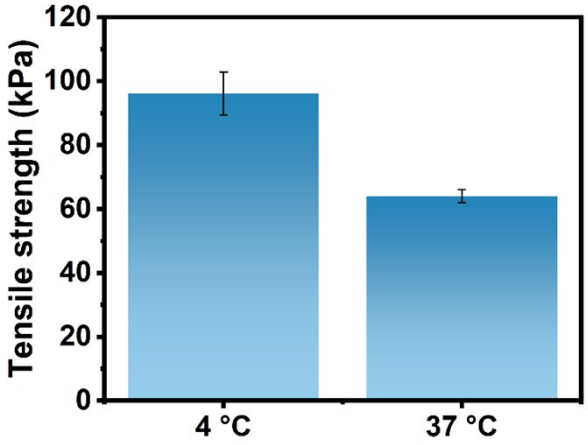

Figure S10. Histogram of tensile strength of Gel_3/PAA_7/PDA@Ag/CTAB hydrogel at 4℃ and 37℃.

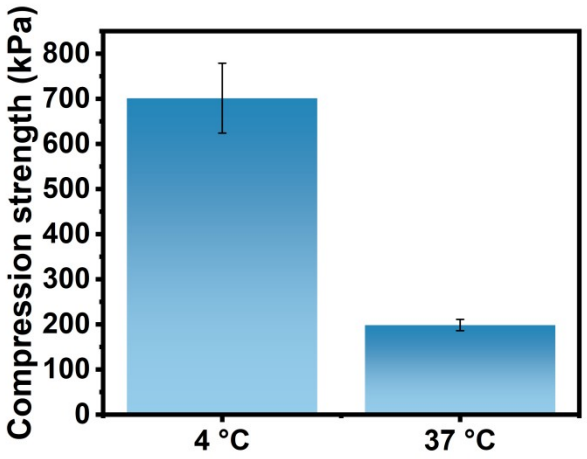

Figure S11. Histogram of compressive strength of Gel_3/PAA_7/PDA@Ag/CTAB hydrogel at 4℃ and 37℃.

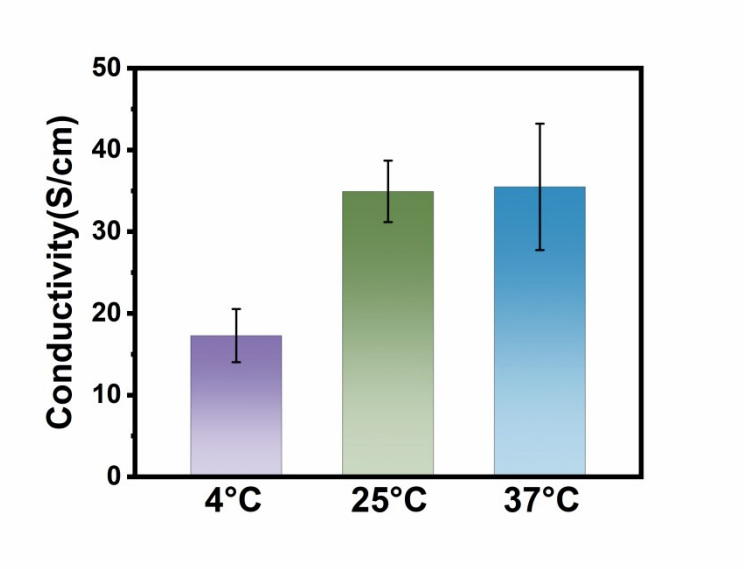

Figure S12. Conductivity at different temperatures (4°C, 25°C and 37 °C),data are presented as the mean ± standard deviation (SD) (n = 4).

Figure S13. 24-hour human skin sensitization assessment of commercial medical electrode patches and hydrogel patches.

Figure S14. Adhesion photographs of the hydrogel at 0 min, 6 min, and 10 min after the start of "jumping" exercise.

Table S1. Multidimensional performance comparison of the thermosensitive hydrogel

Materials	adhesion strength (kPa)	Multi-tissues adhesion	adhesion MD simulation	Self-healing	Sensitivity (GF)	sensing range (%)	AI-sensing	Ref.
MXene/gel/OHA/DES	14.38	NO	NO	NO	0.71	/	YES	15
PAM/Gel/SA	9.8	NO	NO	NO	/	/	NO	17
Gel/PAM	0.68	NO	NO	NO	0.835	800	NO	43
PAM/Gel/TA-CNT	5.46	NO	NO	NO	5.5	500	NO	44
DI@GA hydrogels	2.8	NO	NO	YES	NO	/	NO	45
Gel/PAA/PDA@Ag/CTAB	25.66	YES	YES	YES	13.55	500	YES	**This work**