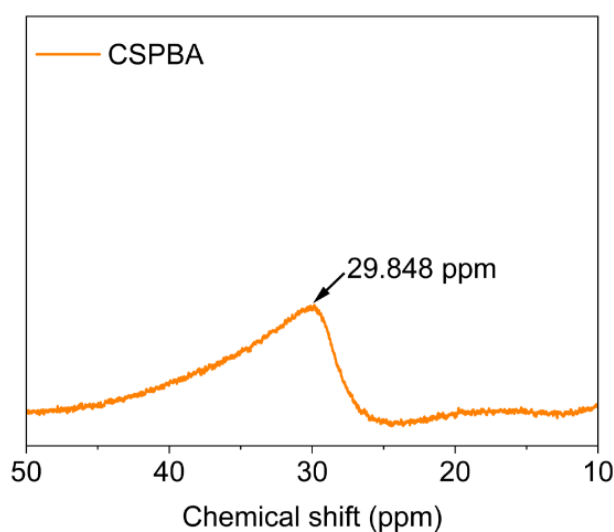


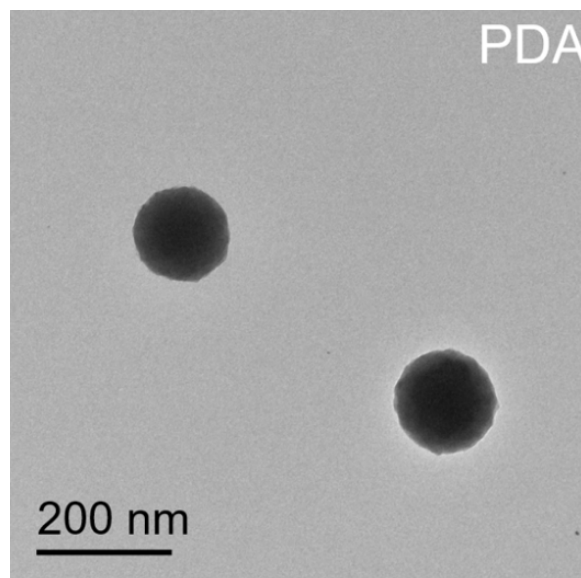
Supporting Information

Ag@polydopamine-functionalized borate ester-linked chitosan hydrogel integrates monitoring with wound healing for epidermal sensor

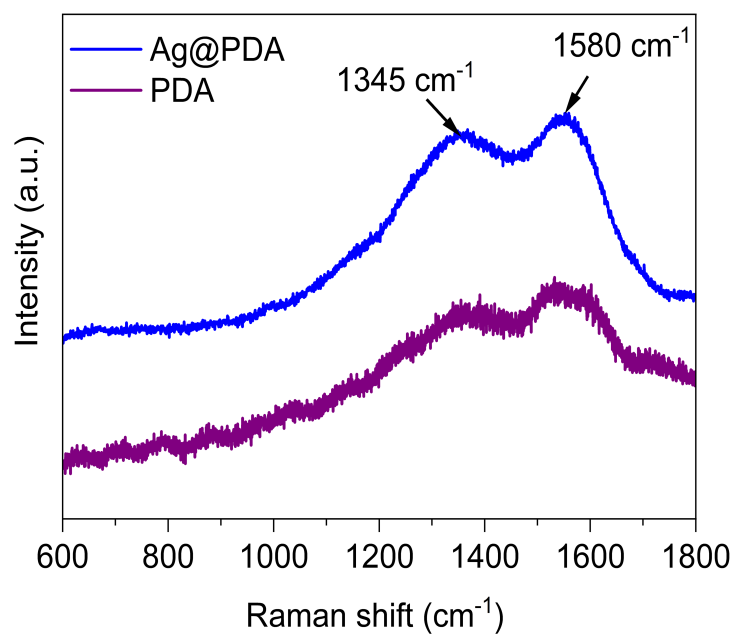
Wei Shi^{1#}, Hui Li^{2#,*}, Chengsheng Xu^{1#}, Gaoyi Wu¹, Jing Chen¹, Jinyong Zhang², Lixin Liang², Qingyang Wu², Yongsheng Liang^{2,*}, Guanglin Li^{1,*}, Wei Tang^{1,*}



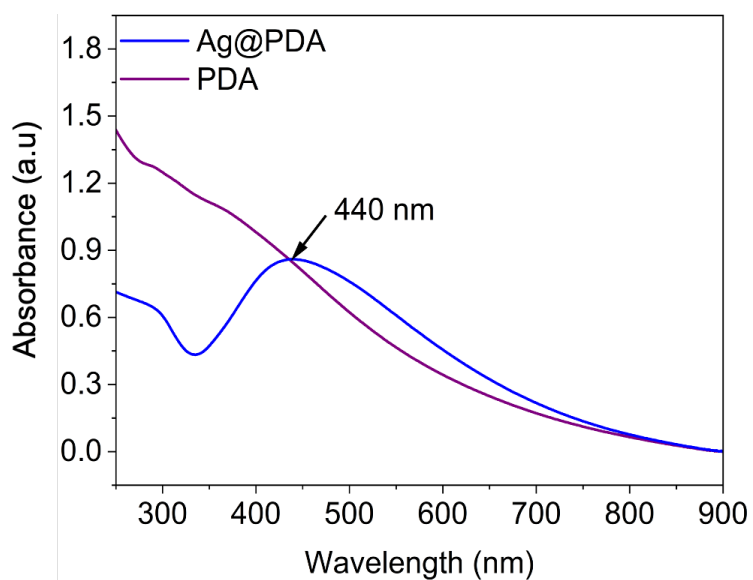
Supplementary Figure 1. ¹¹B NMR spectrum of CSPBA.



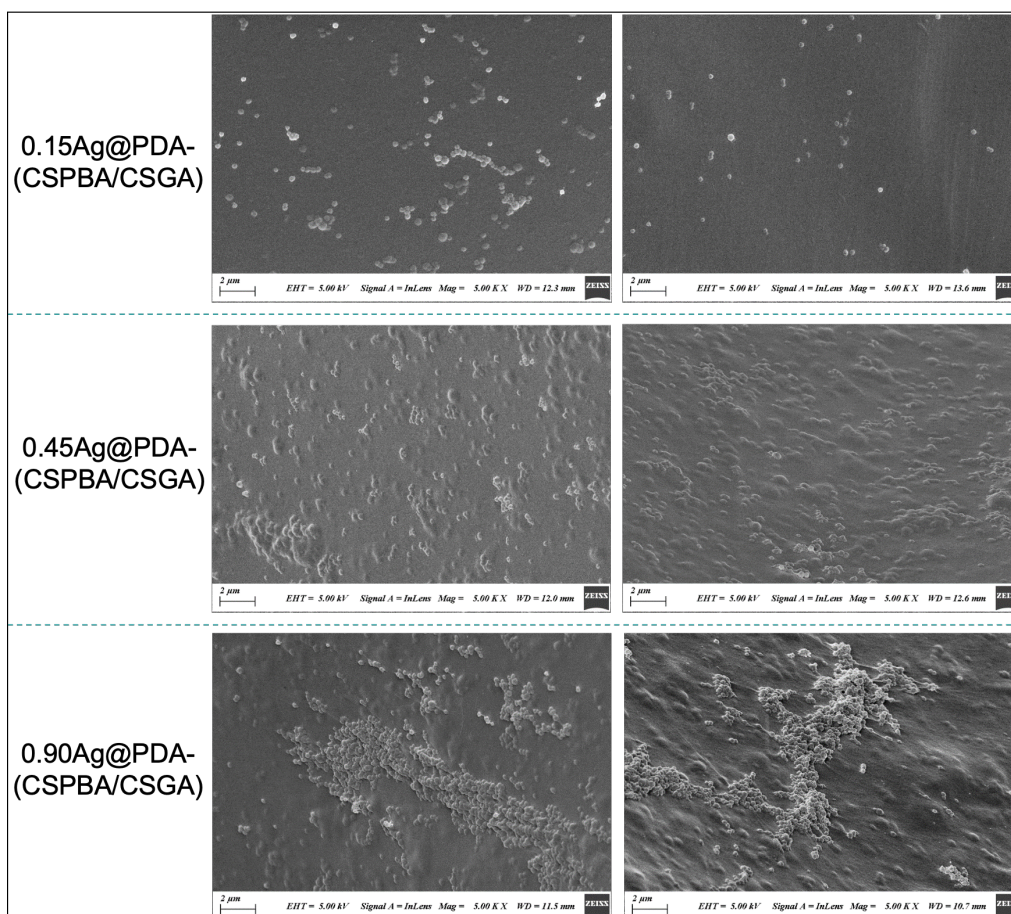
Supplementary Figure 2. TEM image of the PDA nanoparticles.



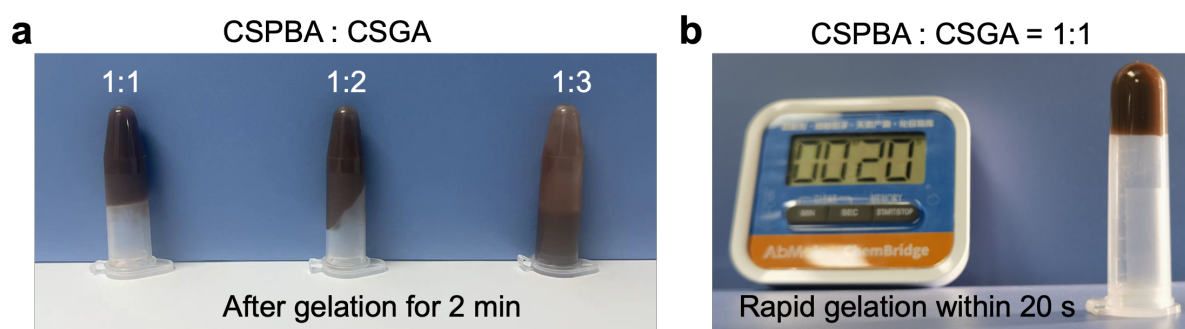
Supplementary Figure 3. Raman spectra of the PDA and Ag@PDA nanoparticles.



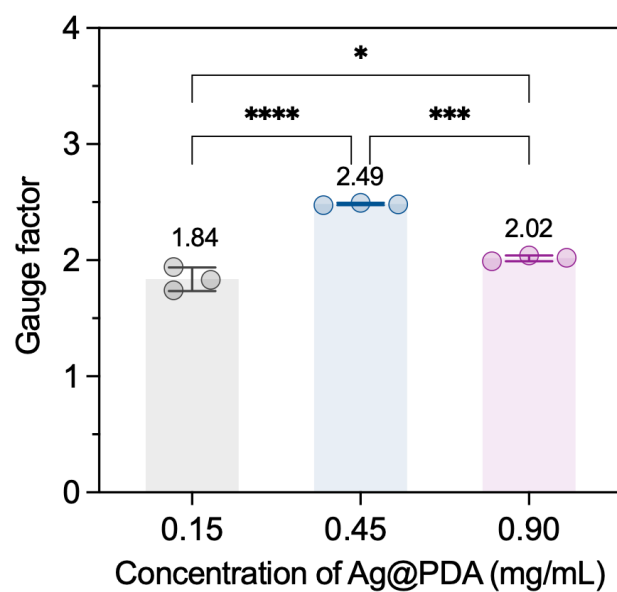
Supplementary Figure 4. UV spectra of the PDA and Ag@PDA nanoparticles.



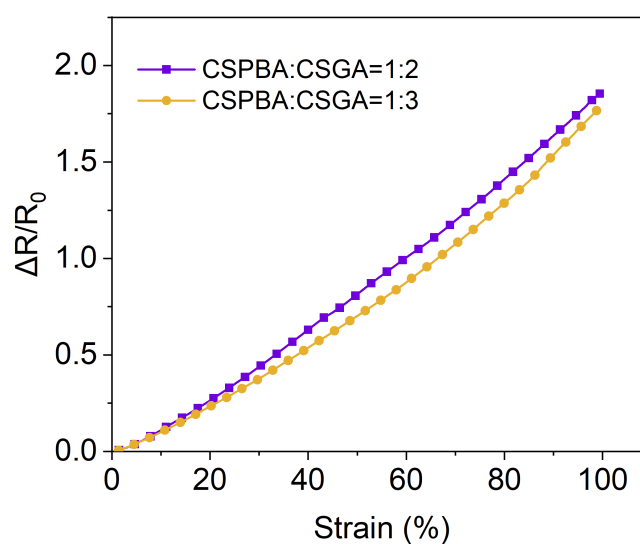
Supplementary Figure 5. SEM images of the distribution of various Ag@PDA content in CSPBA/CSGA matrix.



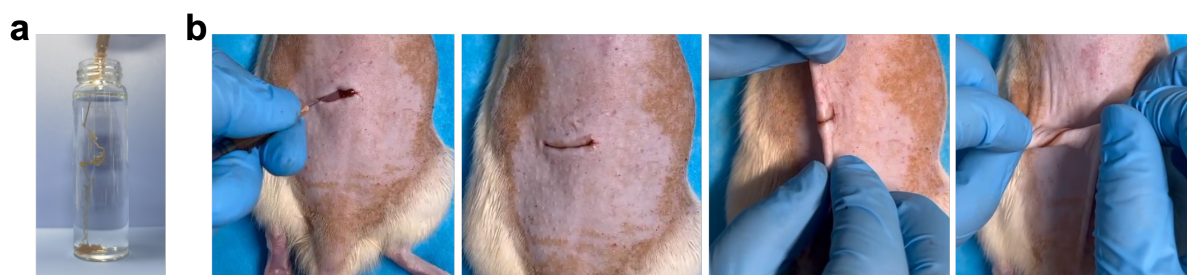
Supplementary Figure 6. a The gelation behaviors of the 0.45Ag@PDA-(CSPBA/CSGA) hydrogels containing different weight ratios of CSPBA-to-CSGA after 2 min. **b** The gelation behavior of the 0.45Ag@PDA-(CSPBA/CSGA) hydrogel at 1:1 of CSPBA-to-CSGA weight ratio.



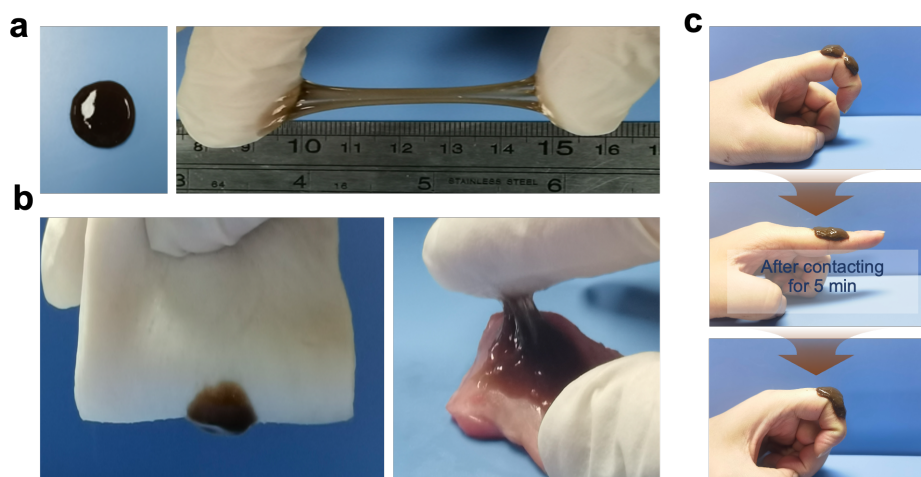
Supplementary Figure 7. The average GF values of the Ag@PDA-(CSPBA/CSGA) hydrogels with varying Ag@PDA content.



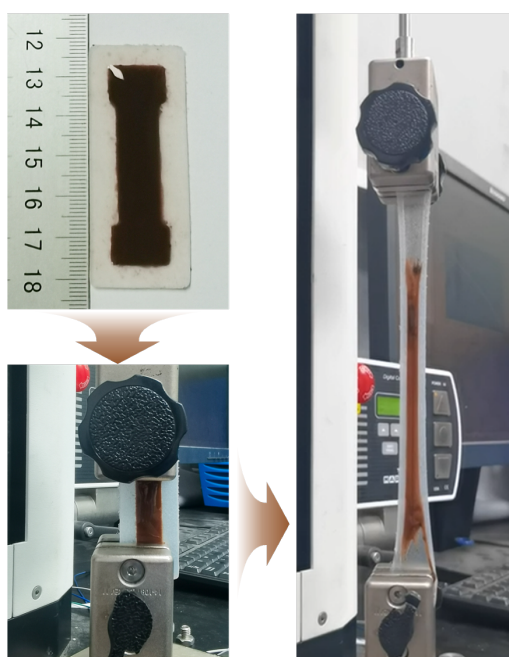
Supplementary Figure 8. $\Delta R/R_0$ signal of the 0.45Ag@PDA-(CSPBA/CSGA) hydrogels containing different weight ratios of CSPBA-to-CSGA.



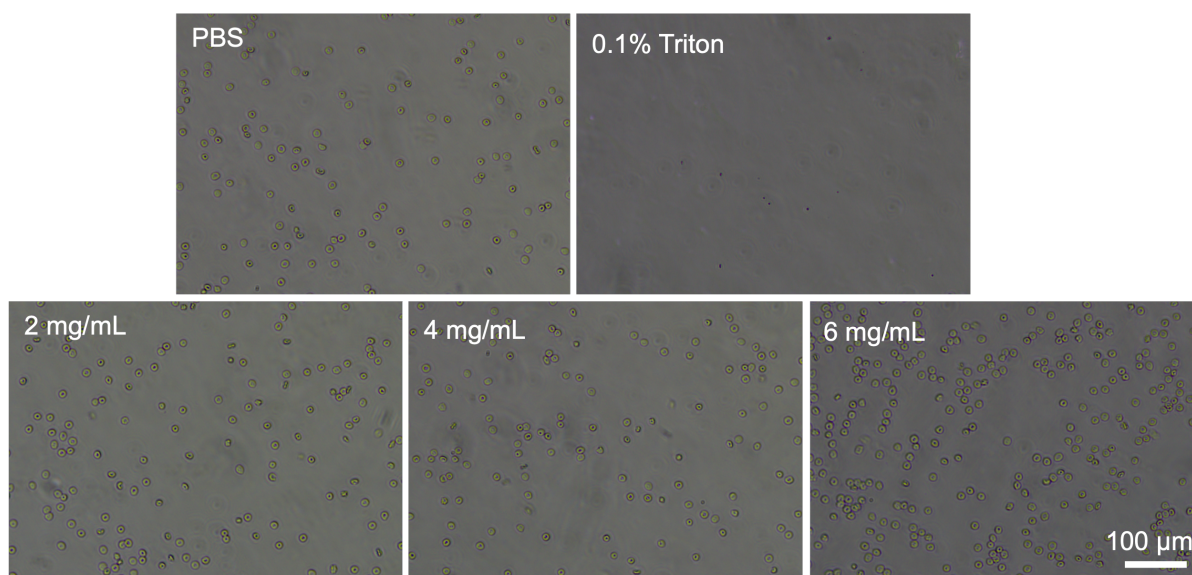
Supplementary Figure 9. **a** Injectability of the Ag@PDA-(CSPBA/CSGA) hydrogel. **b** Tissue adhesive capability of the Ag@PDA-(CSPBA/CSGA) hydrogel on full-thickness skin incision.



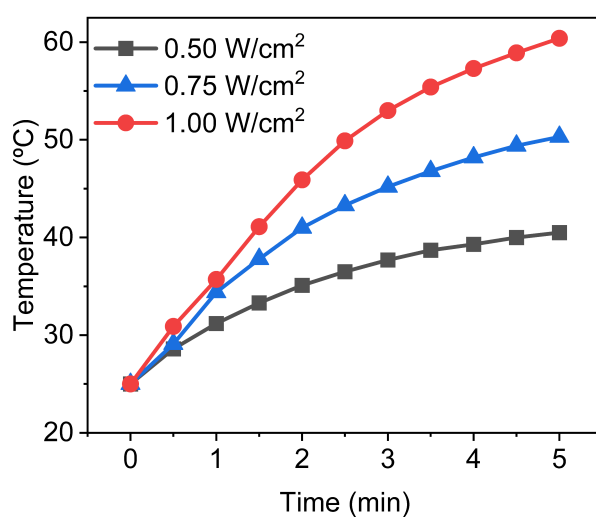
Supplementary Figure 10. **a** Stretchability, **b** tissue adhesion and **c** self-healing capability of the Ag@PDA-(CSPBA/CSGA) hydrogel.



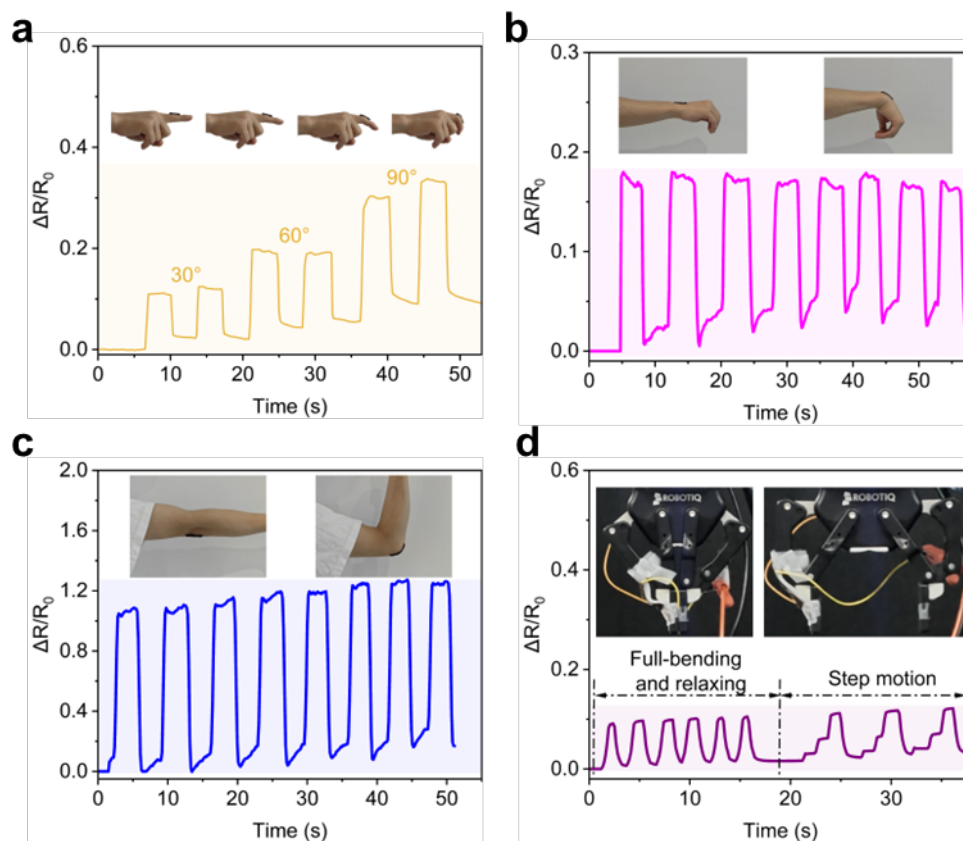
Supplementary Figure 11. Stretchability of the Ag@PDA-(CSPBA/CSGA) hydrogel (50 mm × 15 mm × 1 mm) on Ecoflex substrate.



Supplementary Figure 12. Hemolysis of the Ag@PDA-(CSPBA/CSGA) hydrogel at different concentrations.



Supplementary Figure 13. The photothermal conversion capability of the Ag@PDA-(CSPBA/CSGA) hydrogel sensor.



Supplementary Figure 14. The applications of Ag@PDA-(CSPBA/CSGA) hydrogel sensor for real-time monitoring on **a** finger joints, **b** wrist joints, **c** elbow joints and **d** robot.



Supplementary Figure 15. The Ag@PDA-(CSPBA/CSGA) hydrogel attached firmly on skin during running.

Supplementary Table 1. The sensing and biological properties of wearable hydrogel sensors.

Hydrogel sensors	Gauge factor (tensile strain)	Response time	Cyclic strain sensing	Biocompatibility	Anti-bacteria	Anti-oxidant	Wound healing	Ref.
Ag@PDA-(CSPBA/CSGA)	2.49 (0-100%)	263 ms	100 cycles at 50% strain	Yes	Yes	Yes	Yes	This work
PVA/AAc/NaCl	1.21 (0-100%) 2.29 (100-300%)	NA	50 cycles at 20% strain	Yes	NA	NA	NA	1
SF/TA@PPy	0.7154 (0-500%)	NA	NA	Yes	Yes	NA	NA	2
AA/diacetone acrylamide	0.871 (0-100%) 1.28 (100-200%) 1.71 (200-400%)	115 ms	130 cycles at 50% strain	NA	NA	NA	NA	3
PAM/2,2,2-trifluoroethyl	0.83 (0-200%) 1.38 (200-400%) 1.85 (400-600%)	NA	300 cycles at 50% strain	NA	NA	NA	NA	4
PAM/PDA@CNT	1.99 (0-200%) 3.93 (200-400%)	76 ms	600 cycles at 50% strain	Yes	NA	NA	NA	5
HPAAm/CS-c-MWCNT	1.65 (0-100%) 3.2 (100-500%)	180 ms	300 cycles at 50% strain	Yes	NA	NA	NA	6
PEGSD-Zn ²⁺ /PHA-I	NA	NA	NA	Yes	Yes	Yes	Yes	7
PAM/gelatin/CNT-TA-Ag	1.87 (0-113%)	206 ms	4600 cycles at 25% strain	Yes	Yes	NA	NA	8
PMZn-GL	3.42 (0-50%) 4.77 (50-100%) 5.82 (100-180%)	NA	250 cycles at 30% strain	Yes	NA	NA	NA	9
DMP/IL/PVA	1.2 (0-50%), 1.8 (50-200%)	117 ms	300 cycles at 30% strain	Yes	NA	Yes	Yes	10
HANa	1.1 (0-300%) 1.7 (300-600%) 2.6 (600-1000%)	120 ms	200 cycles at 100% strain	Yes	NA	NA	NA	11
DN-FT-HCl	1.434 (0-100%) 2.448 (100-200%) 3.356 (200-300%)	130 ms	1000 cycles at 50% strain	NA	NA	NA	NA	12
PAM@CNC/TA-Ag NC	1.02 (0-100%)	334.9 ms	500 cycles at 60% strain	Yes	NA	NA	NA	13
PCPAV	1.22 (0-100%) 2.45 (100-400%) 3.75 (400-800%)	83 ms	200 cycles at 30% strain	Yes	Yes	NA	NA	14
Alginate/PVA/PEDOT:PSS	0.90 (0-340%) 1.50 (340-680%) 1.86 (680-1000%)	830 ms	NA	Yes	NA	NA	NA	15

PNAGA/PNIPAm /AgNW	1.469 (0-125%)	NA	100 cycles at 20% strain	NA	NA	NA	NA	16
PcNA/MXene	1.86 (0-180%) 1.1 (180-300%)	290 ms	2000 cycles at 50% strain	Yes	NA	NA	NA	17
PAMC	1.63 (0-200%) 2.27 (200-600%)	216 ms	300 cycles at 100% strain	Yes	NA	NA	NA	18
ILHPMC/PAA	2.96 (0-75%) 6.83 (75-400%)	NA	NA	Yes	Yes	NA	NA	19
PAA/GPC	2.95 (0-200%)	226 ms	500 cycles at 100% strain	Yes	NA	NA	NA	20

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