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Supplementary material

# All polymeric conductive strain sensors with excellent skin adhesion, recovery, and long-term stability prepared from an anion–zwitterion based hydrogel

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| Hydrogel | | AMPSs (g) | VIPS (g) | AAm (g) | MBAA (mL) | I2959 (g) | $H_2O$ (mL) | Water contents (%) |
|---|---|---|---|---|---|---|---|---|
| P(AMPSs/VIPS-co-AAm) | MBAA 0.1 mol% | 12 | 6 | 3.99 | 0.87 | 0.13 | 17 | 60.0 |
| | MBAA 0.15 mol% | 12 | 6 | 3.99 | 1.30 | 0.13 | 17 | 60.4 |
| | MBAA 0.2 mol% | 12 | 6 | 3.99 | 1.73 | 0.13 | 17 | 60.9 |
| | AMPSs/VIPS :AAm =2:1 | 12 | 6 | 2.33 | 1.03 | 0.1 | 15 | 60.7 |
| | AMPSs/VIPS :AAm =1:1 | 12 | 6 | 3.99 | 1.30 | 0.13 | 17 | 60.4 |
| | AMPSs/VIPS :AAm =1:2 | 12 | 6 | 7.98 | 1.95 | 0.19 | 22 | 60.1 |
| P(AMPSs-co-AAm) | AMPSs :AAm =1:1 | 12 | 0 | 1.86 | 0.15 | 0.06 | 6 | 60.8 |

**Table S1**. Recipes for all hydrogel sample according to the monomer molar ratio.

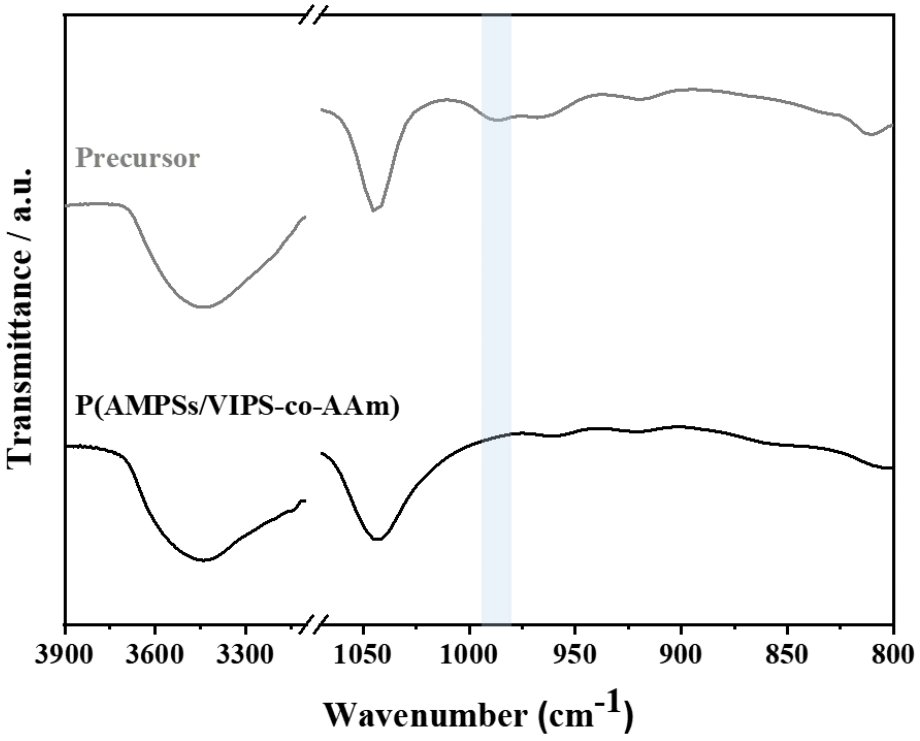



**Fig. S1.** FTIR spectra of the carbon double bond peak conversion after curing.

**Fig. S2.** Photographs of cured P(AMPSs/VIPS-co-AAm) hydrogel (left) and less cured P(AMPSs/VIPS) hydrogel (right).

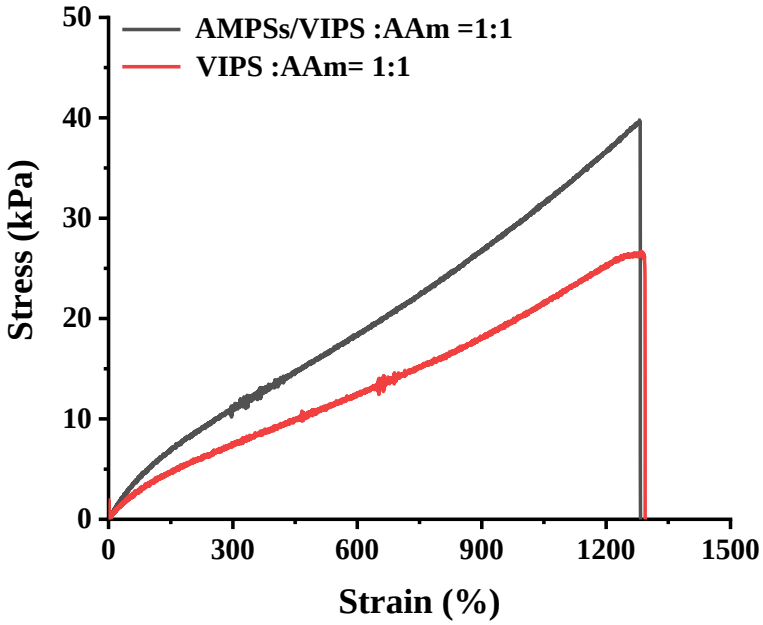



**Fig. S3.** Compare tensile curve of P(AMPSs/VIPS-co-AAm) hydrogel and P(VIPS-co-AAm) hydrogel.

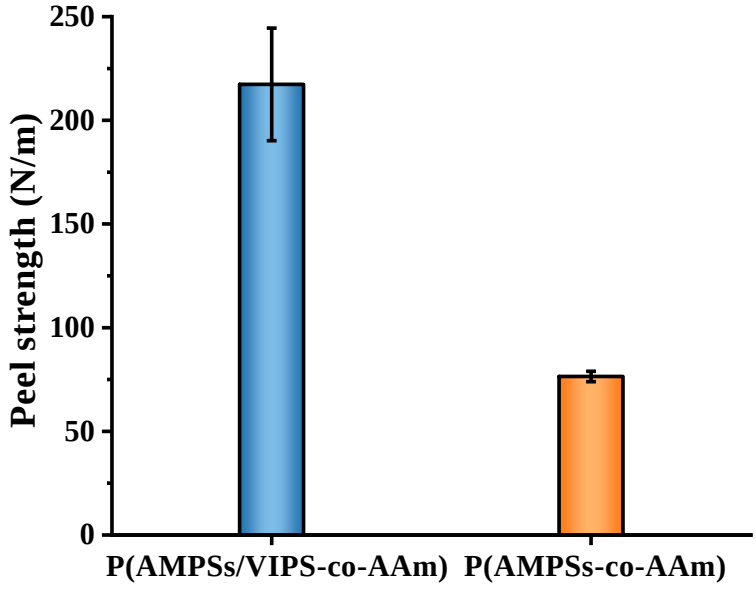



**Fig. S4.** Compare 90° peel strength of P(AMPSs/VIPS-co-AAm) hydrogel and P(AMPSs-co-AAm) hydrogel.

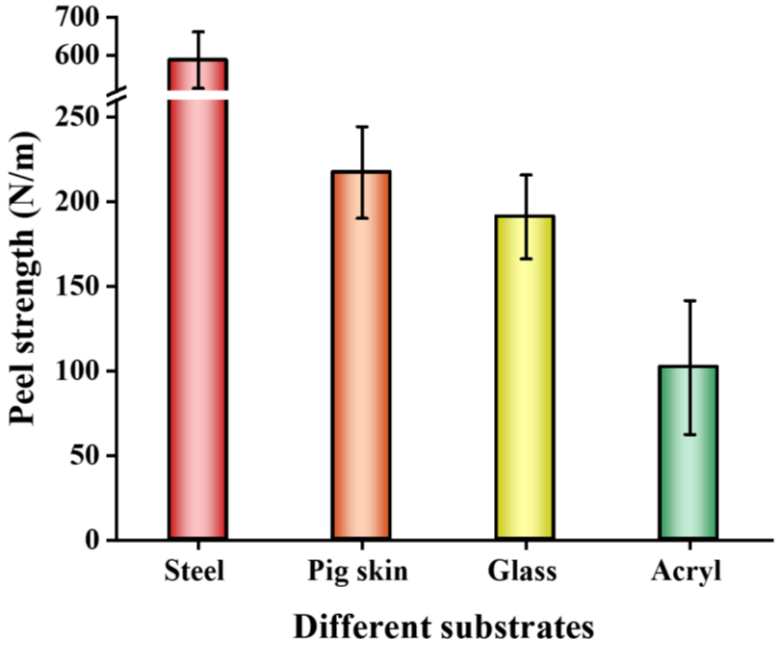



**Fig. S5.** 90° Peel strength of the P(AMPSs/VIPS-co-AAm) hydrogel on various materials.

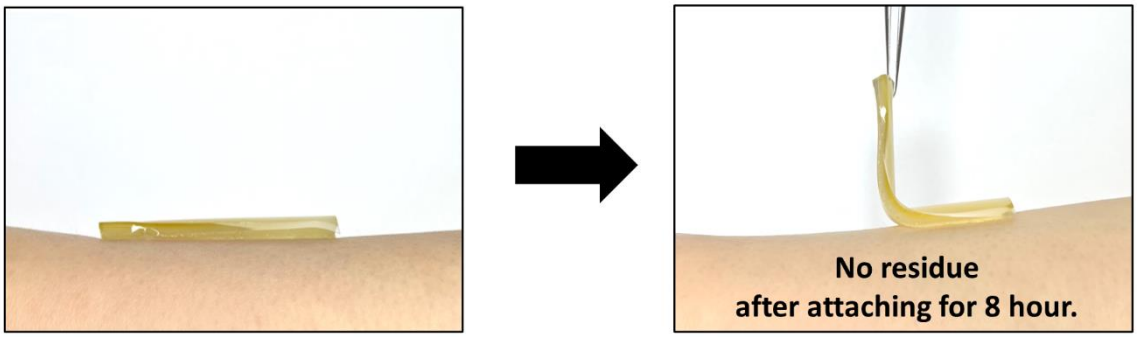



**Fig. S6.** Photographs of no residue left after 8 hours of attachment to the human skin.

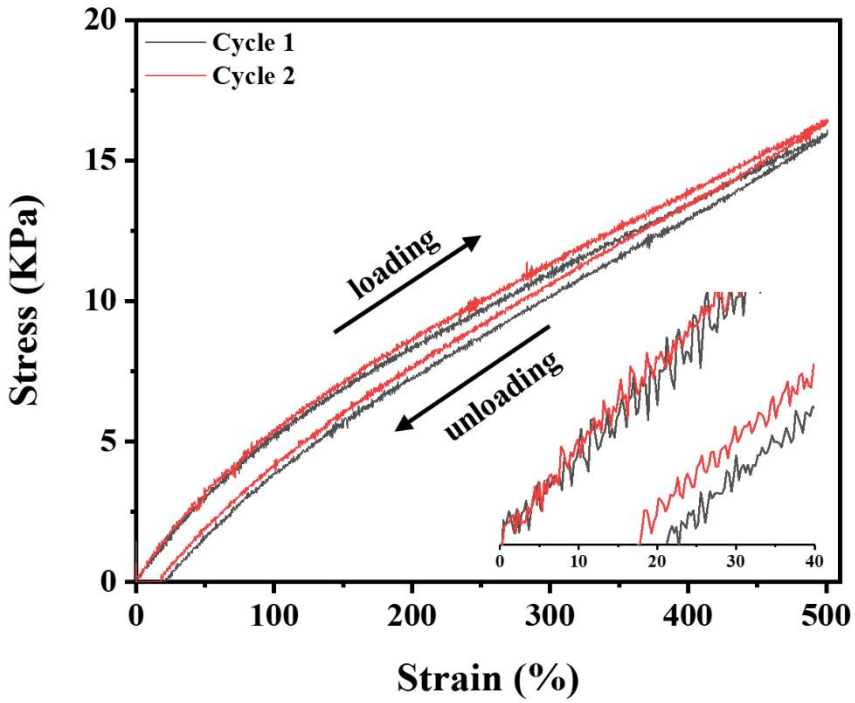
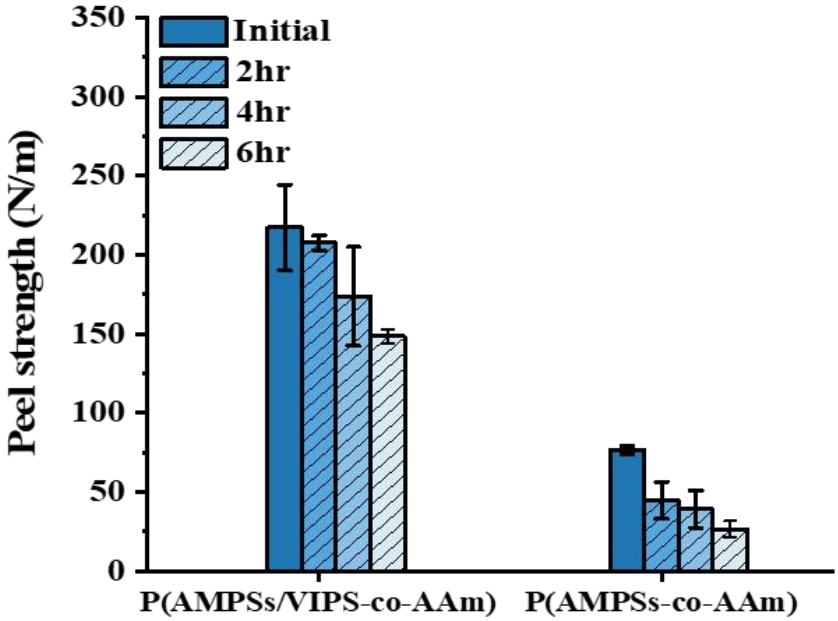



**Fig. S7.** The first and second loading-unloading cycle at 500% strain.

a




b

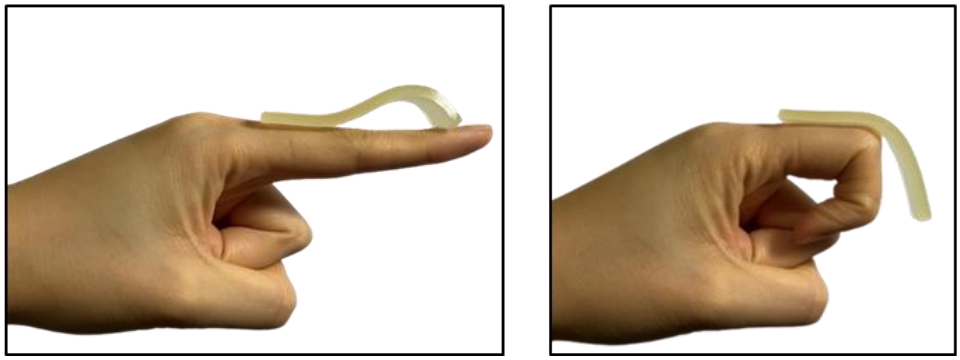


**Fig. S8.** Comparison of 90° peel strength between P(AMPSs/VIPS-co-AAm) and P(AMPSs-co-AAm) hydrogel according to time exposed to air. (b) Photographs of the P(AMPSs-co-AAm) Hydrogels that do not adhere well to the skin while bending the fingers.

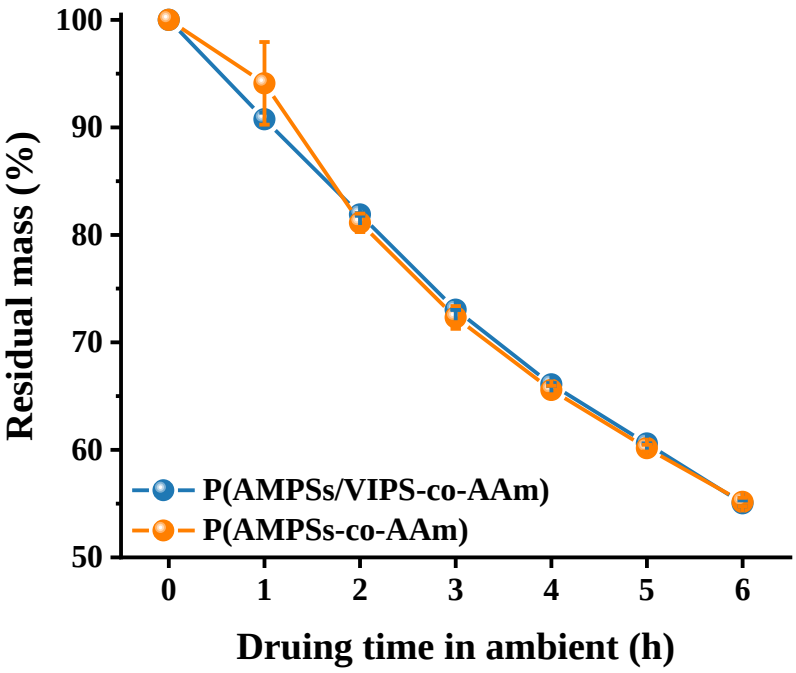



**Fig. S9.** Cut it into 1 x 1 ($cm^2$) size and measure the water contents in the ambient state. Comparison of water contents between P(AMPSs/VIPS-co-AAm) and P(AMPSs-co-AAm) hydrogel.

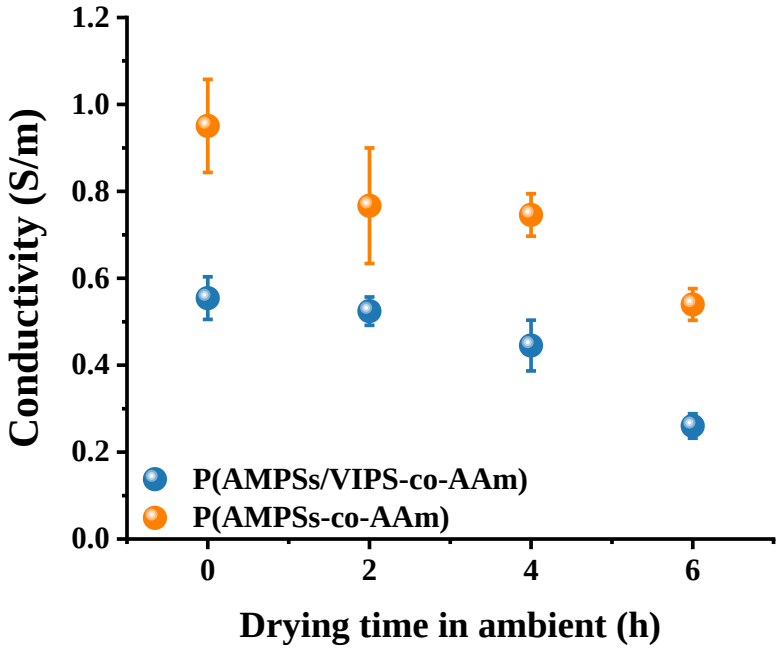



**Fig. S10.** Comparison of ionic conductivity between P(AMPSs/VIPS-co-AAm) and P(AMPSs-co-AAm) hydrogel according to time exposed to air.