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Supplementary Information

Toughened, self-healing and self-adhesive conductive gels with extraordinary temperature adaptability for dual-responsive sensors

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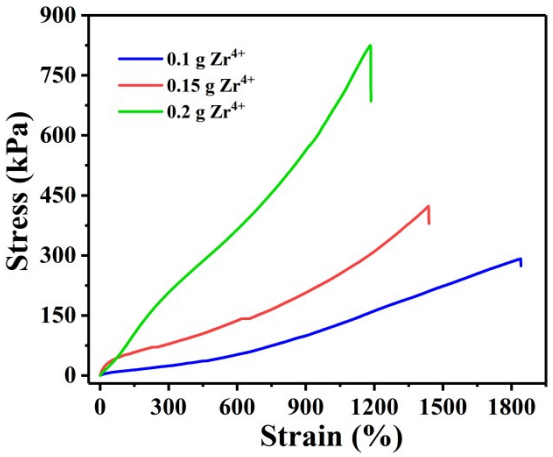

Fig. S1. The stress-strain curves of the PAA-Zr^{4+}/Gly/IL gels with various Zr^{4+} contents.

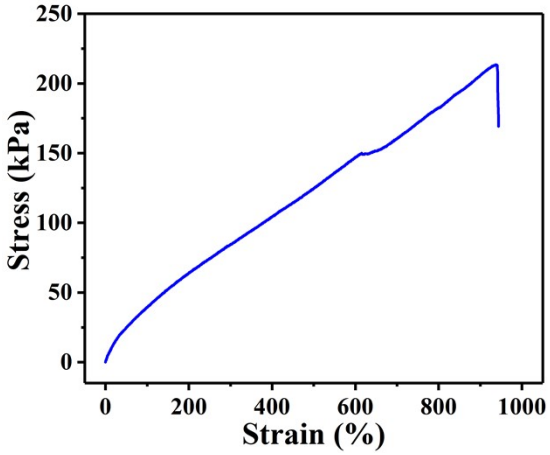

Fig. S2. The stress-strain curve of the PAA-Zr^{4+}/Gly/IL gel with self-healing for 24 h (65% self-healing efficiency for strain and 50% self-healing efficiency for stress).

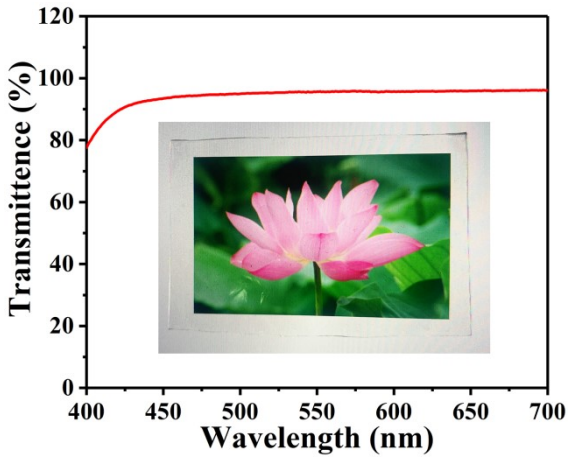

Fig. S3. The UV-vis transmittance spectra of the PAA-Zr^{4+}/Gly/IL gel, and the insets showing the high transparency of the PAA-Zr^{4+}/Gly/IL gel.

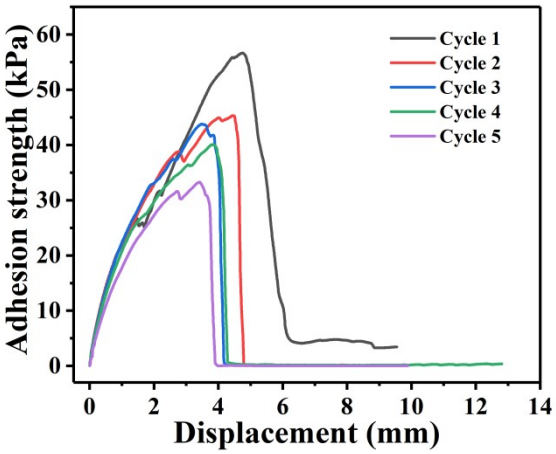

Fig. S4. The cyclic adhesion strength of the PAA-Zr^{4+}/Gly/IL gel onto the copper substrate surface.

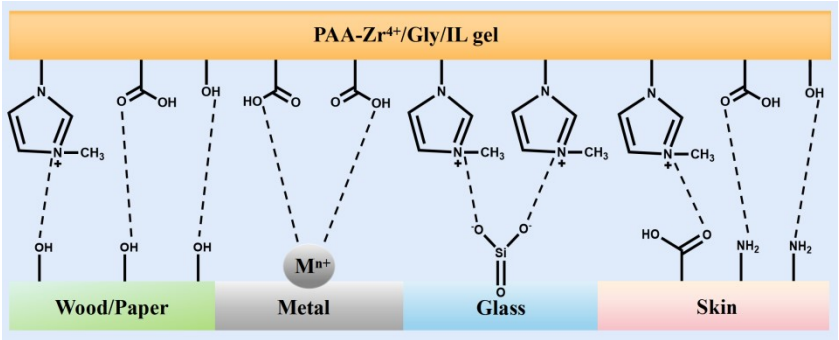

Fig. S5. The adhesive mechanism between the PAA-Zr^{4+}/Gly/IL gel and various substrates.

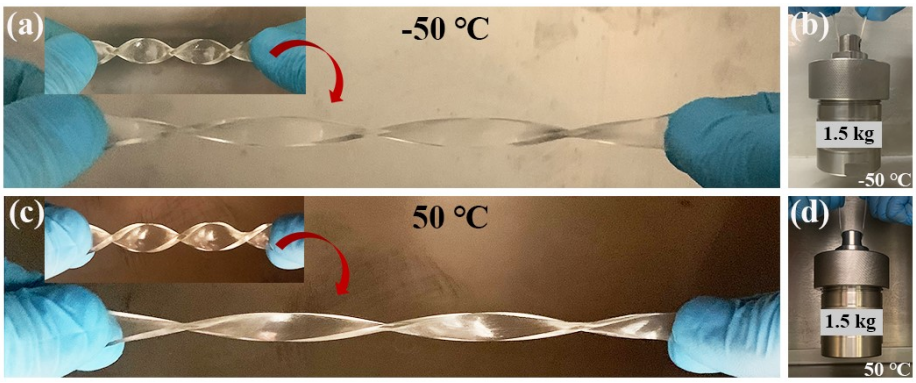

Fig. S6. (a), (b), (c) and (d) Photographs showing the excellent mechanical flexibility and toughness of the PAA-Zr^{4+}/Gly/IL gel at -50 and 50 °C, respectively.

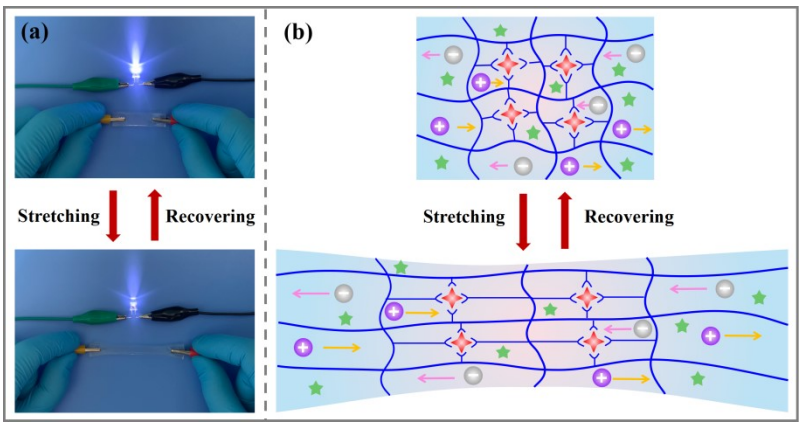

Fig. S7. (a) Comparisons of the luminance of LEDs by using the PAA-Zr^{4+}/Gly/IL gel with various tensile strains as the connecting wire. (b) Schematic illustration of the changes of PAA-Zr^{4+}/Gly/IL gel structure according to external stretching deformation.

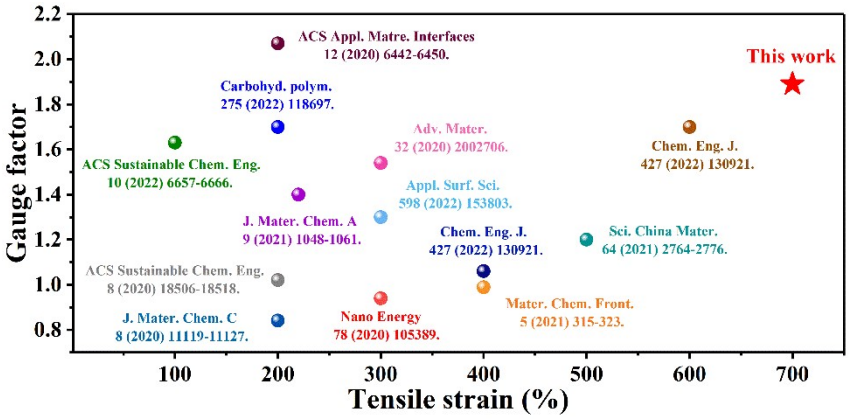

Fig. S8. A scatter diagram showing the gauge factor of some advanced strain sensors reported recently.

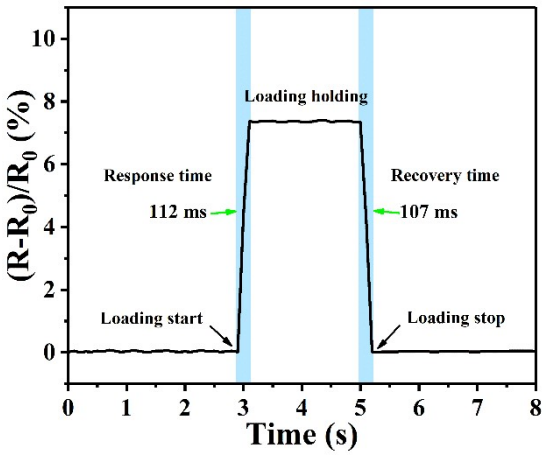

Fig. S9. Response time and recovery time of the PAA-Zr^{4+}/Gly/IL gel sensor at 5% strain.

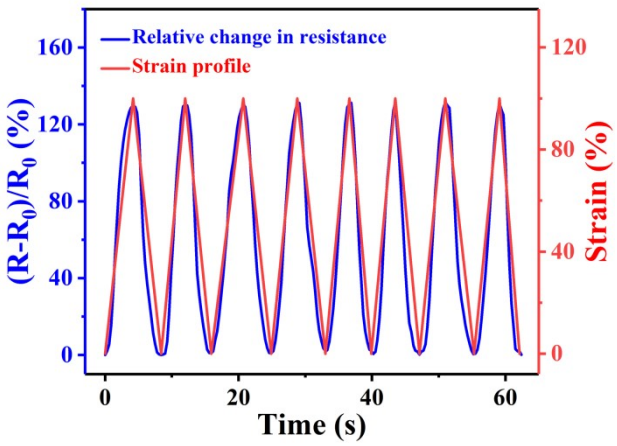

Fig. S10. Relative resistance changes of the PAA-Zr^{4+}/Gly/IL gel sensor at 100% strain during periodic stretching and releasing.