Supporting Information

Janus-type ionic conductive gels based on poly(*N*,*N*-dimethyl)acrylamide for strain/pressure sensors

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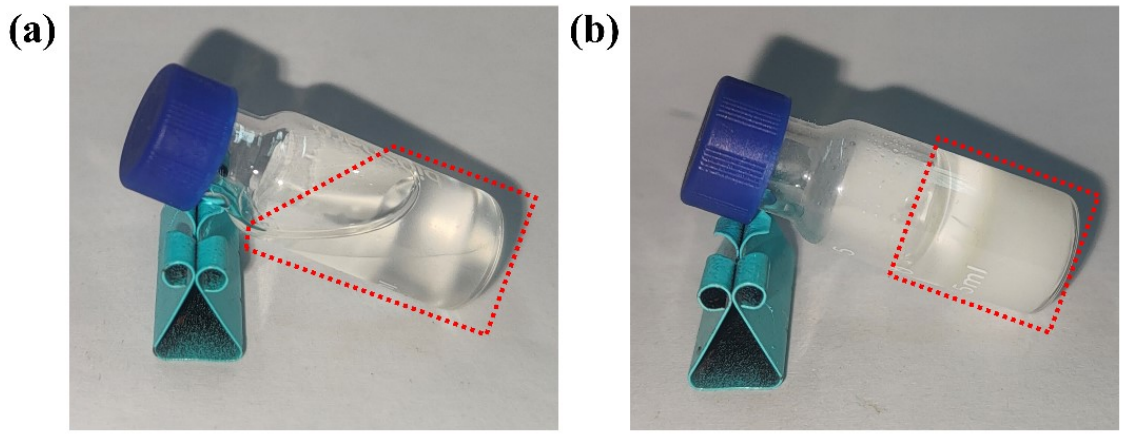

Fig. S1 Optical digital photos of Janus gel (before and after photopolymerization): (a) Precursor solution. (b) Janus ionogel.

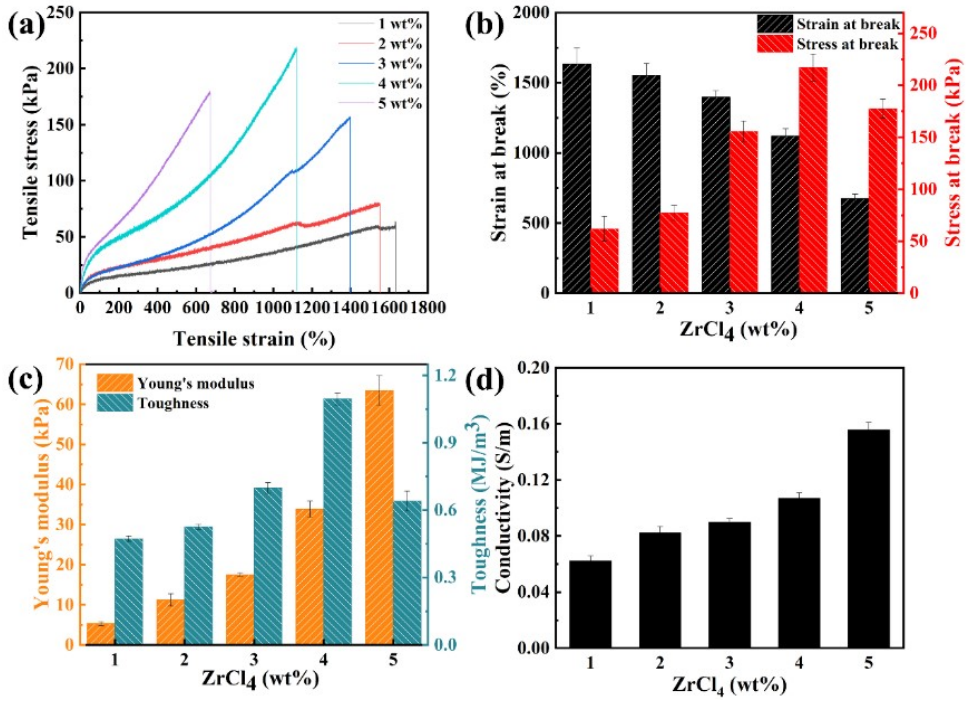

Fig. S2 Janus conductive ionogel with different zirconium chloride contents: (a) Stress–strain curve. (b) Maximum tensile strength and elongation at break. (c) Young's modulus and toughness. (d) Conductivity.

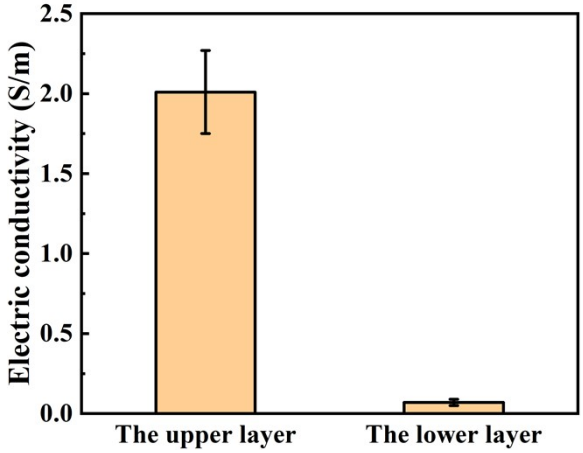

Fig. S3 Electric conductivity of the upper and lower layers of the Janus ionogel after stripping.

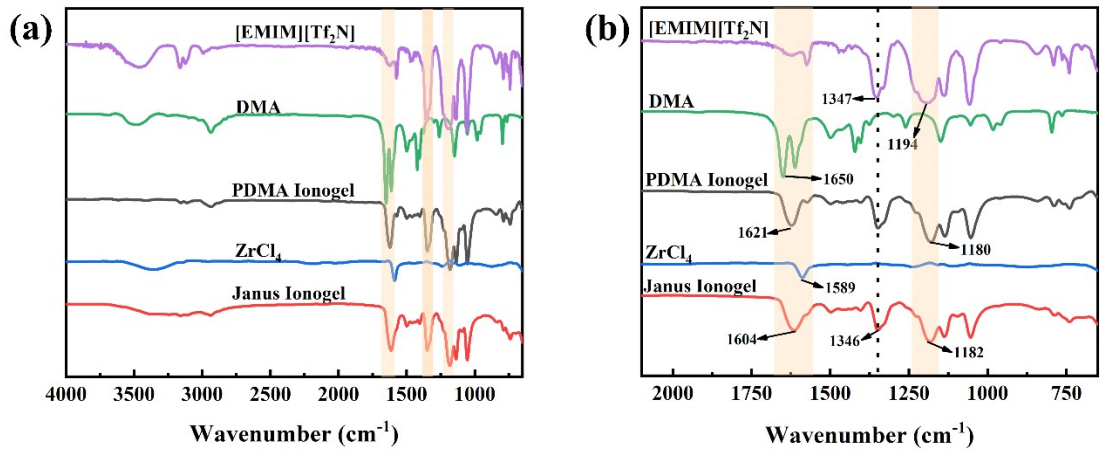

Fig. S4 (a) FT-IR spectra of DMA, [EMIM][Tf_2N], $ZrCl_4$ and ionogel. (b) Locally amplified FT-IR spectra.

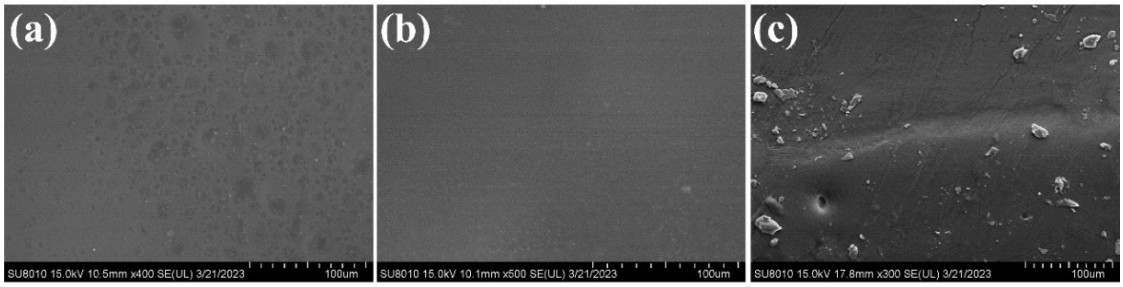

Fig. S5 SEM images of the Janus-type ionogel: (a) The upper surface. (b) The lower surface. (c) The cross-section.

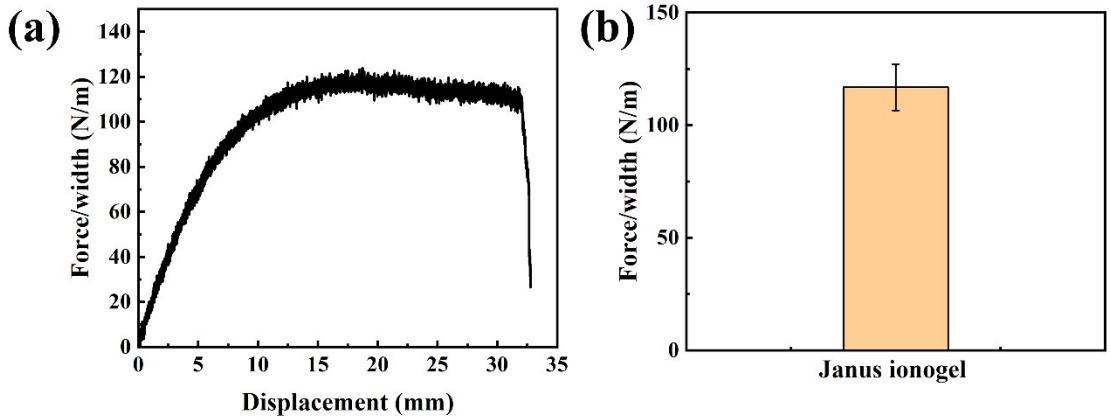

Fig. S6 The interface strength of Janus ionogel: (a) Tensile stress–strain curves. (b) Peel strength.

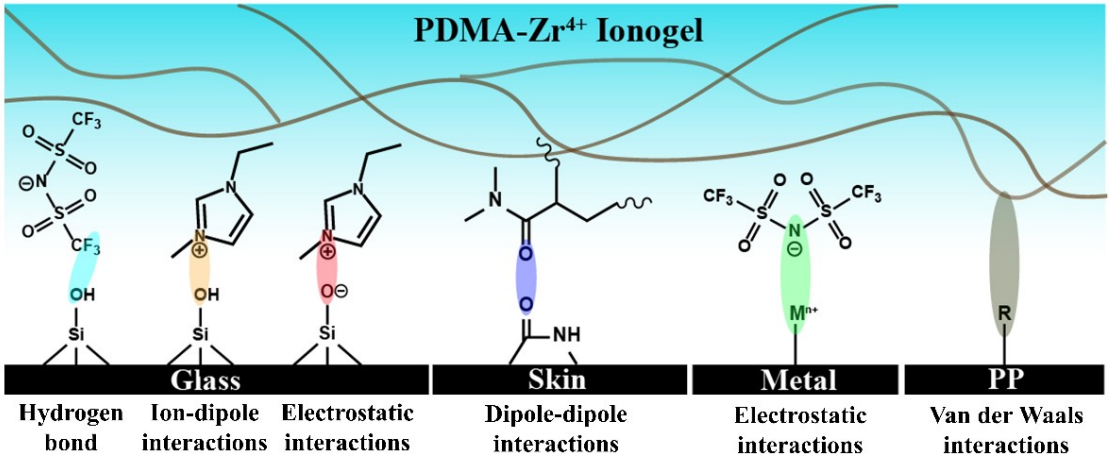

Fig. S7 Adhesion mechanism of the Janus ionogel subsurface to different materials.

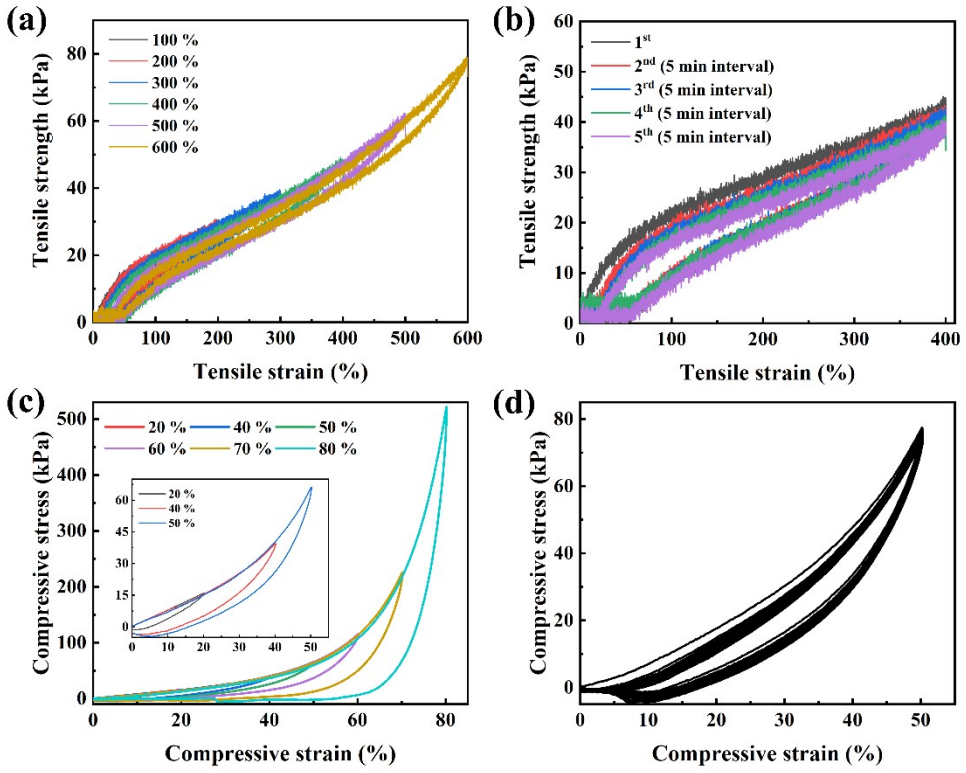

Fig. S8 Mechanical stability of the Janus gel: (a) Cyclic loading–unloading curve under 100-600% strain. (b) The stress–strain curve under cyclic loading at 600% strain with a 5 min interval. (c) The compressive stress–strain curve under 20-80% compressive strain. (d) Noninterval cyclic compression loading–unloading tests at 90% compressive strain.

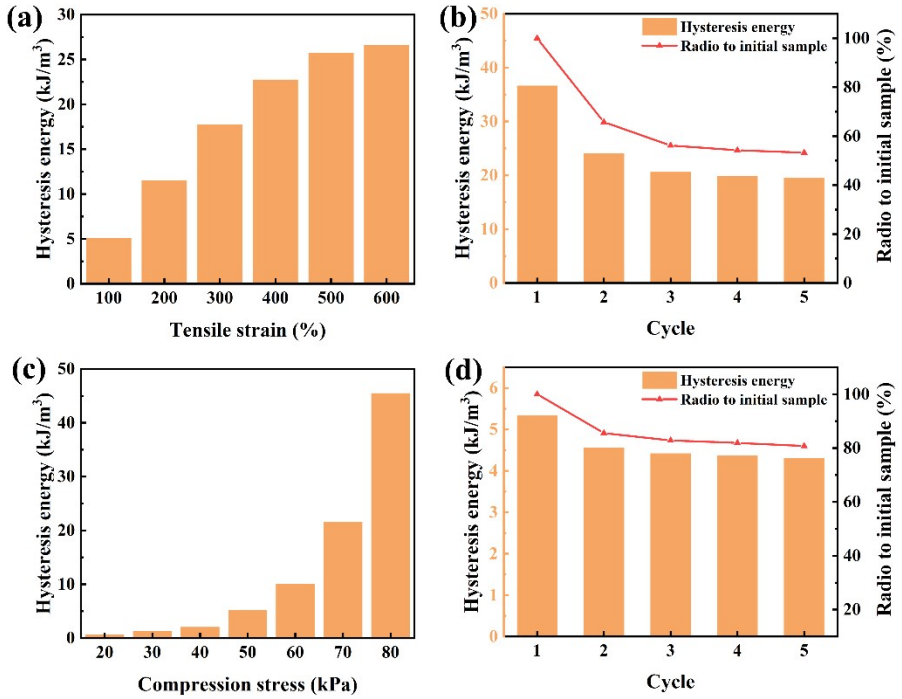

Fig. S9 Loading–unloading experiment of Janus gel: (a) Corresponding hysteresis energy under different tensile strains (100-600%). (b) Corresponding hysteresis energy under different cycles at 400% strain. (c) Corresponding hysteresis energy under different compressive stresses (20 kPa-80 kPa). (d) Corresponding hysteresis energy under different cycles under a stress of 50 kPa.

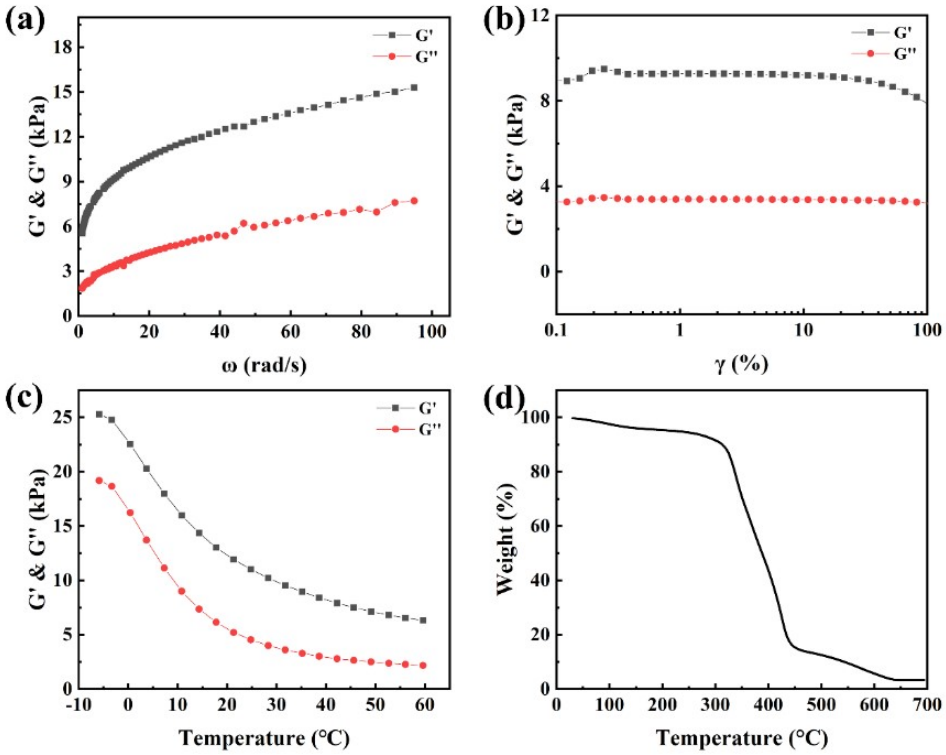

Fig. S10 Dynamic mechanical properties and thermal stability of Janus ionic gel: (a) Frequency

sweep rheological curve. (b) Strain scanning rheological curve. (c) Rheological curves at different temperatures (angular frequency: 10 rad s^{-1}). (d) TGA curve.

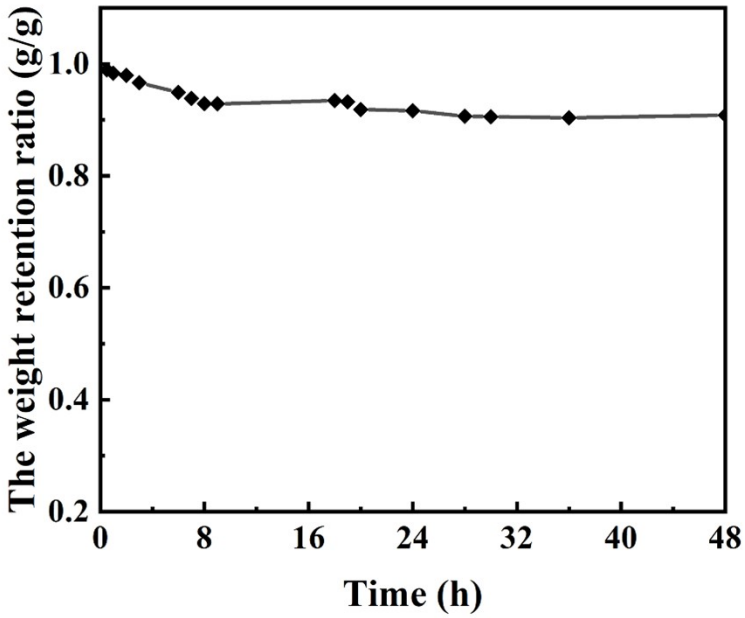

Fig. S11 The weight change of the Janus gel over 2 days (temperature: 21 °C, relative humidity: 70%).

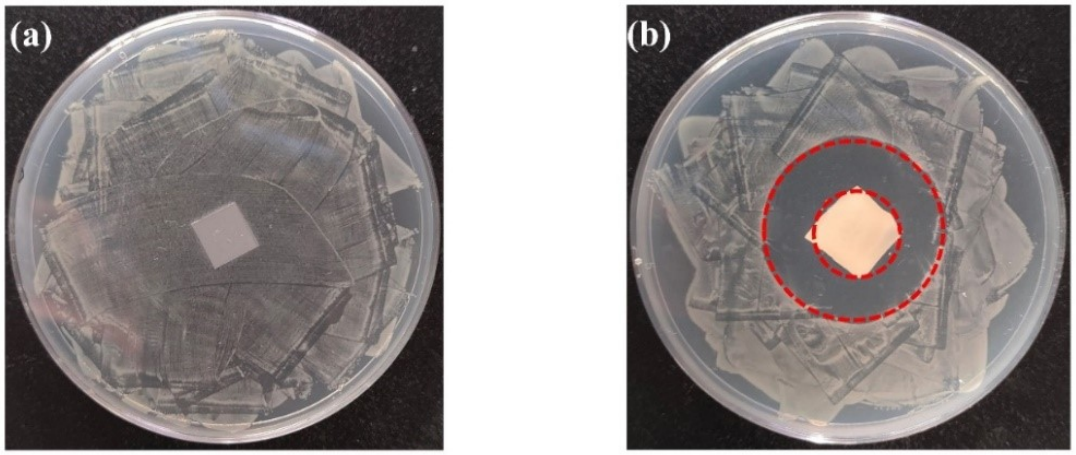

Fig. S12 (a) Photos of the inhibition zone of the pure silicon wafer and (b) Janus ionogel on *E. coli.*