

Supporting information for

**Dually Cross-Linked Single Network Poly(Ionic Liquid)/Ionic Liquid
Ionogels for a Flexible Strain-Humidity Bimodal Sensor**

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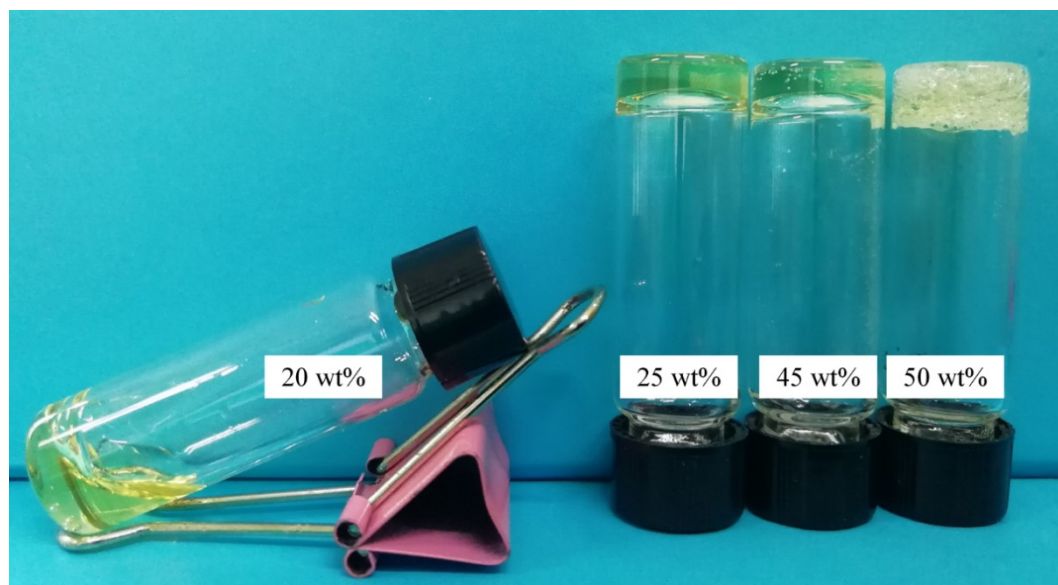


Figure S1. The photographs of the samples with the different contents of the PIL.

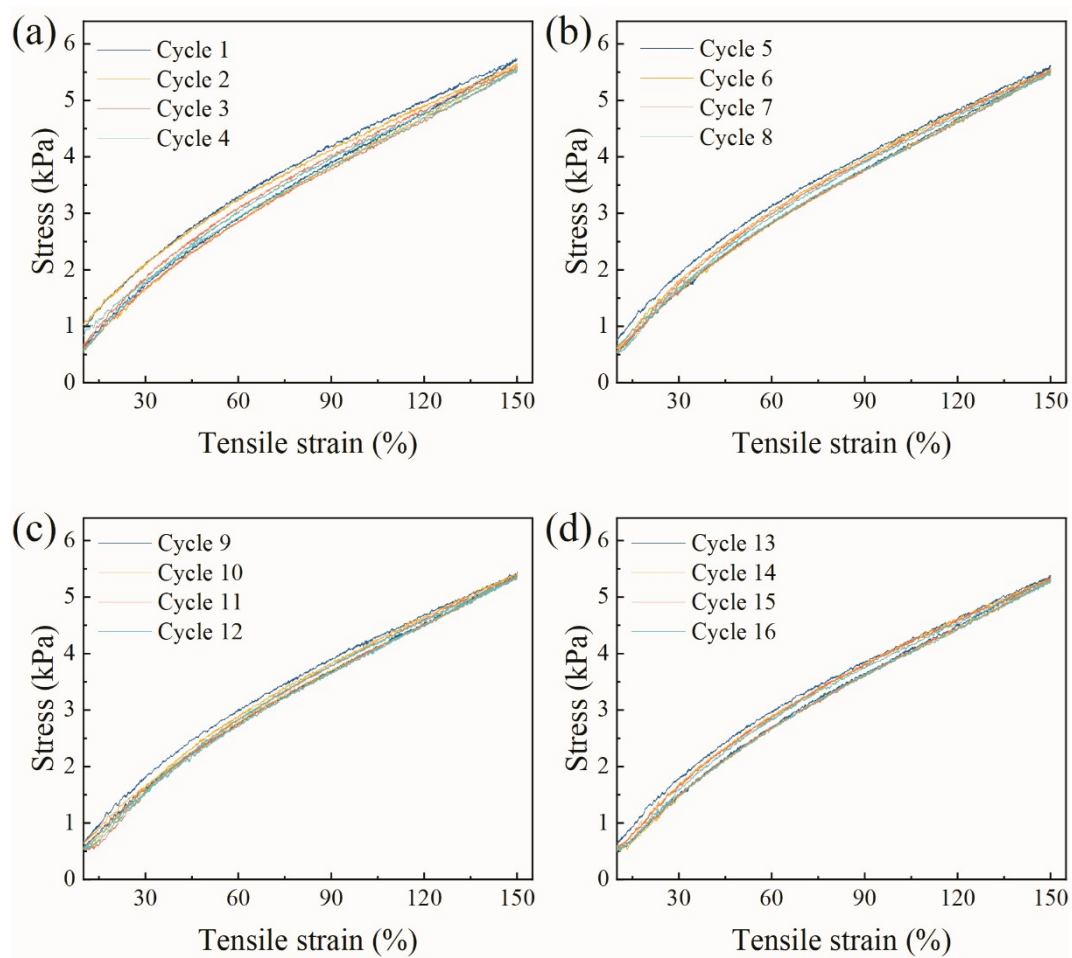


Figure S2. Cyclic tensile stress-strain test of IG30 at constant strain of 150%.

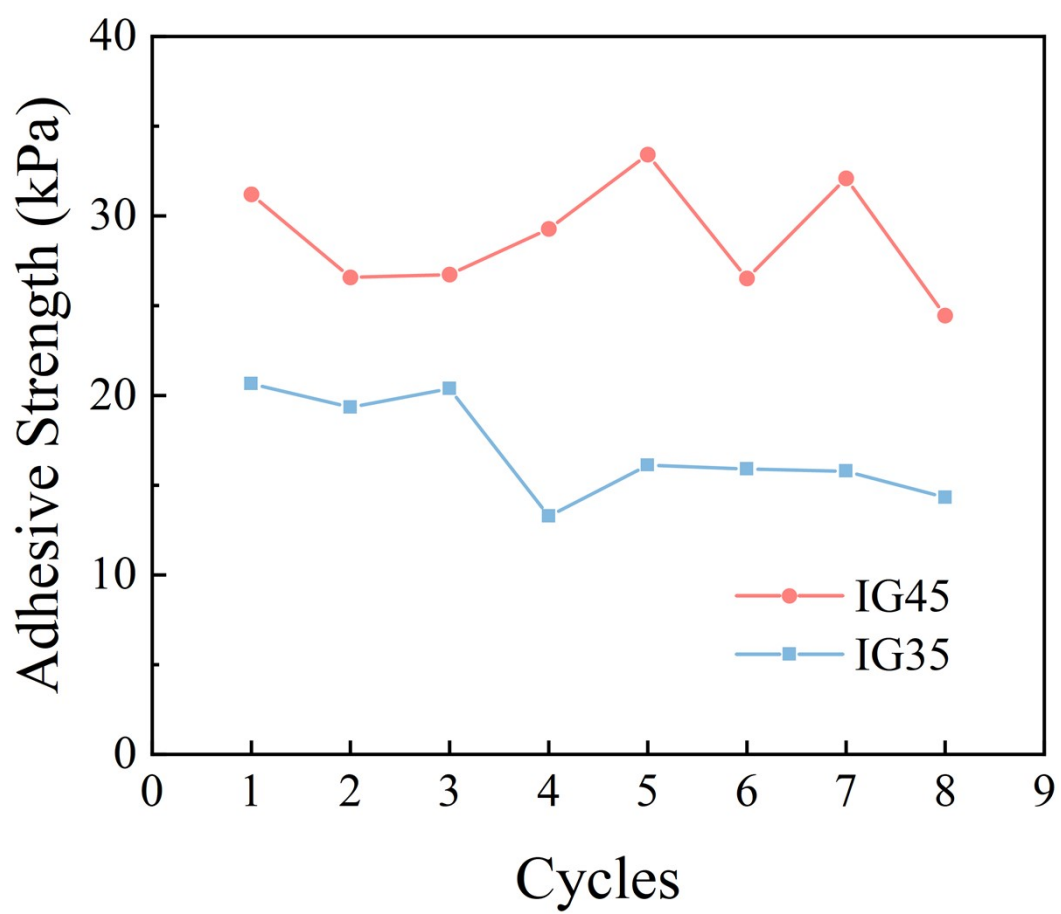


Figure S3. Cyclic lap shear strength test of the IG35 and IG45.

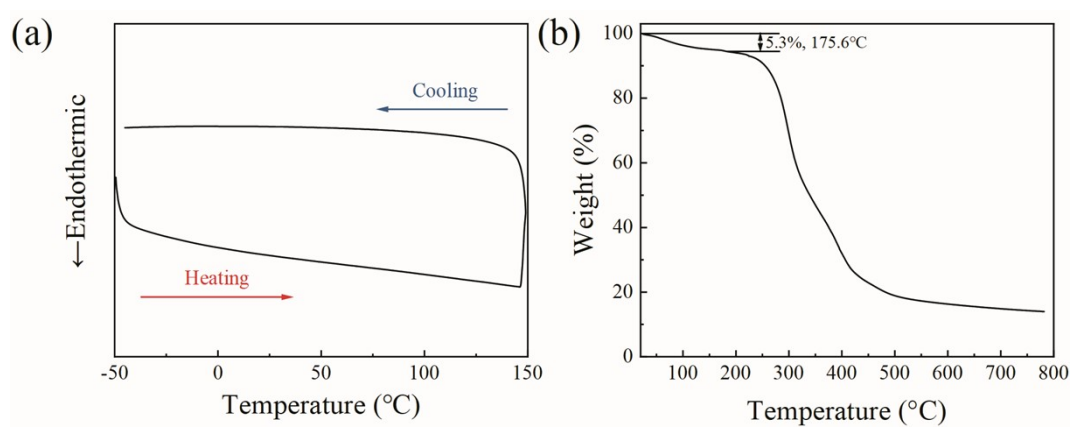


Figure S4. (a) DSC thermograms of the IG35; (b) TGA thermograms of the IG35.

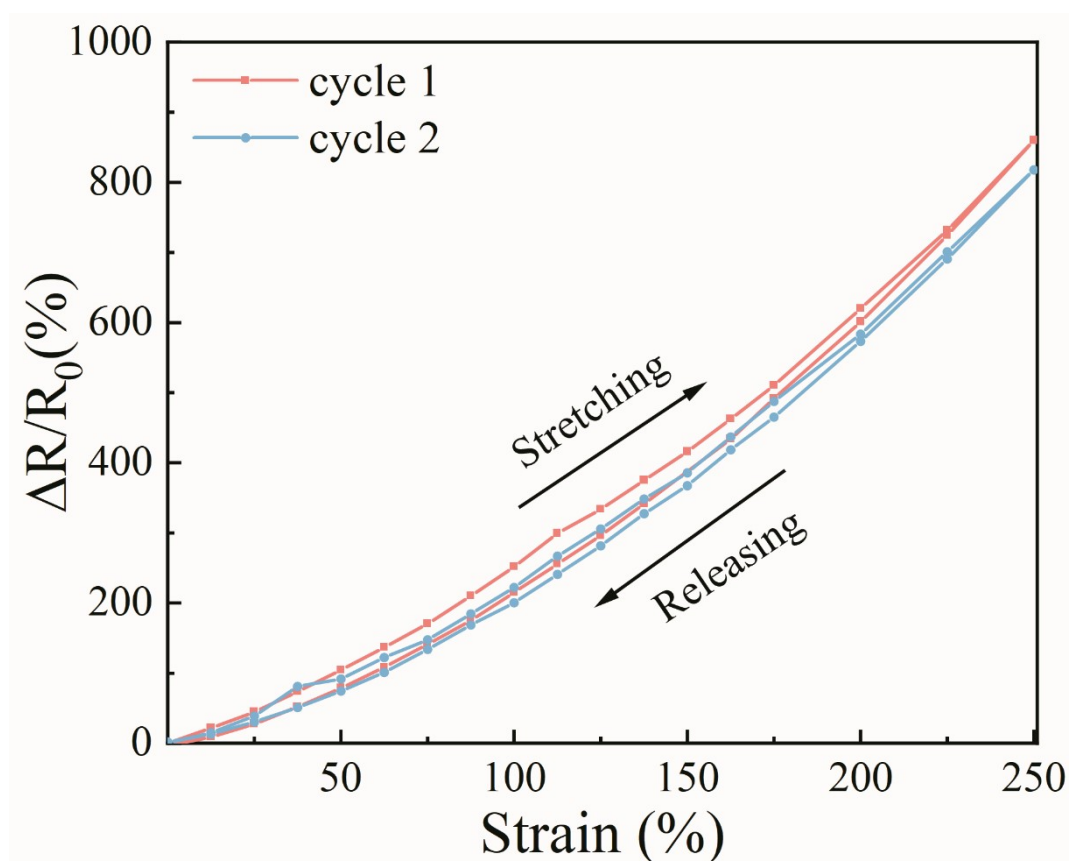


Figure S5. Resistance changes ($\Delta R/R_0$) of IG35 as a function of tensile strain during stretching-relaxing cycles.

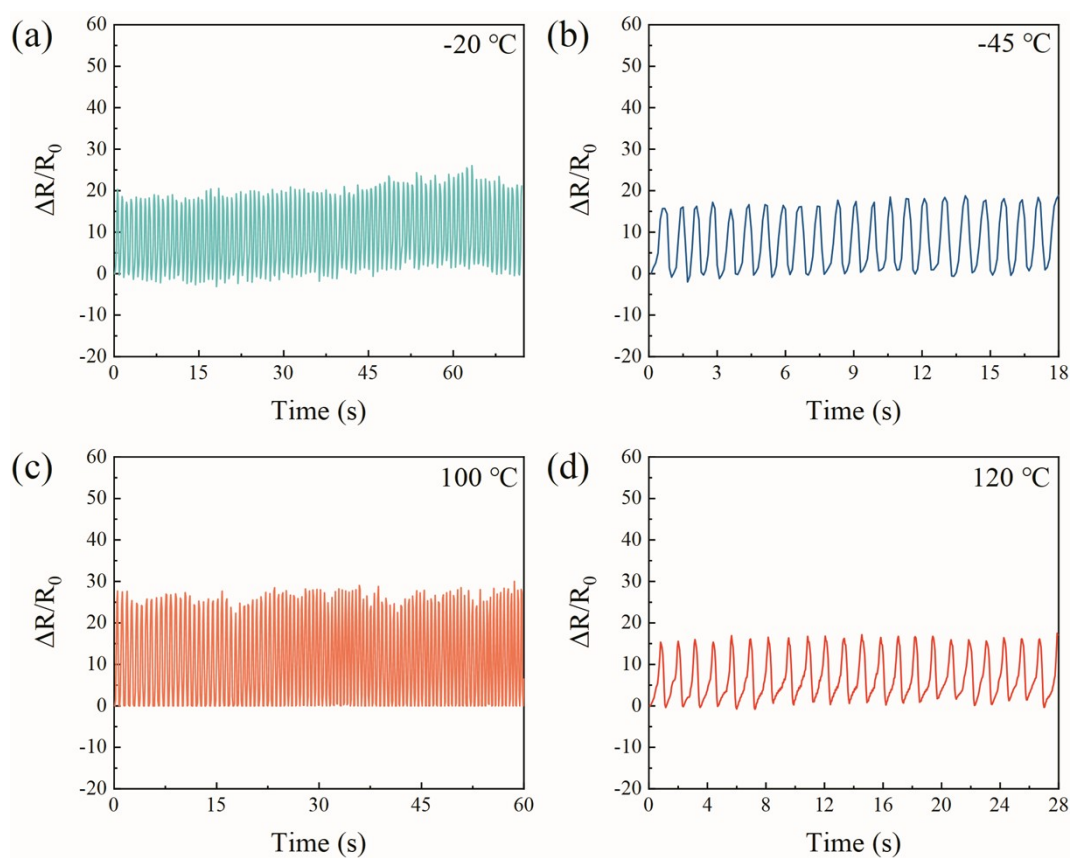


Figure S6. Resistance changes of the strain sensor upon periodical bending/unbending motion of the joint of thumb at different temperature.

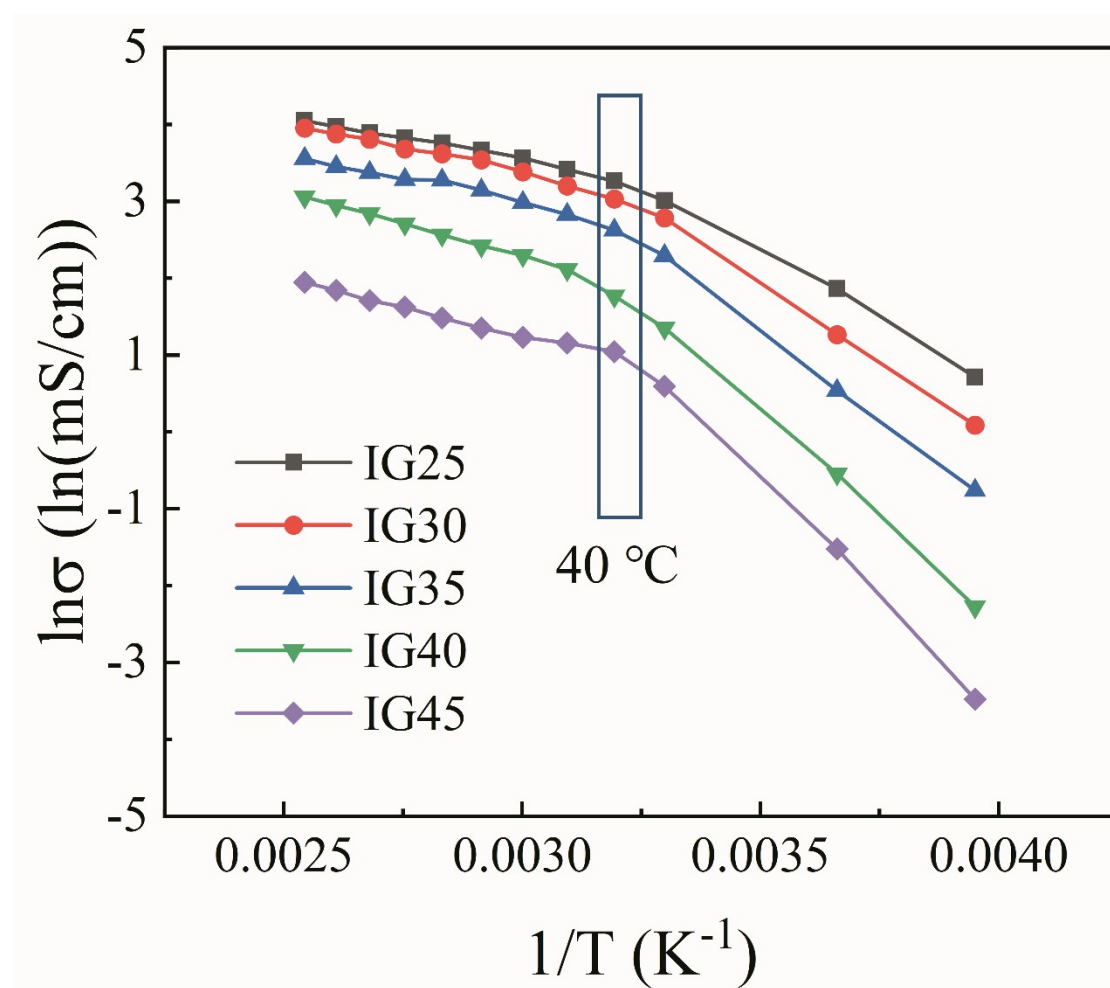


Figure S7. Arrhenius plots of ionic conductivity of the DCSN PIL/IL ionogel with different PIL content.

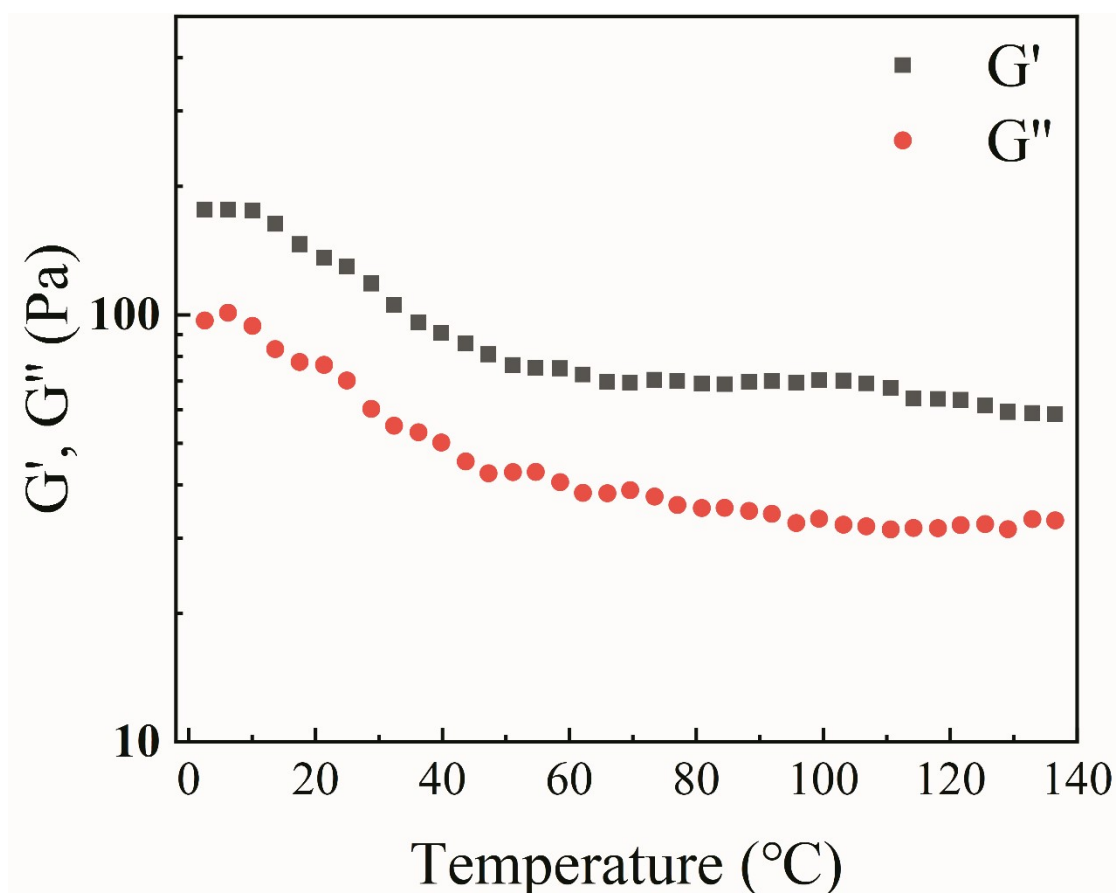


Figure S8. Rheology behaviors of IG35 under a temperature sweep ranging from 0 to 140 °C.

As shown in the figure S7, the storage moduli (G') exceeded the corresponding loss moduli (G'') throughout the entire measured temperature range, revealing the temperature tolerance of our PIL/IL ionogel from the perspective of viscoelasticity. And it was observed that both the G' and G'' values decreased with the increase of temperature, revealing the more loosening physically crosslinked points at higher temperature. This phenomenon also explains to a certain extent why PIL/IL ionogel exhibits higher conductivity at high temperature.

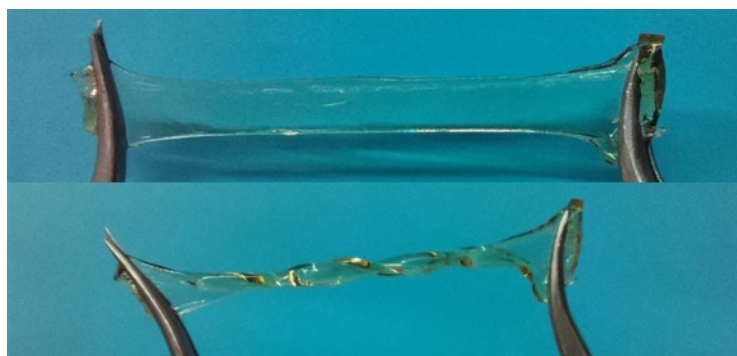


Figure S9. Photograph of IG35 cold treated at -45°C for 5h