Supporting Information

Tetra-PEG Network Containing Ionic Liquid Synthesized via Michael Addition Reaction and Its Application to Polymer Actuator

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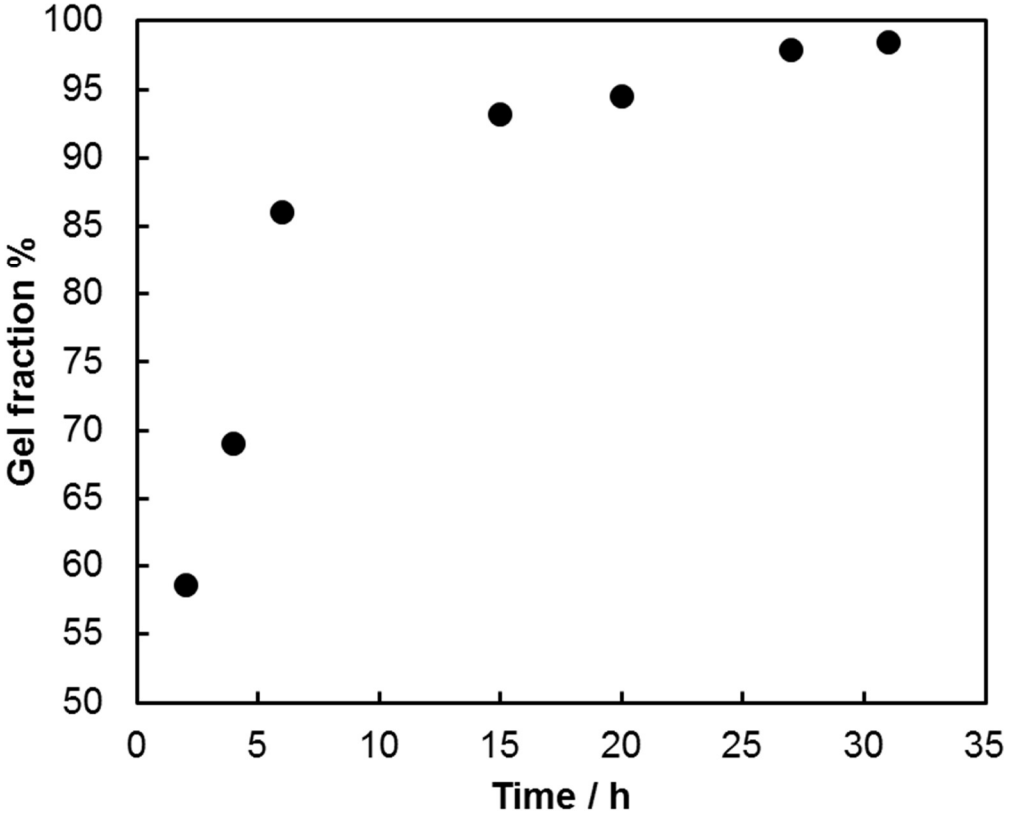

Figure S1. Gel fraction of a 10 wt% tetra-PEG/[C_2mim][NTf_2] solution as a function of reaction time.

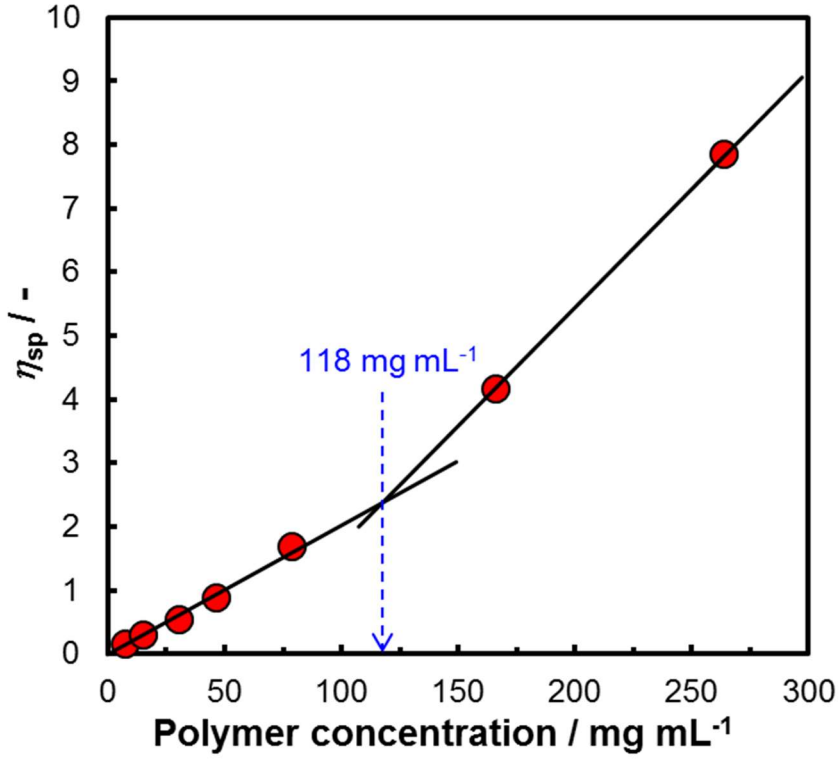

Figure S2. Specific viscosity (η_{sp}) of solutions of tetra-PEG in [C_2mim][NTf_2] as a function of polymer concentration.

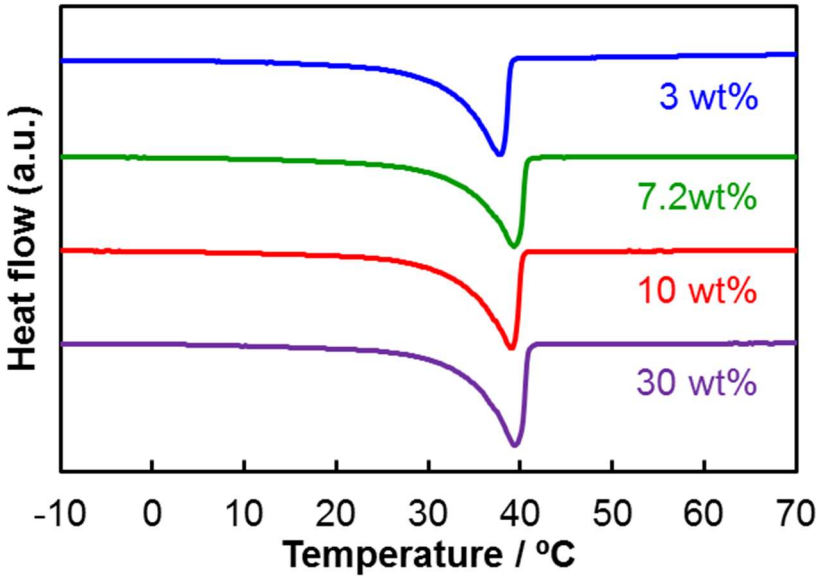

Figure S3. DSC thermograms of the dried tetra-PEG ion gels prepared from each macromonomer concentrations.

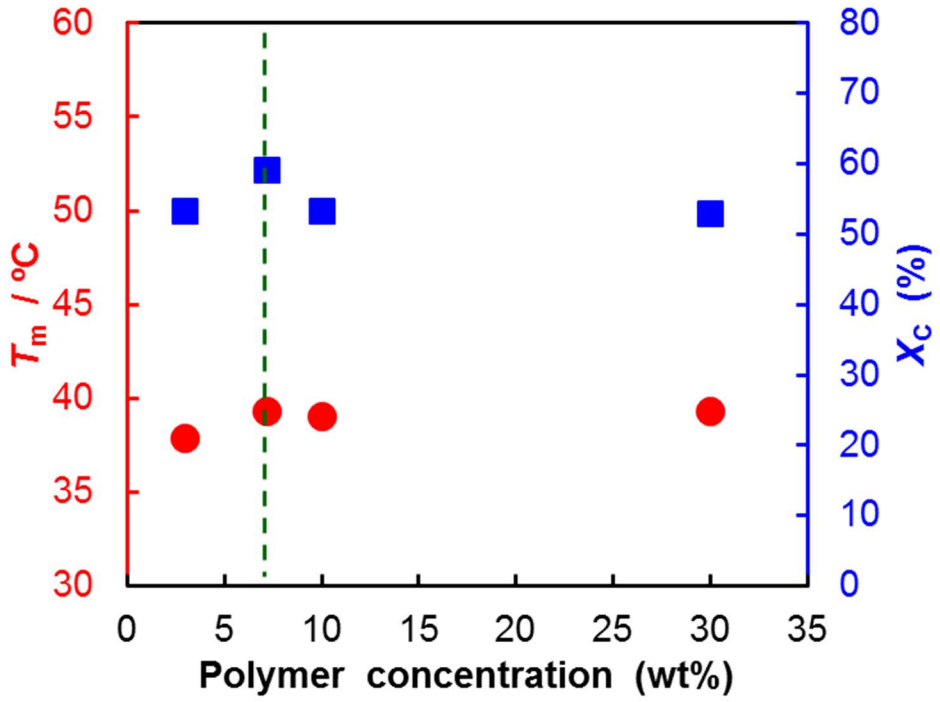

Figure S4. Polymer concentration dependence of the melting temperature (T_m) (red, left axis) and degree of crystallinity (X_C) (blue, right axis) of the dried tetra-PEG gels.

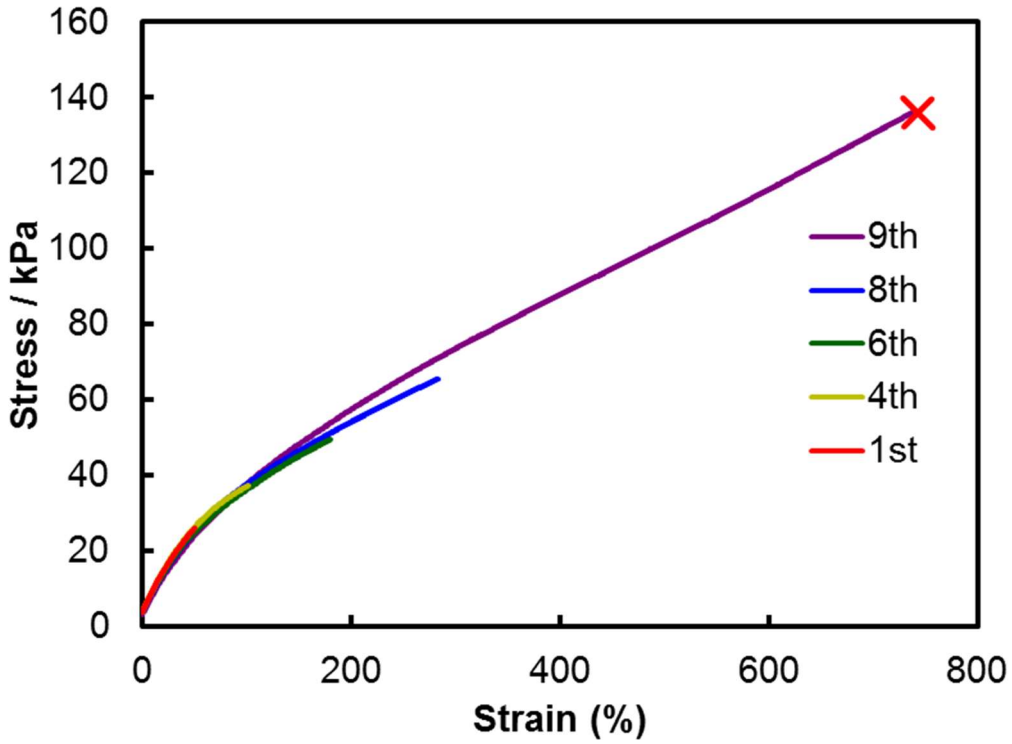

Figure S5. Stress-strain curves of repetitive tensile tests for a 10 wt% tetra-PEG/[C_2mim][NTf_2] ion gel. The applied strain was changed during cycling: 1st to 3rd cycle: = 50%, 4th = 100%, 5th = 150%, 6th = 180%, 7th = 270%, 8th = 280%, and 9th = 735% (fractured). The curves for 2nd, 3rd, 5th, and 7th cycles are not shown.

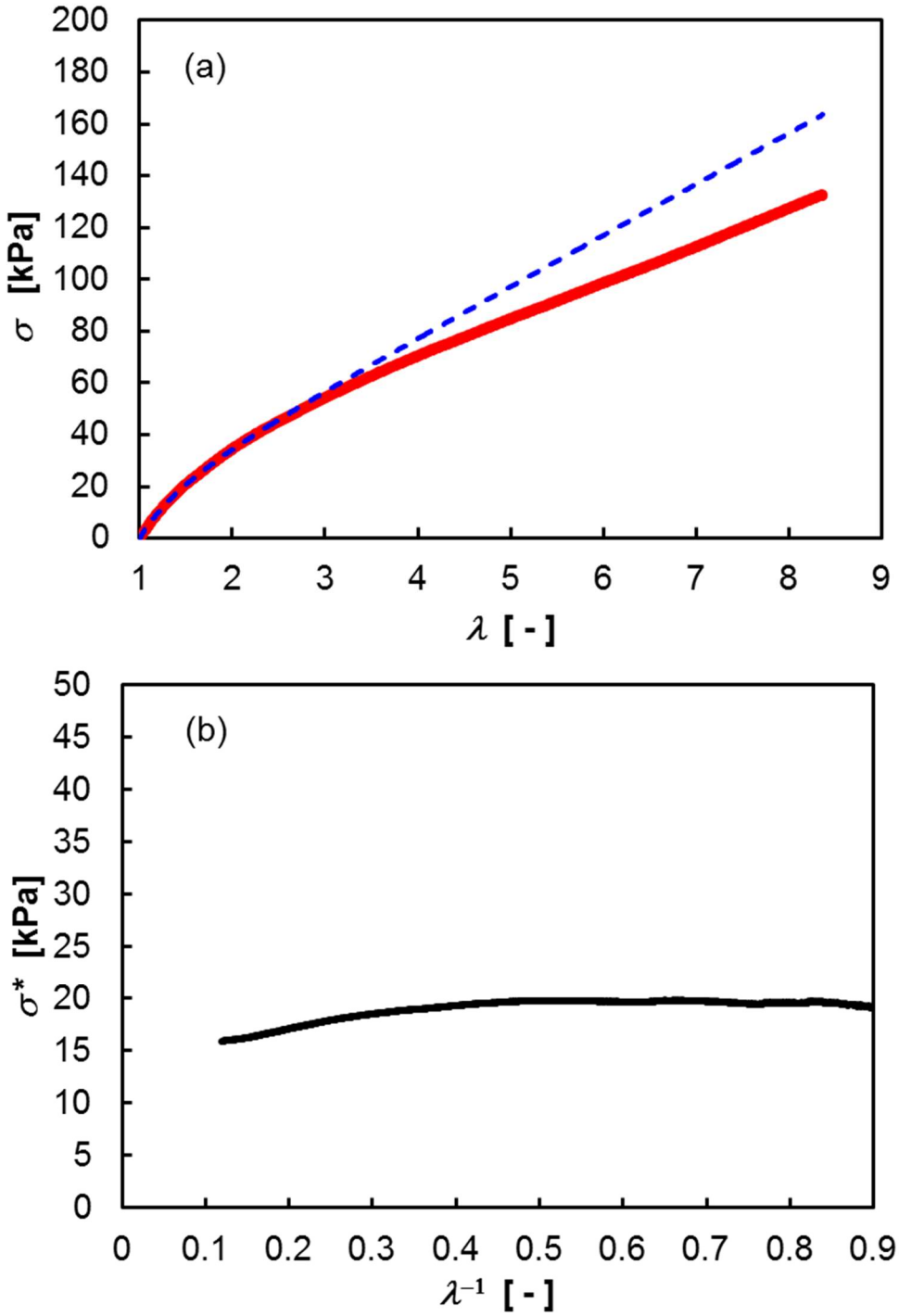

Figure S6. (a) Stress-elongation curve of the 10 wt% tetra-PEG/[C_2mim][NTf_2] ion gel (solid red line) based on the result of stress-strain curve for **Figure 7**. The dashed blue line is the fitting result of equation (6) using *G* value of 19.6 kPa. (b) Mooney – Rivlin plot of the 10 wt% tetra-PEG ion gel.

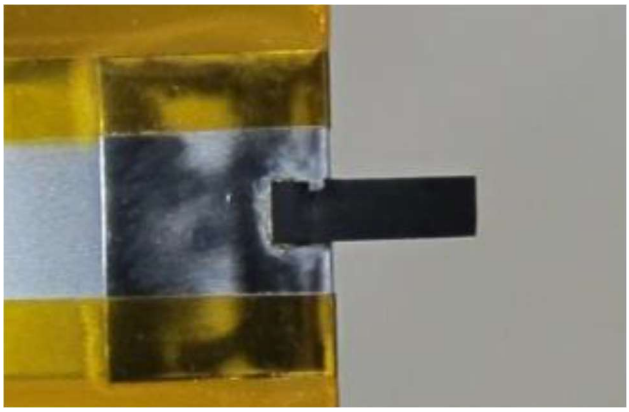

Figure S7. Photograph of PMMA actuator after 1000 cycles. Damage could be observed at the clamped point of the actuator.