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Supplementary Materials for
**Fractographic Mirror Law for Brittle Fracture of Nonlinear Elastic Soft
Materials**

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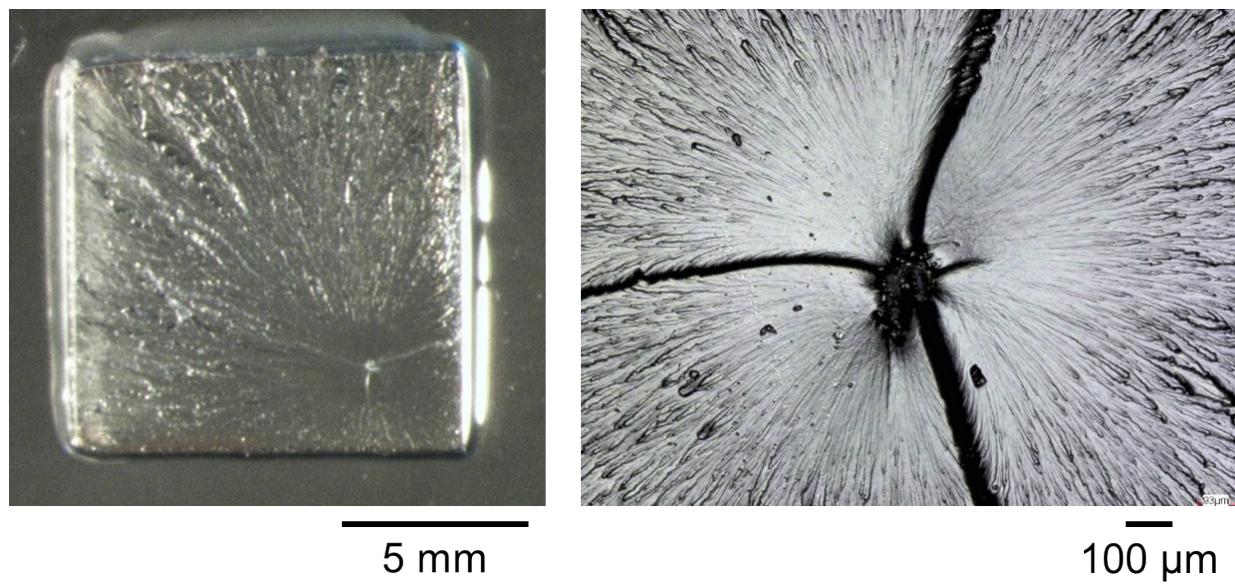


Fig. S1.

Example of the gel broken from internal defect (contaminant probably introduced during gel preparation). Left: overview. Right: high magnification image around the defect.

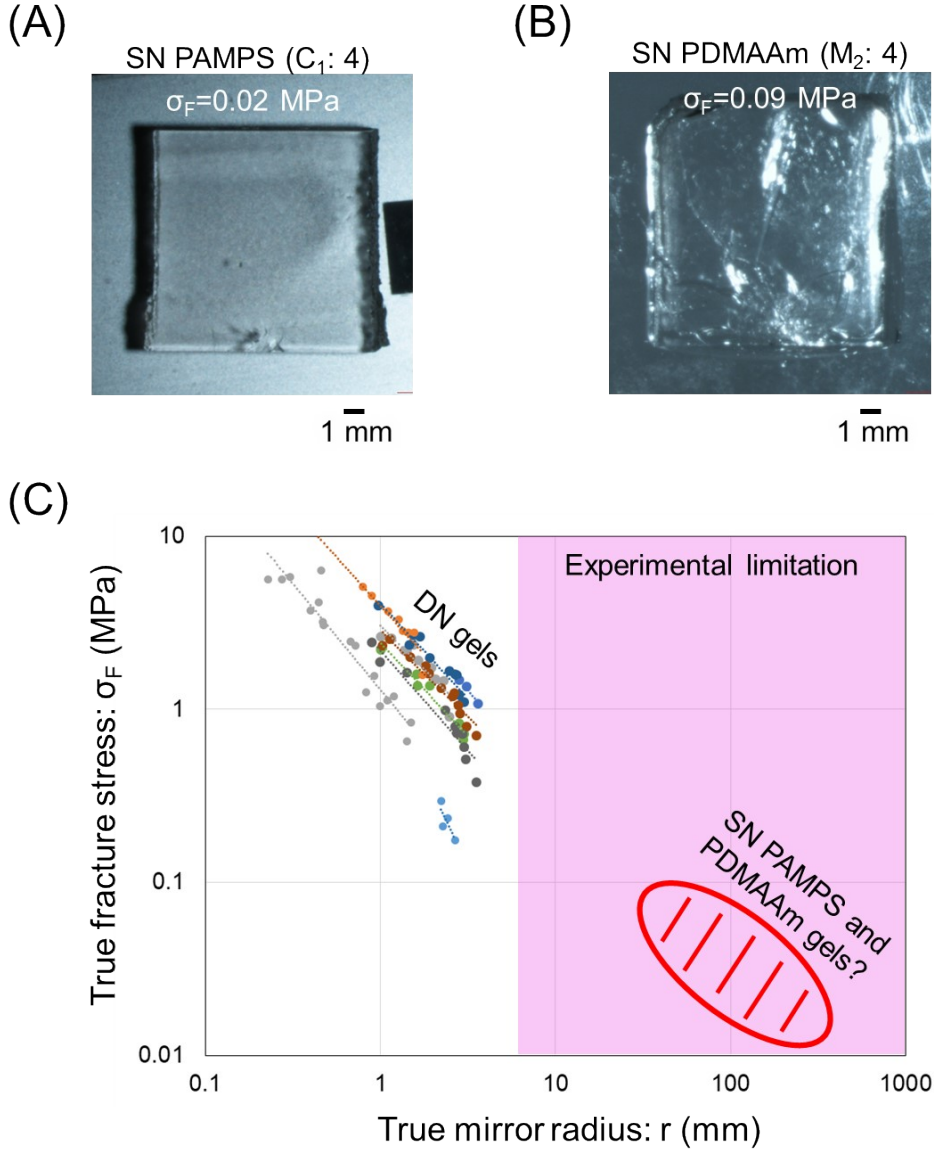


Fig. S2.

Fracture surfaces of single network (SN) gels, which are constituent materials of DN gels. (A) Equilibrium swollen SN PAMPS gels ($C_1:4$). (B) Non-swollen SN PDMAAm gels ($M_2:4$). (C) Relationship between fracture stress and mirror radius. These SN gels break with a smaller fracture stress (10–100 kPa) than DN gels (0.2–10 MPa). Therefore, the expected mirror radius (red-hatched region) greatly exceeds the sample size (1 cm $\times$ 1 cm) used in this study.

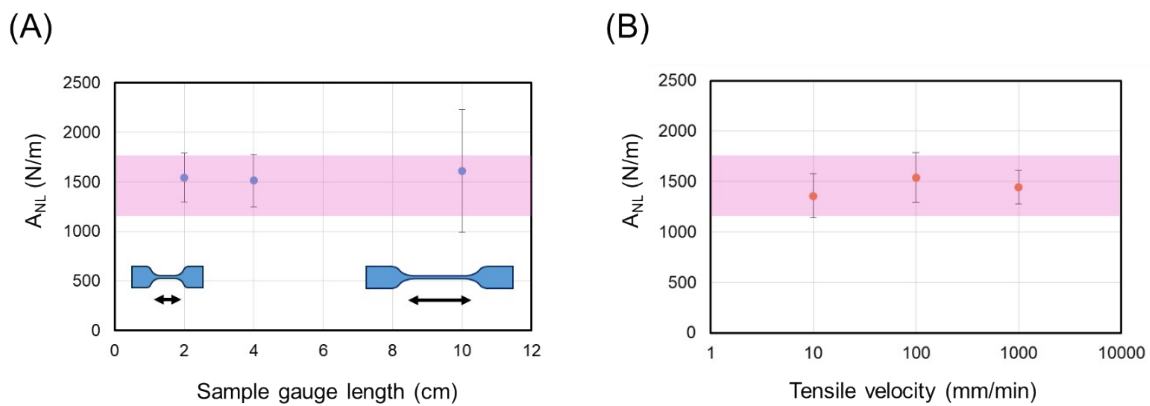


Fig. S3.

Material constant A_{NL} under different experimental conditions. (A) Different sample gauge lengths. (B) Different tensile velocities. The sample composition is DN gel (8/2).

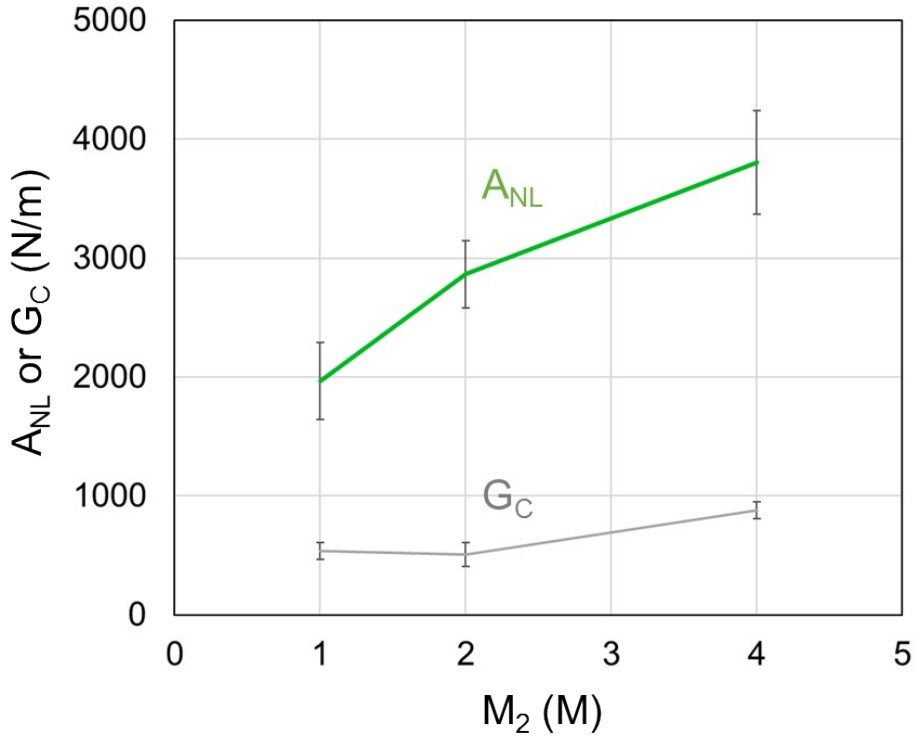


Fig. S4.

Relationship between mirror constant A_{NL} and critical energy release rate G_c of DN hydrogels with varied second-network monomer concentrations M_2 . The G_c was measured using a pure shear test [27]. The sample composition is DN gel (4/ M_2).

Movie S1.

Tensile test movie of DN (8/2).