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Toughness and Fracture Energy of PDMS Bimodal and Trimodal Elastomers[1] CLAUDE COHEN, GEOFFREY GENESKY, Cornell University — PDMS bimodal and trimodal end-linked elastomers display remarkable ultimate properties in uniaxial extension when the molar masses of the precursor chains are widely separated and are present in an appropriate range of concentrations. The mass of the long chain component in these networks remains dominant. These elastomers can be stretched to large elongations before fracture while displaying an upturn in stress at high strain when the short chains are near their overlap concentration and will support the applied load. The fracture energy of pre-cut bimodal and trimodal networks on the other hand does not exhibit a pronounced improvement over that of unimodal networks. It appears to be governed by the average molar mass of the "effective" elastic strand length in each network that is based on its elastic modulus.

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