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**Fracture Behavior of High-Toughness, Ionically Cross-linked Triblock Copolymer Hydrogels** KEVIN HENDERSON, KATHRYN OTIM, KENNETH SHULL, Northwestern University — Mechanisms for enhancing energy dissipation and hence toughness are important for the generation of robust synthetic soft materials for biomedical applications. Ionic cross-linking in particular has been explored in triblock copolymer hydrogels and affords a remarkable change in mechanical performance comparable to non-cross-linked analogs. Here we employ a physically associated base triblock copolymer network composed of hydrophobic poly(methyl methacrylate) endblocks and a hydrophilic poly(methacrylic acid) midblock capable of complexing with divalent cations. Increases in stiffness and strength have previously been reported, with the extent dependent upon the identity, concentration, and pH of a cross-linking cation solution. We delineate the measured toughness in such systems using tensile tear tests and relate the mechanical performance to a damage zone model reminiscent of loading behavior observed in double network hydrogels.

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