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Reversible Networks by Hydrogen Bonding of ABA Triblock Copolymers in an Ionic Liquid TIMOTHY LODGE, University of Minnesota, ATSUSHI NORO, YUSHU MATSUSHITA, University of Nagoya — Ion gels, comprising a polymeric network solvated by an ionic liquid, are of great interest as, e.g., gate dielectrics in plastic electronics, polymer electrolytes with high ionic conductivity, actuators and artificial muscles, gas separation media, and sensors. We have explored the thermoreversible gelation of a model system containing poly(2-vinyl pyridine-b-ethyl acrylate-b-2-vinyl pyridine)) (VEAV) triblocks dissolved in 1-ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide) [emi][tfsi], where the EA blocks are under good solvent conditions. Addition of poly(vinyl phenol) (PVPh) creates hydrogen bonds with the V end blocks, leading to gelation. As each end block and each PVPh "crosslinker" has about 50 segments, up to 50 hydrogen bonds may be formed per block. Consequently, over the temperature range 30 – 160 C the longest relaxation time of the gel, related to the "sticker" lifetime, varies by about 12 orders of magnitude. The thermal stability of the ionic liquid thus provides an unprecedented opportunity to study the dynamic properties of reversible networks over a wide range of timescale.

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