

Abstract Submitted
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Thermoreversible Supramolecular Ion Gels via Hydrogen Bonding YU LEI, TIMOTHY LODGE, Department of Chemistry, University of Minnesota — Ion gels are a novel class of functional materials of broad interest for advanced applications. We have developed a thermoreversible supramolecular ion gel system consisting of a poly(2-vinylpyridine-*b*-ethylene oxide-*b*-2-vinylpyridine) (P2VP-PEO-P2VP) triblock copolymer, a poly(4-vinylphenol) (PVPh) linear homopolymer, and an ionic liquid, 1-ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)amide ([EMI][TFSA]), where a highly interconnected transient polymer network is formed by hydrogen bonding between the P2VP endblocks and PVPh cross-linkers. This system exhibits novel physical properties, such as interesting dynamics and homopolymer clustering in the cross-links. The applicability of time-temperature superposition to this system is striking, resulting in a master curve that extends over 20 orders of magnitude in reduced frequency. The hydrogen-bonded phase can arrange into a hexagonally packed cylindrical morphology with long-range ordering, which reveals very slow kinetics and is thermodynamically stable only within a narrow temperature window. The highly tunable relaxation dynamics as well as shear modulus might enable materials design for specific applications.

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