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Time-composition superpositioning in the rheological behavior of triblock copolymer/selective co-solvent blends ARJUN KRISHNAN, North Carolina State University, RUDOLF BUKOVNIK, Tyco Electronics Corp., RICHARD SPONTAK, North Carolina State University — Thermoplastic elastomers composed of styrenic triblock copolymers are of great importance in applications such as adhesives and vibration dampening due to their resilience and facile processing. The swelling of these polymers by adding midblock selective solvents or oligomers provides an easy route by which to modify the morphology and mechanical behavior of these systems. In this study we consider a ternary blend of a poly[styrene-*b*-(ethylene-*co*-butylene)-*b*-styrene] triblock copolymer and mixtures of two midblock selective co-solvents: a mineral oil that is liquid at ambient temperature, and a glassy tackifier resin that exhibits limited solubility in the midblock matrix. We use dynamic rheology to study the viscoelastic response of a wide variety of systems under oscillatory shear. The copolymer concentration is varied between 15 to 35 wt%, while the resin/oil ratio in the midblock-solvent matrix is independently varied. Frequency spectra acquired at ambient temperature display viscoelastic behavior that shifts in the frequency domain depending on the resin/oil ratio. At high oil loadings, the materials behave as physical gels. For each copolymer concentration, all the frequency data can be shifted by time-composition superpositioning to yield a single master-curve.

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