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Wide bicontinuous compositional windows from co-networks made with telechelic macromonomers GREGORY TEW, Polymer Science and Engineering, University of Massachusetts, Amherst — Phase-separated and self-assembled co-network materials offer a simple route to bicontinuous-like morphologies, which are expected to be highly beneficial for applications such as ion, charge, and oxygen transport. Despite these potential advantages, the systematic definition of co-network structures has not been achieved, largely due to the lack of well-controlled chemistries for their preparation. Here, a thiol-ene end-linking platform enables the systematic investigation of phase-separated poly(ethylene glycol) (PEG) and polystyrene (PS) networks in terms of the molecular weight and relative volume fractions of precursor polymers. The ion conductivity and storage modulus of these materials serve as probes to demonstrate that both phases percolate over a wide range of compositions, spanning PEG volume fractions from $\sim$ 0.3 - 0.65. These findings demonstrate that this approach to thiol-ene co-networks is a versatile platform to create bicontinuous morphologies.

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