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Radical-cured block copolymer modified thermosets[1] ERICA REDLINE, LORRAINE FRANCIS, FRANK BATES, Department of Chemical Engineering and Materials Science, University of Minnesota — Poly(ethylene-*alt*-propylene)-*b*-poly(ethylene oxide) (PEP-PEO) diblock copolymers were synthesized and added at 4 wt. % to bisphenol A glycidyl methacrylate (BisGMA). The mixture was thermally cured using free radical chemistry. In separate experiments, 4 wt. % PEP-PEO was added to a combination of poly(ethylene glycol) dimethacrylate (PEGDMA) and BisGMA and cured. Based on small angle X-ray studies of the modified monomers before curing, diblock copolymers self-assembled into well-dispersed spherical micelles with PEP cores and PEO coronas. TEM results showed that these micellar structures were retained during curing. Fracture resistance measurements indicate that the addition of block copolymers does not significantly toughen these thermoset materials. This finding is contrary to the large increase in fracture resistance observed in block copolymer-modified epoxies. We propose that differences in network structure, originating during polymerization, are responsible.

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