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Enhanced stability of self-assembled polymer nanostructures by molecular crosslinking MARK STOYKOVICH, IAN CAMPBELL, BRIAN PEREA, University of Colorado-Boulder — Self-assembled nanostructures of block copolymers have attracted interest for applications in next generation lithography and advanced materials synthesis. Many of these applications require mechanically and chemically robust nanostructures that cannot be achieved by simple diblock copolymer materials alone. Here we have investigated a method to stabilize block copolymer nanostructures after self-assembly in thin films by incorporating cross-linking molecular components within the self-assembled domains. Polymer blends consisting of a majority symmetric PS-block-PMMA copolymer and equal amounts of PS and PMMA homopolymers were prepared and determined to form lamellar phase morphologies. The PS and PMMA homopolymers were synthesized with a small fraction of glycidyl methacrylate monomer which served as the cross-linking agent in the blends. These nanostructures exhibit enhanced solvent and thermal stability, and have been demonstrated for the fabrication of three-dimensional multilayer structures.

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