Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Interfacial roughness of self-assembled lamellae in cross-linkable block copolymer thin films CHUNLIN HE, MARK STOYKOVICH, CU-Boulder — Although diblock copolymers are attractive for fabricating structures with 5-50 nm dimensions, the ability of such materials to self-correct or "heal" nanoscale defects is of equal importance for future lithographic applications. Reduced interfacial roughness and enhanced dimensional control have been demonstrated to occur at the molecular-level when the block copolymers are directed to self-assemble on chemically patterned surfaces or in topographic structures. Here we demonstrate that cross-linking in self-assembled block copolymer domains can also significantly reduce interfacial roughness caused by thermal fluctuations. Lamellar-forming block copolymer/homopolymer blends, with and without cross-linkable components, were directed to self-assemble on chemically patterned substrates and processed by solvent-annealing at room temperature. The lamellae were subsequently thermally-processed or exposed to UV light to perform a cross-linking reaction in a step distinct from the self-assembly process. Spectral analysis of the interfacial roughness was compared between the cross-linkable and uncross-linkable block copolymer materials, and the cross-linked system was quantified to have lower interfacial roughness due to a tighter coupling between neighboring interfaces.

Chunlin He
CU-Boulder

Date submitted: 12 Dec 2012 Electronic form version 1.4