Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Influence of added copolymers on thin film polymer blends studied by atomic force microscopy: surface morphology and dewetting DEAN WALDOW, JENIFER HOFFERT, KRIS PETERSON, Pacific Lutheran University — Atomic force microscopy (AFM) was used to study thin film polymer blends of polystyrene (PS) and polybutadiene (PB). These blends were studied with increasing concentration of block, random, and graft copolymers. Thin films were prepared by spin coating from a good solvent, which resulted in film thicknesses of approximately 65 nm. The AFM data were collected in AC mode and included both topographic and phase data. The topography data were analyzed using lateral Fourier Transform analysis as well as real space techniques both lateral and normal to the surface. The results suggest that lateral phase separated domain size decreases with increasing copolymer concentration for each of additives studied and for all concentrations. The evolution of the phase separated morphologies and dewetting was also studied by an anneal / quench technique as well as real time monitoring at temperatures above the PS glass transition temperature. Results for the domain evolution experiments demonstrate significant suppression of lateral domain growth and some suppression of large encapsulated domains seen in the binary blend. The graft copolymer demonstrated the most significant effects with the diblock and random copolymers following in significance respectively.

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Date submitted: 27 Nov 2007 Electronic form version 1.4