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X-ray Standing Wave Studies of Stability and Dynamics in Poly(4-bromostyrene)/Poly(4-vinylpyridine) Thin Films YAN SUN, KENNETH SHULL, Northwestern University, JIN WANG, Argonne National Laboratory — The thermodynamic stability and wetting behavior in systems consisting of two or three distinct layers of polymeric thin films have been investigated with atomic force microscopy (AFM) and x-ray standing waves (XSW) generated via total external reflection from an x-ray mirror. We have probed the structural evolution of thin poly(4-bromostyrene) (PBrS) films with various degrees of bromination, prepared on top of a poly(4-vinylpyridine) (P4VP) layer whose dynamics is influenced by its interaction with the underlying substrate and couples to that of PBrS. The addition of a top poly(styrene) (PS) layer was also used in some cases. The samples were subjected to annealing treatments above the polymer glass transition temperatures. Reflectivity and x-ray fluorescence from bromine markers in the PBrS layer were tracked. Dewetting of the PS occurred with sufficient annealing time, though the results suggest that this proceeded faster with low PBrS bromination. AFM studies on the PBrS/P4VP system revealed a clear PBrS thickness dependence on the dewetting morphology and dynamics of this layer.

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