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High Resolution Imaging of Polymers Using Stochastic Optical Reconstruction Microscopy (STORM) M.W. GRAMLICH, J. BAE, R. HAYWARD, J.L. ROSS, University of Massachusettes - Amherst — Recent super-resolution fluorescence imaging techniques represent attractive new methods for structural characterization of polymeric systems. STORM is a technique developed over the last decade to image structure and dynamics in biological systems. The high spatial resolution approaches that of other well-established techniques, such as atomic force microscopy (AFM) or scanning electron microscopy, but with all the advantages of a far-field optical technique. We have adapted STORM imaging techniques to polymeric materials, specifically using thin film blends of polystyrene (PS) and poly(methyl methacrylate) (PMMA) as a model system. We labeled PMMA with Alexa-647 fluorescent dye, and combined 10wt% label to un-labeled PMMA, then prepared 50:50 by weight blends with PS. We find the lateral PMMA domain size increases with film thickness. Furthermore, we show that the structure and size of the domains is equivalent to results from AFM. Funding is acknowledged from NSF MRI grant#DBI-0923318 to Ross and Wadsworth, "Development of FPALM-STORM for Live Cell Single Molecule Microscopy"; NSF MRSEC grant #DMR-0820506 to UMass. We would like to acknowledge Rachel Letteri, Brent Hammer, Todd Emrick, Weiyin Gu, and Tom Russell for help with material preparation.

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