Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Scattering-type near-field infrared microscopy of selforganized nanodomains of diblock copolymers MARKUS B. RASCHKE, LEOPOLDO MOLINA, Max-Born-Institute, Berlin, Germany, DONG HA KIM, WOLFGANG KNOLL, Max Planck Institute for Polymer Research, Mainz, KARSTEN HINRICHS, ISAS - Institute for Analytical Sciences, Berlin — The expansion of scattering-type scanning near-field optical microscopy (*s*-SNOM) into the infrared spectral region provides the ability to achieve all-optical resolution down to the several nanometer range in combination with the chemical sensitivity of infrared spectroscopy. Here, we have performed a nanometer scale surface analysis and identification of domains formed by phase separation of the diblock copolymers polystyrene-*b*-polyvinylpyridine (PS-b-P2VP) and polystyrene-*b*-polyethyleneoxide (PS-b-PEO). This has been achieved by means of non-interferometric IR-scattering detection based on epi-illumination of sharp Au-coated cantilever tips in a noncontact atomic force microscopy configuration. Contrast is obtained probing characteristic differences in the C–H stretch vibrational resonances between the different polymer constituents and a spatial resolution down to 10 nm has been made possible. The mechanism of the near-field tip-sample coupling by vibrational resonances responsible for the imaging contrast has been deduced and can be modelled based on the dielectric functions of the polymer compounds measured by spectroscopic ellipsometry.

Markus Raschke
Max-Born-Institute

Date submitted: 01 Dec 2004 Electronic form version 1.4