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Confocal Raman-AFM, A New Tool for Materials Research UTE SCHMIDT, KLAUS WEISHAUPT, WOLFRAM IBACH, MATTHIAS KRESS, OLAF HOLLRICHER, WITec GmbH, Ulm, Germany — Characterization of heterogeneous systems, e.g. polymers, on the nanometer scale continues to grow in importance and to impact key applications in the field of materials science, nanotechnology and catalysis. The development of advanced polymeric materials for such applications requires detailed information about the physical and chemical properties of these materials on the nanometer scale. However, some details about the phase-separation process in polymers are difficult to study with conventional characterization techniques due to the inability of these methods to chemically differentiate materials with good spatial resolution, without damage, staining or preferential solvent washing. The CR-AFM is a breakthrough in microscopy. It combines three measuring techniques in one instrument: a high resolution confocal optical microscope, an extremely sensitive Raman spectroscopy system, and an Atomic Force Microscope. Using this instrument, the high spatial and topographical resolution obtained with an AFM can be directly linked to the chemical information gained by Confocal Raman spectroscopy. To demonstrate the capabilities of this unique combination of measuring techniques, polymer blend films, spin coated on glass substrates, have been characterized. AFM measurements reveal the structural and mechanical properties of the films, whereas Raman spectral images show the chemical composition of the blends.

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