MAR14-2013-020183

Abstract for an Invited Paper
for the MAR14 Meeting of
the American Physical Society

Multimodal and multispectral nano-imaging: accessing structure, function, and dynamics on the molecular scale

MARKUS RASCHKE, University of Colorado, Boulder, CO

Structure, function, and dynamics of many soft-matter systems, including polymer heterostructures, organic photovoltaics, or biomembranes are typically defined on the mesoscopic few nm to sub-micron scale. Tip-enhanced and scattering scanning near-field optical microscopy (s-SNOM) have already demonstrated their ability to spectroscopically access that relevant spatial regime. I will demonstrate how in combination with advanced linear, broad-band, and ultrafast IR-vibrational spectroscopy s-SNOM provides ultrahigh spatial, spectral, and dynamic molecular structural information. From studying with nanometer spatial resolution vibrational dynamics, solvatochromism, and spectral Stark shifts, we gain microscopic insight into structure and intra- and intermolecular interactions in polymer and biological heterostructures. The approach provides access to understanding and ultimately controlling the interplay between structure, function, and dynamics in heterogeneous functional soft matter.