



Advanced Scanning Probe Force Microscopy for Nanoscale Analysis

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Abstract

Scanning Probe Force Microscopy (SPM) has demonstrated true atomic resolution on metals, semiconductors and insulators even under liquid conditions. The application of SPM to single molecules is a challenge because of relatively weak bonding to the substrate, which often leads to high diffusion rates of the molecules. The imaging of molecules, which were designed to interact with specific sites on insulating surfaces, wires of porphyrin molecules on ionic crystal surfaces observed by noncontact Atomic Force Microscopy (nc-AFM) and Kelvin Probe Force Microscopy (KPFM) as well as the acquisition of full 3D force fields of single molecular structures will be discussed. Recently, intramolecular resolution is studied on a variety of molecules. A further challenge is the manipulation of molecules on surfaces, including the controlled rotation, which means that the direction of rotation of the molecule can be chosen by the experimentalist.