X-Ray Absorption Spectromicroscopic Analysis of Functionalized Pattern Surface

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The ability to manipulate matter in the nanometer scale attracts great attention in the nanoscience and technology. Nanofabrication of functionalized patterns is one of the most interest issues in the emerging field of nanotechnology. It is because of their potential applications in the biosensors, optoelectronics, or resist templates, etc. The functionalized nanopatterns afford the chemical defined surface is hence a key feature in the development of nonotechonology. Self-assembled monolayers (SAMs) have been the promising functionalized materials because of the well-ordered and functionality-controlled properties at the molecular level. It provides a platform for investigating biomolecules adsorption and bio-sensing with its unique selectivity and flexibility. Soft X-ray spectromicroscopy provides more chemical mapping capability at a relevant spatial scale than the conventional high resolution microscopy (e.g. SEM or AFM). Inheriting the nature of x-ray absorption, photoemission electron microscope (PEEM) has superior surface and chemical sensitivity to characterize the functionalized nanopatterns. We present the fabrication of SAMs-patterned surface with terminal COOH- and NH_2- on gold and silicon substrates. By utilizing the X-PEEM, near-edge X-ray absorption fine structure (NEXAFS) and attenuated total reflection infrared spectroscopy (ATR-IR), the composition and structure of functionalized patterns are explored.