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Conformational molecular architecture in alkylthiolate monolayer using atomic force microscopy electrostatic nanolithography OLGA MAYEVSKA, SERGEI LYUKSYUTOV, The University of Akron, OH, PAVEL PARAMONOV, Georgia Tech University, GA, KAZUO UMEMURA, Musashi Institute of Technology, Tokyo, Japan, SHANE JUHL, RICHARD VAIA, AF Research Laboratory, WPAFB OH — We propose a simple approach to form 50-nm raised structures based on conformational changes of organomercaptan molecules assembled in monolayer on surface of gold. Manipulation of amphifunctional molecules may be performed using a strong electric field (10^8 - 10^{10} Vm⁻¹) induced by an atomic force microscope (AFM) tip. Such a field leads to re-arrangement of alkylthiolates assembled on Au (111) resulting in nano-patterning of raised nanostructure (1.5-9 nm high, 20-50 nm wide) arrays on a second-time scale by manipulating the tip above the monolayer. It is suspected, that as a result of the oxidative cleavage initiated by a weak bias of the tip, the S-end of the chain carrying a sulfenium cation is attracted to the tip forming a bi-layer, and the higher-layer structures in monolayer. Stabilization of the multiple-layered structures is accomplished via mutual attraction and entanglement of the hydrocarbon chains.

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