

Abstract Submitted
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Ultraflat Nanoelectrodes: A Novel Platform for Fundamental Research on the Electronic Properties of Organic Monolayers ALLARD KATAN, Materials Science Division, Lawrence Berkeley National Laboratory, FLORENT MARTIN, BAS HENDRIKSEN, BRUCE HARTENECK, MIQUEL SALMERON — We have developed a novel platform to allow the study of electronic properties of ultrathin films. This platform, dubbed Ultraflat Nano-Electrodes, is similar to a bottom-contact geometry for transistors, but has the metal source and drain electrodes embedded in the gate oxide, and the entire device has sub-nm roughness. Onto the nearly atomically flat surface of the device molecular layers can be deposited without breaking the continuity of the film. Thus an organic transistor is formed with a nano-sized channel, where all of the active material is accessible to an AFM tip, so that structural details of the entire active region can be imaged or manipulated with molecular resolution. We will show the fabrication method of our device and present the results of in-situ AFM investigations, combined with transport measurements on monolayers of several organic semiconductors. These measurements illuminate the role of structural defects and grain structure in charge transport through molecular films.

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