

Abstract Submitted
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Structure of tetracene films on hydrogen-passivated Si(001) studied via STM, AFM and NEXAFS¹ ANDREW TERSIGNI, JUN SHI, D. T. JIANG, X. R. QIN, University of Guelph — Scanning tunneling microscopy (STM), atomic force microscopy (AFM) and near-edge x-ray absorption fine structure (NEXAFS) have been used to study the structure of tetracene films on hydrogen-passivated Si(001). STM imaging of the films with nominal thickness of three monolayers (3 ML) exhibits the characteristic “herringbone” molecular packing known from the bulk crystalline tetracene, showing standing molecules on the *ab*-plane. The dimensions and orientation of the herringbone lattice indicate a commensurate structural relationship between the lattice and the crystalline substrate. The corresponding AFM images illustrate that at and above the third layer of the films, the islands are anisotropic, in contrast with the submonolayer fractals, with two preferred growth directions appearing orthogonal to each other. The polarization dependent NEXAFS measurements indicate that the average molecular tilting angle with respect to the surface first increases with the film thickness up to 3 ML, then stabilizes at a value close to the bulk tetracene case afterwards. The combined results indicate a distinct growth morphological change that occurs around a few monolayers of thickness.

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Xiaorong Qin
University of Guelph

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