

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Molecular Imaging of Ultrathin Pentacene Films: Evidence for Homoepitaxy** YANFEI WU, GREG HAUGSTAD, C. DANIEL FRISBIE, University of Minnesota — Ultrathin polycrystalline films of organic semiconductors have received intensive investigations due to the critical role they play in governing the performance of organic thin film transistors. In this work, a variety of scanning probe microscopy (SPM) techniques have been employed to investigate ultrathin polycrystalline films (1-3 nm) of the benchmark organic semiconductor pentacene. By using spatially resolved Friction Force Microscopy (FFM), Kelvin Probe Force Microscopy (KFM) and Electrostatic Force Microscopy (EFM), an interesting multi-domain structure is revealed within the second layer of the films, characterized as two distinct friction and surface potential domains correlating with each other. The existence of multiple homoepitaxial modes within the films is thus proposed and examined. By employing lattice-resolved imaging using contact mode SPM, direct molecular evidence for the unusual homoepitaxy is obtained.

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Date submitted: 09 Nov 2012

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