Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Self-assembly of photooxidatively resistant pentacene derivatives on gold surfaces JUN WANG, Dept. of Physics, IRVINDER KAUR, Dept. of Chemistry, BOGDAN DIACONESCU, JIAN-MING TANG, Dept. of Physics, GLEN P. MILLER, Dept. of Chemistry, KARSTEN POHL, Dept. of Physics, Univ. of New Hampshire — Novel pentacene derivatives that show excellent resistance to photooxidation have been prepared and show potential as semiconductors in active layers of organic thin film electronic devices. The design and fabrication of more efficient organic thin film devices require us to develop an essential understanding of the growth processes of these molecules on various substrates and how the intermolecular and molecule-substrate interactions reflect their final structure formation. Self-assembled monolayers (SAMs) are promising molecular structures with long-term stability in these devices. Here we present a combined experimental and theoretical study by STM and ab-initio calculations of the self-assembly of a photooxidatively resistant pentacene derivative — 6,13-dichloropentacene (DCP) — on gold surfaces. On the Au(111) surface, DCP forms self-assembled domains with various high symmetry orientations. The uniformity of the SAM improves greatly when the DCP molecules are deposited on the Au(788) vicinal surface where the presence of parallel atomic steps select only one of the possible SAM orientations due to the molecule-step interaction. Thus we observe the formation of large DCP SAM structures with perfect single domain orientation.

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Date submitted: 20 Nov 2009 Electronic form version 1.4