Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

2-Dimentional Islanding and Sublimation of Dodecane on a Au(111) Surface: An Investigation using Helium Atom Reflectivity TIMOTHY ARLEN, Cal Poly Physics Dept., CRAIG WEBSTER, Princeton University, PETER SCHWARTZ, Cal Poly Physics Dept., CAL POLY PHYSICS DEPARTMENT COLLABORATION — Dodecane is deposited at sub-monolayer coverages onto a Au(111) surface, and the 2-dimensional gas crystallizes into islands, which can again sublimate to a 2-dimensional gas at higher substrate temperatures. We observe island formation and subsequent sublimation, using low energy helium reflectivity. When the dodecane molecules are deposited onto the gold surface, the specular intensity decreases as a result of loss of surface order, but recovers when the formation of dodecane islands leaves large empty surfaces of gold. The islanding process was observed in real time using specularity data for substrate temperatures of 40-400 K. Two sets of specularity data were obtained: 1) Specular recovery curves following the deposition of dodecane on the Au(111) surface recorded the islanding process as a function of time, and 2) Equilibrium specular intensity was recorded as a function of substrate temperature (heating/cooling curves). A computer model of the dynamics of the sub-monolayer growth process using Monte Carlo simulations was developed, showing excellent agreement with experimental data of dodecane on the gold substrate. The simulations reveal insights regarding the intermolecular potential and corrugation potential of the molecules on the gold surface.

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Date submitted: 15 Dec 2004 Electronic form version 1.4