

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Evidence of surface reconstruction during inorganic crystal nucleation under Langmuir monolayers** SUMIT KEWALRAMANI, GUENNADI EVMENENKO, Northwestern University, CHUNGJONG YU<sup>1</sup>, Pohang Accelerator Laboratory, Korea, KYUNGIL KIM, Northwestern University, JAN KMETKO<sup>2</sup>, Cornell University, PULAK DUTTA, Northwestern University, PULAK DUTTA AT NORTHWESTERN UNIVERSITY TEAM — When a carboxylic acid Langmuir monolayer is spread on aqueous solutions of lead and carbonate ions, an inorganic film nucleates at the organic surface. *In situ* synchrotron x-ray diffraction studies show that the structure is that of hydrocerussite ( $2\text{Pb}(\text{CO}_3)\cdot\text{Pb}(\text{OH})_2$ ), oriented with the hexagonal basal planes parallel to the water surface. In addition, there are peaks from a  $\sqrt{7} \times \sqrt{7}$  superstructure of the hydrocerussite surface lattice. The organic monolayer unit cell contracts so as to form an epitaxial match with the superstructure. The Bragg rods of the supercell reflections reveal that the surface layer is  $\sim 40$  Å (5-6 layers) thick, with vertical layer spacing close to that of hydrocerussite. Surface reconstruction phenomena have been observed previously only on very clean surfaces under ultrahigh vacuum

<sup>1</sup>Previously in the the same team at Northwestern University

<sup>2</sup>Previously in the same team at Northwestern University

Pulak Dutta  
Northwestern University

Date submitted: 03 Dec 2004

Electronic form version 1.4