Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Observation of growth mode dependence on over-potential values: a combination of in-situ optical monitoring and ex-situ atomic force microscopy characterization. M. K. O'TOOLE, Department of Physics, University of California at Davis, J. GRAY, Lawrence Livermore National Laboratory, T. MOFFAT, National Institute of Standards and Technology, C. ORME, Lawrence Livermore National Laboratory, W. SCHWARZACHER, H.H. Willis Physics Laboratory, X.D. ZHU, Department of Physics, University of California at Davis — We study the over-potential electrodeposition of Pb on Cu(100) using a combination of an *in-situ* oblique-incidence reflectivity difference technique and *ex-situ* atomic force microscopy. We identified two distinctly different over-potential growth modes that depend on the values of the overpotential. We have characterized the morphology corresponding to the two growth modes using AFM. At a high over-potential there is even growth of small clusters across the monolayer thick under-potential deposited (UPD) Pb covered Cu(100) surface. At lower over-potentials (a fraction of a volt from the value for UPD), we observed much larger 3-D clusters, more than 400 nm in height and separated by an averaged distance of one micron.

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Date submitted: 01 Dec 2004 Electronic form version 1.4