Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Low Temperature STM Study of Single-Molecule Attachment to GaP(110) AARON BRADLEY, Department of Physics, UC Berkeley, M.M. UGEDA, M. YU, JCAP, LBNL, K.L. MEAKER, Department of Physics, UC Berkeley, J. NEATON, Molecular Foundary, LBNL; JCAP, LBNL; UC Berkeley, G. MOORE, I. SHARP, JCAP, LBNL, M.F. CROMMIE, Department of Physics, UC Berkeley; Materials Science Division, LBNL; JCAP, LBNL — Engineering efficient artificial photosystems for catalytic and photovoltaic (PV) purposes is a major challenge for the development of viable solar fuel generators. One possible route toward this goal is to employ molecular catalysts covalently attached to semiconductor light absorbers through molecular linkages. The effect of such linkage on local electronic structure, however, remains an important question. Scanning tunneling microscopy (STM) is a useful tool for answering this question since it enables characterization of molecular interfaces at the atomic level. Here we describe our progress at measuring the structural and electronic properties of single organic molecules adsorbed to a p-doped GaP(110) surface. Low temperature STM was used to explore the surface chemistry and reactivity of GaP(110) by exposing UHV-cleaved GaP surfaces to sub-monolayer coverages of ethylene (C2H4) and iodobenzene (IC6H6), the latter being a candidate linker for connecting catalysts and PV molecules to semiconducting light absorbers. Our high-resolution STM images in combination with DFT calculations provide guidance for future attachment strategies involving improved molecule/semiconductor interfaces.

Aaron Bradley
UC Berkeley

Date submitted: 11 Nov 2012 Electronic form version 1.4