Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Single-Molecule STM Studies on Atomically-Flat Nanoparticles[1]

D.H. DAHAYANAKA, D.W. KELLE, D.J. WASIELEWSKI, E.S. DAY, D.R. WHITE, L.A. BUMM, Center for Semiconductor Physics in Nanostructures, Homer L. Dodge Department of Physics and Astronomy, University of Oklahoma, Norman, OK 73019, USA, C.M. WAITE, J.L. MOORE, R.L. HALTERMAN, Department of Chemistry and Biochemistry, University of Oklahoma, Norman, OK 73019, USA

— The scanning tunneling microscope (STM) has been broadly applied to measure electronic characteristics of individual molecules supported in an inert monolayer matrix, which is typically grown on gold thin films on mica or bulk single crystal substrates. Although these substrates are excellent for electronic measurements, they have serious disadvantages for optical measurements because they are not optically transparent and the metal surface can quench the molecular excited state. We demonstrate that single molecule electronic measurements can also be performed using atomically-flat gold nanoparticles (FGNPs) supported on indium tin oxide coated glass as a replacement for the typical gold substrate. These substrates are optically transparent and each of the FGNP "nanosubstrates" is an optically resonant photonic antenna, thus they have the added advantage that optical measurements can be performed.

[1]This work has been supported by NSF CAREER grant No. CHE-0239803 and NSF MRSEC No. DMR-0080054.

Center for Semiconductor Physics in Nanostructures, Homer L. Dodge Department of Physics and Astronomy,

Date submitted: 30 Nov 2005 Electronic form version 1.4