Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

STM studies of transport through single azobenzene molecules[1]
TAEYOUNG CHOI, JAY A. GUPTA, Department of Physics, Ohio State University
— A microscopic understanding of electrical contact to molecules is needed to improve the performance and reproducibility of devices based on organic materials. We use a low-temperature scanning tunneling microscope to study current flow through single molecules where the contacts and local environment are characterized with atomic resolution. Azobenzene was adsorbed on a Cu(100) surface partially covered with one-monolayer thick islands of CuN, an insulator with a bandgap exceeding 4 eV. Peaks in tunneling spectra attributed to molecular orbitals are observed for molecules on CuN, but not on Cu. This is consistent with the decrease in hybridization expected for adsorbates on insulating films. Current flow through azobenzene molecules which bridge Cu and CuN regions is highly asymmetric with bias voltage, suggestive of rectifying behavior. Atomically precise contacts can be made to the molecules by using the STM tip to manipulate nearby metal atoms. Spectroscopic imaging is used to monitor changes in molecular orbitals due to charge transfer between molecule and contacts.

[1]Supported by NSF CAREER (DMR-0645451)

Jay Gupta
Department of Physics, Ohio State University

Date submitted: 20 Dec 2007 Electronic form version 1.4