Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Fabrication of single digit electrodes by e-beam lithography for coupled Raman spectroscopy and electrical conductivity measurements of single molecules NEIL SMITH, JAN YARRISON-RICE, Physics Department, Miami University, Oxford, OH 45056, ARCHENA JAISWAL, SHOUZHONG ZOU, Chemistry Department, Miami University, Oxford, OH 45056 — We have successfully fabricated Cr: Au electrodes on thermally oxidized silicon wafers with repeatable gaps of 35 nm using electron-beam lithography and thermal deposition. Next steps include closing the gap to approximately 3 nm using additional Au deposition with chemical electrolysis and attaching the dimetal complexes across the nanometer gap. The coupling of Raman spectral measurements, which probe structural and orientational changes, with electrical measurements can shed light on the current (I)-voltage (V) characteristics of molecules.[1] Initial measurements of the I-V behavior of self-assembled monolayers of 1,4-Phenylene Diisocyanide in an applied field were made between large electrodes (0.78 micron). The monolayer exhibited a symmetric I-V curve, and the Raman lines shifted and broadened under the influence of the applied field. Once the electrodes are completed, the electrical conduction of single molecules with dimetal bonds will be studied. We gratefully acknowledge the support of NSF through NER-ECS-0403669.
References:
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Date submitted: 16 Dec 2004 Electronic form version 1.4