Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Preparation and characterization of optically-active metal probes for tip-enhanced Raman spectroscopy JAE CHO, ISAAC RIISNESS, MICHAEL GORDON, University of California, Santa Barbara — Tip-enhanced Raman spectroscopy (TERS) has enabled spatially correlated topographic and chemical imaging of biomolecules, catalysts, photovoltaics, and materials on the nanoscale. Critical to the TERS experiment is the tip; tip size sets the spatial resolution, whereas tip material and shape determine how well far-field laser light couples to electron oscillations (plasmons) in the tip to create a tightly confined field that enhances Raman scattering of molecules in the tip-surface gap. Tips are typically prepared via electrochemical etching of metal wires in strong acid or base solutions. This etching process is not well understood, and the production of sharp, plasmonically active tips remains a key challenge in the TERS field. To address this issue, we developed an electrochemical etching cell with diagnostic system based on a tuning fork oscillator to evaluate the tip-etching process. We present initial study of oscillation dynamics during electrochemical tip etching under varying conditions.

Jae Cho
University of California, Santa Barbara

Date submitted: 31 Oct 2011 Electronic form version 1.4