

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Single molecule surface-enhanced Raman spectroscopy in nanogap structures DANIEL WARD, NAOMI HALAS, DOUGLAS NATELSON, Rice University — Single molecule sensitivity in surface enhanced Raman scattering (SERS) is of significant interest to multiple fields of study but has been difficult to demonstrate conclusively. We have developed a planar nanogap structure with single molecule Raman sensitivity (Nano Lett. 7, 2007; Nano Lett. 8, 2008). Nanogap devices offer a reliable way to probe SERS phenomena often thought to be the hallmarks of single molecule sensitivity: intensity fluctuations and spectral diffusion. We present a series of experiments on intensity fluctuation and spectral diffusion rates as a function of temperature to better understand the mechanism driving these phenomena. We also explore how the gap width affects overall Raman intensity. Additionally, time permitting, we present results on plasmonic light emission from nanogap devices when excited by hot electrons. The spectrum shows intensity peaks at energies well above the excitation energy revealing a wealth of interesting physics.

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Date submitted: 21 Nov 2008

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