Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Mechanisms of surface-enhanced Raman scattering on metal oxide nanowires HAE-YOUNG SHIN, TRANG NYUGEN THI TUE, Department of Physics, Ewha Womans University, HAYOUNG JUNG, MYUNG HWA KIM, Department of Chemistry and Nano Sciences, Ewha Womans University, SEOKHYUN YOON, Department of Physics, Ewha Womans University — For several decades, surface-enhanced Raman scattering (SERS) from various analytes adsorbed on metal has been studied and utilized for optoelectronic and biochemical devices. There are two well accepted mechanisms of SERS on metal: One is the electromagnetic enhancement and the other is the charge transfer enhancement. On the other hand, another mechanism depending on the geometry, for example diameter, aspect ratio, etc., of the sample has been considered recently to explain SERS from molecules adsorbed on dielectric nanostructures where far less free charges exist. In this study, we would like to explain the mechanism of SERS on metal oxide nanostructures. To study enhancement effects, we measured Raman scattering signal from molecules adsorbed on metal oxide nanowires and nanocones excited by lasers with three different wavelengths. We observed that the Raman signal was enhanced regardless of excitation wavelengths, even though the enhancement factor showed slight wavelength dependence. Importantly, we observed that the enhancement was always larger when the analytes were adsorbed on nanocones. From our understanding, we can suggest a way to systematically create, or control "hot spots" for enhancement of light field using one dimensional metal oxide nanostructures.

Hae-Young Shin
Department of Physics, Ewha Womans University

Date submitted: 15 Nov 2013 Electronic form version 1.4