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Tip-enhanced spectroscopy from ordered silver nanoparticle arrays ERIN ORAZEM, DAVE BUSSIAN, University of California, Santa Barbara, SARAH CROSS, University of Califronia, Los Angeles, JASON SCHMIDT, The Clorox Company, MELISSA SUMMERS, Stanford University, STEVE BURATTO, University of California, Santa Barbara — I will report on recent efforts from our group to develop new methods for enhanced spectroscopy from metal nanoparticle arrays. Triangular-shaped silver nanoparticles (20 – 200 nm) fabricated via nanosphere lithography have shown dramatic enhancement (10^6 – 10^{10}) of the resonance Raman spectrum of R6G, which was attributed to the shape of the Ag triangle.[1] In addition to the large surface-enhanced resonance Raman spectroscopy (SERRS) enhancement we have also observed enhanced luminescence from the Ag nanoparticle films. In order to further understand the shape dependence of the electric-field enhancement we have used near-field scanning optical microscopy (NSOM) to map both the SERRS and luminescence for a single 200nm Ag nanotriangle. The enahancement is largest for the apex of the triangle or near sharp points. In addition, I will discuss the progress in tip-enhanced SERS (TE-SERS) from these same nanoparticle arrays. In TE-SERS the electric field enhancement is due to the large coupling between the metal tip and the Ag nanoparticle and can be mapped and quantified.

[1]J. Schmidt, S. Cross, S. Buratto J. Chem. Phys., **121**, 10657 (2004).

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