

Extrinsic Raman Labels for SERS Readout in Immunosorbent Assays: Cubic and Spherical Gold Nanoparticles

Radha Narayanan¹, Robert J. Lipert², Marc D. Porter^{1,*}

¹*Center for Combinatorial Science, The Biodesign Institute, Arizona State University,
Tempe, AZ 85287-6401*

²*Ames Laboratory-USDOE, Iowa State University, Ames, IA 50011*

This presentation describes results from the first extension of particle shape in the construction of extrinsic Raman labels (ERLs) in immunosorbent assays. ERLs, applied in the last step of the assay, are sensitive tags for captured antigens, with detection limits at low femtomolar levels in early disease detection (cancer biomarkers)¹ and bioterrorism prevention (viruses).² This presentation compares the detection limit obtained for ERLs based on standard spherical citrate capped gold nanoparticles (s-Cit-Au) with those for CTAB-stabilized spherical (s-CTAB-Au) and cubic gold nanoparticles (c-CTAB-Au) in the SERS readout for human IgG. With respect to s-Cit-Au, the detection limit is 37 times lower with s-CTAB-Au and 300 times lower with the c-CTAB-Au. These findings, along with assessments of underlying factors that contribute to these differences, will be discussed.

1) D. Grubisha, R. Lipert, H.Park, J. Driskell, M. Porter, *Anal. Chem.* **2003** *75*, 5936.

2) J. Driskell, K. Kwarta, R. Lipert, M. Porter, J. Neill, J. Ridpath, *Anal. Chem.* **2005**, *19*, 6147.

* E-mail: Marc.Porter@asu.edu