

## **605a Synthesis and Plasmonic Properties of Gold-Seeded Silver Nanoshells on Polystyrene**

*Ken-Tye Yong, Yudhishira Sahoo, Mark T. Swihart, and Paras N. Prasad*

We present a study of silver nanoshells formed on the surface of monodispersed polystyrene microspheres of different sizes as well as on free-standing gold nanoparticles. Silver nanoshells were grown on polystyrene cores with diameters of 188, 296, and 543 nm. Commercially available carboxylate-terminated polystyrene particles were functionalized with 2-aminoethanethiol hydrochloride (AET) to produce thiol-terminated microspheres. Gold nanoparticles were synthesized by reduction of chloroauric acid with tetrakis(hydroxymethyl)phosphoniumchloride (THPC-gold) or with sodium citrate (citrate gold) to produce particles of ~2 nm and ~12 nm diameter, respectively. These were bound to the thiol-terminated surface of the polystyrene microspheres, where they served as nucleation sites for silver shell growth. Reduction of a silver precursor resulted in increasing coverage of silver on the polystyrene core. The nanoshells were characterized using transmission electron microscopy (TEM), scanning electron microscopy (SEM) and UV-vis spectroscopy. Upon varying the core size of the polystyrene particles and the thickness of the silver nanoshells, the surface plasmon resonance of the nanoshell could be tuned across the visible and near-infrared region of the electromagnetic spectrum.