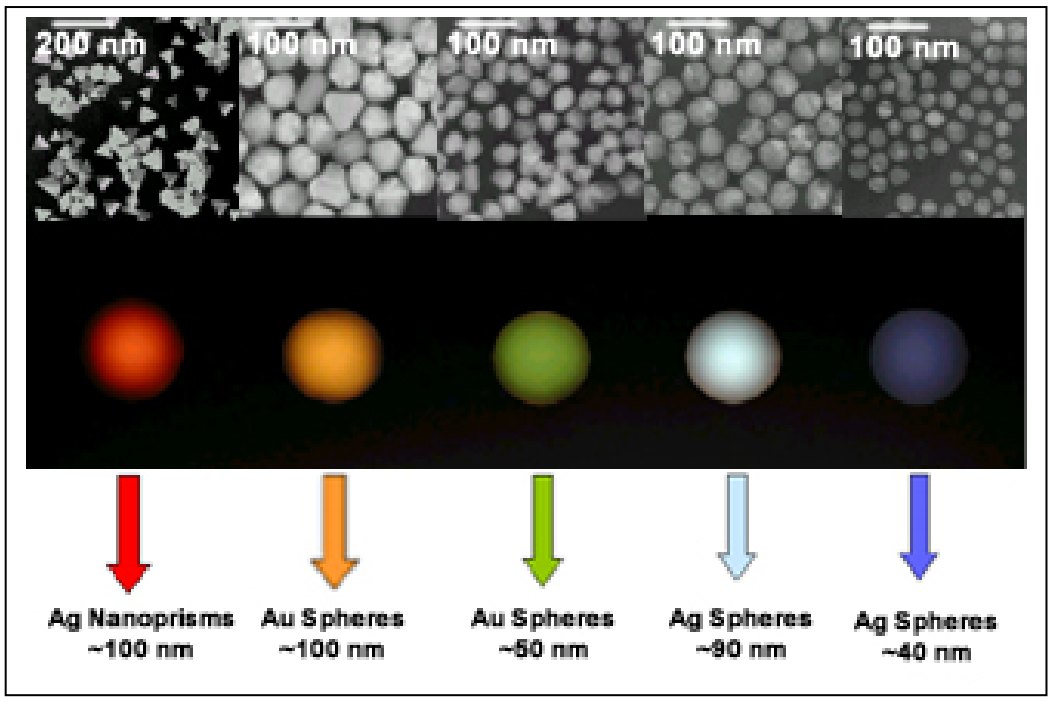
NANOPRISMS

Jin, R.; Cao, Y.; Mirkin, C. A.; Kelly, K. L.; Schatz, G. C.; Zheng, J., "PhotoInduced Conversion of Silver Nanospheres to Nanoprisms," *Science*, **2001**, 94, 1901–1903.

A method has been discovered for making high quality silver nanoprisms with tailorable dimensions. These nanoparticles are triangular in cross section, in striking contrast to nanoparticles prepared with previously existing methods (which are primarily spherical or cylindrical in shape). Theory predicts that the electrical and optical properties of metal nanoparticles should be exceptionally sensitive to the shape of the particles and these theoretical predictions are confirmed, in a quantitative fashion, by our experimental observations with the triangular nanoprisms. Thus, the ability to control the shape of the metal nanoparticles allows their optical properties to be tailored in predictable ways in order to obtain materials with properties that were previously difficult, if not impossible, to obtain. Furthermore, all of this is achieved with chemical methods that allow for easy production of large quantities of particles with the desired characteristics. The light scattering properties of the particles (shown in the figure) serve as striking evidence of the control that can be achieved by varying the nanoparticle shape, as well as size and composition. The extraordinary optical properties of the nanoprisms can be used in a variety of highly sensitive chemical and biological detection schemes, and may also find use in novel, nanoscale optoelectronic and photonic devices.



Composition, Size, and Shape Matter