DECAHEDRAL SILVER PARTICLES

Product Number: 203PS

Description: 0.1 mM monodispersed pentagonal shaped silver nanorods in aqueous solution are ideal for plasmonic applications. Owing to their shape, they possess two tunable plasmonic peaks corresponding to the lateral and longitudinal modes of the rod. The pentagonal facets also possess very sharp edges which produce local high field strengths. These particles typically have diameters of 40 nm with lengths varying from 50 nm to 300 nm. They exhibit a narrow lateral plasmonic peak at 425 nm, and a broad, tuneable longitudinal mode ranging from 500 nm to 1300 nm.

Properties:

Appearance	Double milky color
Particle Shape :	Pentagonal rods
Plasmonic Peaks	425nm; 500 nm - 1300 nm
Particle Size, TEM	35 - 120 nm
Size distribution	<5%
Concentration	0.1 mM of Ag
Absorption	2 OD/cm

Example particle images:

Variouse particle sizes can be manufacted. To ensure consistency and accuracy of the provided materials, each manufacted batch is characterized independently.

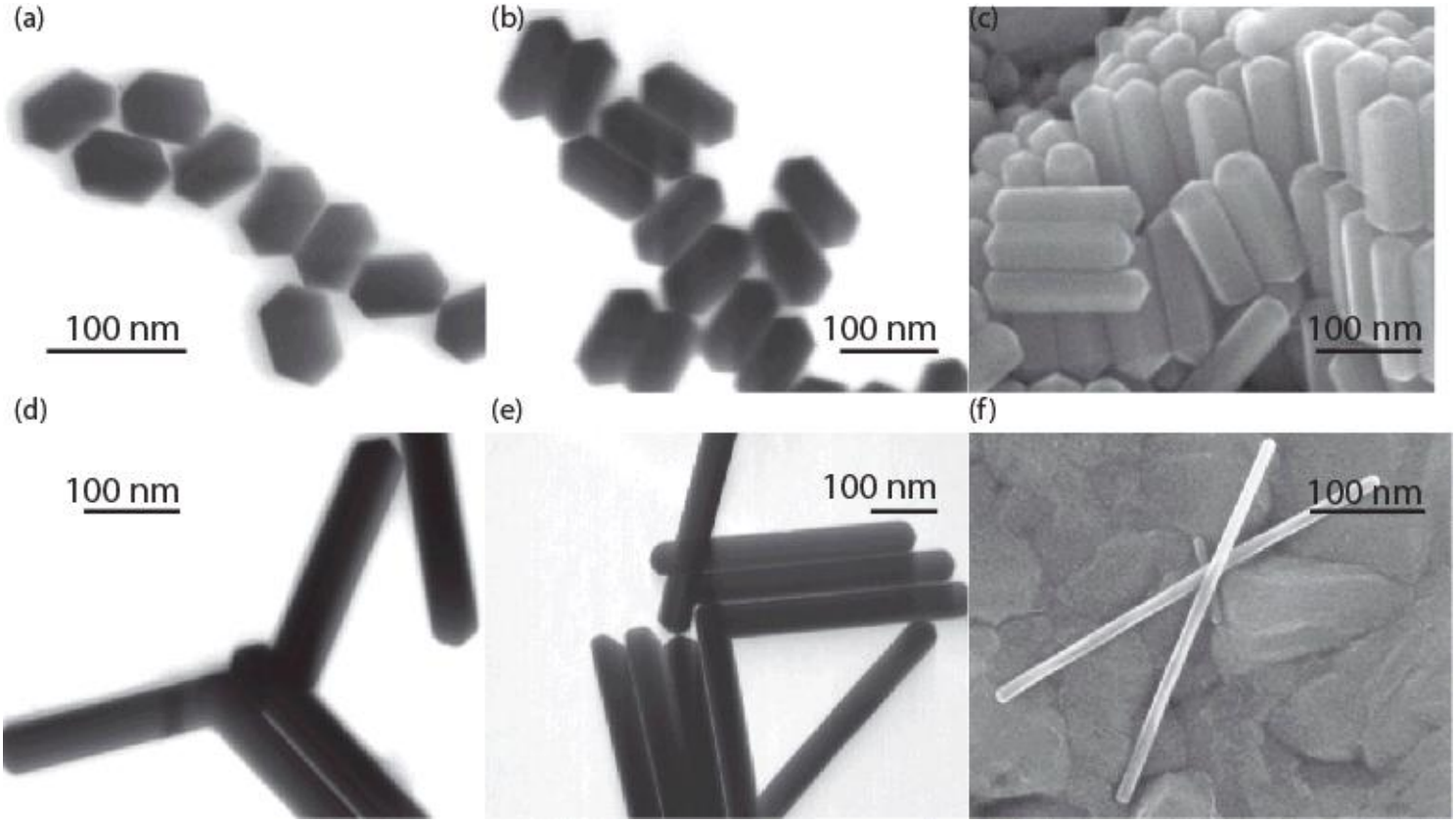

Figure 1. Scanning electron or Transmission electron microscopy micrographs of pentagonal silver nano-rods with length of (a) 75±3 nm, (b) 108±5 nm, (c) 142±7.0 nm, (d) 260±10, (e) 430 ± 15 nm and (f) 400 ± 15.

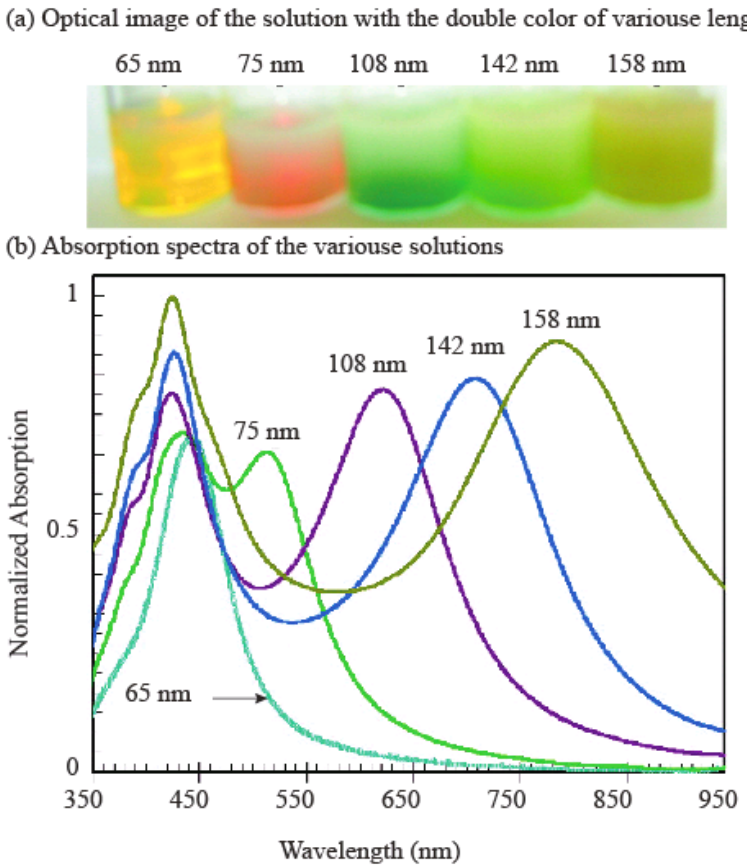

Figure 2. a) Optical images and the b) normalized absorption spectra of pentagonal silver nano-rods of various sizes. The respective sizes are marked on the plots.

SERS Measurements: To achieve high SERS enhancement factors, decahedral shaped silver nanoparticles must first be drop casted or spin coated on the desired surface. The surfaces should then be treated with oxygen or air plasma to remove the surface protecting groups. Our experiments have shown that the plasma standard oxygen and air plasma recopies do not modify the silver properties and only enhance the SERS signal. Figure 3 shows an example of SERS enhancing signal using various different nanoparticles using thiosalicylic acid as a probing molecule.

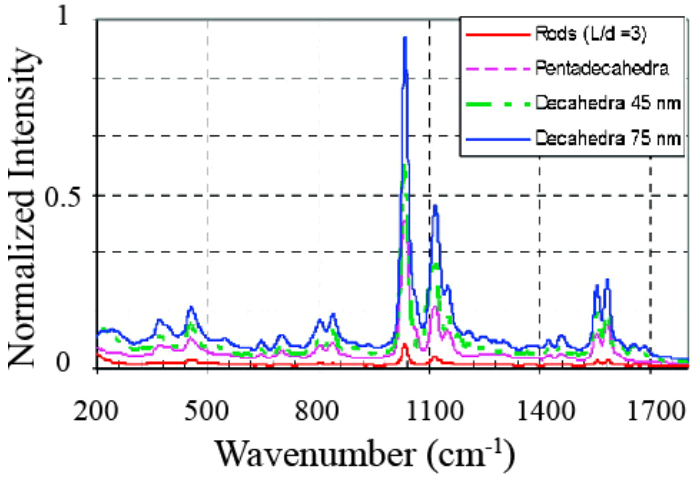

Figure 3. Comparison of surface-enhanced Raman scattering (SERS) efficiency of several decahedral and pentagonal silver anno rods (with the same silver concentration and surface coverage of ca. 1.5 monolayers) using thiosalicylic acid as a probing molec

Particle Stability: The silver decahedra are stable provided they are kept in their native solution containing citrate and PVP. Both their morphology and optical properties remain un-changed for at least several months.

Caution: For increased shelf-life, store between 4-22^{O}C; do not freeze.