

# Nanoplasmonics and surface enhanced spectroscopy

## Flower-shaped gold nanoparticles: synthesis, characterization by surface enhanced infrared absorption spectroscopy (SEIRA) and their application as potent antivirus nanocarriers

**P.M. Boltovets<sup>1</sup>, S.O. Kravchenko<sup>1</sup>, O.G. Kovalenko<sup>2</sup>, O.M. Fesenko<sup>3</sup>, B.A. Snopok<sup>1</sup>**

*1 Institute of Semiconductor Physics, Natl. Acad. of Sci. of Ukraine. Prospect Nauki, 41, Kyiv-03039, Ukraine. E-mail: paraskeva2013@gmail.com*

*2 Institute of Microbiology and Virology, Natl. Acad. of Sci. of Ukraine. Acad. Zabolotny str, 154, Kyiv-03680, Ukraine.*

*3 Institute of physics Natl. Acad. of Sci. of Ukraine. Prospect Nauki, 46, Kyiv-03039, Ukraine.*

The shape of nanoparticles (NP) has been recognized as an important feature that determines their applicability in biology and medicine. NP of flower shape (F-shape) have been identified as potent plasmonic carriers because of their enhanced properties when compared to spherical shape NP. The present study described a rapid, environmentally friendly wet-chemical synthesis of F-shaped, stable, water-soluble, gold NP using the polysaccharides (PS) with potent antivirus effects as specific capping agents to introduce anisotropic growth. Reduction of chloroauric acid by the glucuroxymannan extract resulted in the production of crystalline, irregular at the nanometer scale, and mostly F-shaped NP, which was further confirmed by the results obtained from UV-visible spectroscopy, transmission electron microscopy and SEIRA (Fig.1). The preliminary measurement of Raman scattering indicates fast burning of organic components. SEIRA analysis indicated the probable involvement of –OH groups as fragments in the bio-reduction and stabilization process. The results of surface plasmon resonance study of mixed organic-inorganic nanocomposites' (AuPS) interaction with TMV allows one to consider AuPS as potent antivirus formulations.

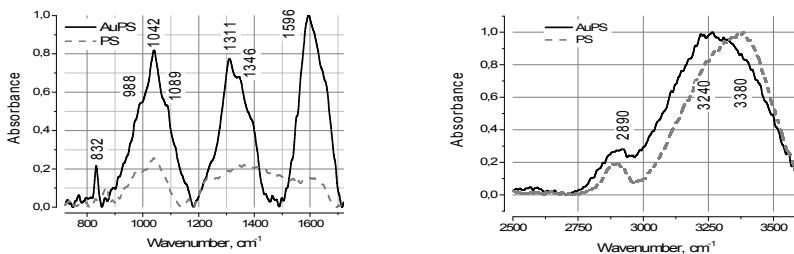


Fig.1. Normalized SEIRA spectra of PS and AuPS