

# Prof. Serhiy Malynych

*Department of Electromechanics and Electronics, Hetman Petro Sahaidachnyi National Army Academy (Lviv, Ukraine)*

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## **Properties and applications of noble metals nanoparticles**



Noble metal nanoparticles are very promising for numerous practical applications. It has been established that incident electromagnetic waves excite collective oscillations of free electrons inside metal particles termed Localized Surface Plasmon Resonances (LSPR). In other words, LSPR are coupled oscillations of the electron density and electromagnetic waves. The excitation of LSPR in metal nanoparticles represents the most efficient process by which light interacts with matter and defines optical properties of nanoparticles. It is also very important that LSPR frequency could be successfully tuned within a broad spectral range by varying the refractive index of surrounding medium or by using the nanoparticles of different size and shape. For gold and silver nanoparticles, the resonance falls into the visible region of electromagnetic spectrum. A striking consequence of this fact is bright colors exhibited by particles immersed into transparent matrix (e.g., aqueous suspensions or glass). Here, we will discuss those and some other remarkable optical properties of noble metal nanoparticles as well as their applications.

### **Short Bio**

Prof. Malynych graduated from Ivan Franko National University of Lviv (Ukraine) and completed his PhD in Semiconductor Physics there. His doctoral research was focused on spectroscopy of high-temperature superconductors. During more than six years Serhiy worked as a post-doctoral researcher and visiting scholar in the Department of Chemistry at Clemson University (SC) under Prof. George Chumanov. There, he studied optical properties of noble metal nanoparticles.

Prof. Malynych successfully defended thesis in fulfillment of Doctor of Science degree (habilitation) in the Institute of Semiconductors Physics (Kyiv, Ukraine). The thesis was dedicated to the optical properties of noble metal nanoparticles.

At present, Prof. Malynych occupy a position of full Professor at Hetman Petro Sahaidachnyi National Army Academy teaching Physics and Electromechanical Systems.