

Nanocomposites and nanomaterials

Synthesis and Photodynamic Properties of Silver Nanoparticles

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Many methods of synthesis of the noble metals nanoparticles with different sizes and shapes are known [1]. The working wavelength range of absorption in a long-wave spectral region is determined by shape of silver nanoparticles. The possibility of controlled obtaining nanoparticles opens new possibilities and perspectives of using such nanoobjects in electronics, photonics and biomedicine.

This work presents the research of process of formation and growth nanodecahedron and nanoprisms from spherical silver particles, obtained by different methods. Since nanoparticles have the ability to absorb light with a certain wavelength, the use of photon flows can be an effective way to modify the geometrical shape of nanoparticles [2].

The synthesis of nanoparticles was carried out in two stages. The first step was the formation of silver nanoparticles by using photostimulated recovery of silver ions from salt solution and citrate method. Spherical green-yellow colloids of silver nanoparticles were obtained by these methods.

In the next step of our research, obtained colloids were irradiated by LED-diodes with power 1W and wavelengths of 525 nm for green, 465 nm for blue and 623 nm for red during 6 days. Change the color of colloids was visually observed after 24 hours. Changing of color of the colloids is a result of changing shape and position of absorption peak on the spectral range due to plasmon resonance.

Characterization of nanoparticles was conducted and potential opportunities for their practical application were considered.

1. *Burda C., Chen X., Narayanan R., El-Sayed M. A.* Chemistry and properties of nanocrystals of different shapes // *Chemical reviews*.-2005. -105, N 4.-P. 1025-1102.
2. *Maier S. A.* Plasmonics: fundamentals and applications // *Springer Science & Business Media*, -2007.