### "Nanooptics and photonics"

**Liquid crystal material with gold nanoparticles as an optical sensors active medium for the amino acids detection.**

**Mykytyuk Z.M.1, Sushynskyi O.E.1, Barylo H.I.1, Kremer I.P. 1, Ivakh M.S.1**

*1 Electronic devices department, Lviv Polytechnic National University*

*S. Bandery Str., 12, Lviv-79013, Ukraine.*

*E-mail: mariia.s.ivakh@lpnu.ua*

In paper we investigated the noble metals nanoparticles with aim to design the sensors for detection of various types of biomolecules (proteins, enzymes, amino acids, ect.). These nanoparticles are used as an active sensor medium taken into consideration their unique physico-chemical properties and high surface area. Synthesized gold nanoparticles are the nanorods with different length 40.5nm, 48.3nm and 61.7nm and a diameter is 20nm. Nanorods was entered into BLO-62 + 5CB liquid crystal mixture. Gold nanoparticles concentration was within 0,1-2wt.%. The maximum value of gold nanoparticles concentration depend on sample optical transparency.

We investigated a cholesteric liquid crystals mixtures with gold nanoparticles as an active medium of amino-acid optical sensors. As a interaction result of gold nanoparticles with amino acids is their aggregation occurs with the complex formation. The gold nanorods introduction in a cholesteric matrix doesn’t lead to the destruction of the cholesteric mesophase, as a result, the selective reflection property is not disappeared. The formed complex affects to the cholesteric spiral pitch, and change the spectral characteristics. It is is base for designing active medium of optical sensor. The sensor sensitivity was estimated by the value of spectral sensitivity coefficient.

Our research work made it possible to determine the nanocomposite optimal concentration with aim to obtain the maximum value of sensitivity.

1. *Aksimentyeva O., Mykytyuk Z., Fechan A., Tsizh B., Sushynskyi O.* Cholesteric liquid crystal doped nanosized magnetyt as active medium of optical gas sensor // Molecular Crystals and Liquid Crystals.-2014.-Vol. 589.-P.83-89.
2. *Vistak M.*, *Sushynskyi O., Mykytyuk Z., Aksimentyeva O., Y. Semenova //* Sensors and Actuators A: Physical.-2015.-Vol.235.-P.165-170.