• Nanocomposites and nanomaterials

Temperature stability of plasmon polariton sensors with sensitive acrylic film

S. Mamykin[1], M. Dusheyko[2], O. Ozhozhenko[2], I. Gnilitskyi[3]

[1]V. Lashkaryov Institute of Semiconductor Physics, Natl. Acad. of Sci. of Ukraine Nauky Ave., 41, Kyiv-03028, Ukraine

E-mail: mamykin@isp.kiev.ua

[2]National Technical University of Ukraine "Kiev Polytechnic Institute" Peremohy Ave., 33, Kyiv-03056, Ukraine

[3]University of Modena and Reggio Emilia, Reggio Emilia, Italy

Synthetic materials based either on acrylic and methacrylic acid or on polymer composites are widely used in sensorics as a sensing element, such as a moisture sensor [1] as well as basis for the preparation of nanocomposites with added metal and/or semiconductor nanoparticles [2]. Particularly, acryl is the basis for making of SPR and LR-SPR immunosensors [3]. Adding plasticizer dibutyl phthalate (DBP) in acrylic composites improves their tough-elastic properties, heat resistance deformation, fracture toughness, and wear resistance. In all these applications, it is essentially important to know the temperature sensitivity of optical parameters of acrylic films or composites on their basis. The aim of this work is to study the temperature sensitivity of acrylic films with the addition of DBP by surface plasmon resonance (SPR) method.

Acrylic film samples with different concentrations of DBP were deposited by centrifugation on the surface of plasmon-polariton photodetectors [4]. The angular dependence of light reflectance and photocurrent under SPR excitation were investigated. Effect of temperature on optical parameters and thickness of the film has shifted the angular position of resonance. Results reveal in a few times increasing the temperature sensitivity of acrylic films caused by adding DBP.

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3. *Netsuwan P. et al.* Long-range surface plasmon resonance immunosensor based on water-stable electrospun poly (acrylic acid) fibers // Sensors and Actuators B: Chemical. – 2014. – N. 204. – P. 770-776.
4. *Gnilitskyi I. et al.* Diffraction Gratings Prepared by HR-LIPSS for New Surface Plasmon-Polariton Photodetectors & Sensors // Laser Science. – Optical Society of America, 2016. – P. JW4A. 88.