

Nanochemistry and Nanobiotechnology

Sensor film complexes with coumarin and quantum dots

V.P. Mitsai¹, P.P. Misura¹

¹ Institute of Applied Problems of Physics and Biophysics, Natl. Acad. of Sci. of Ukraine, Stepanchenka St.,3 Kiev-03680, Ukraine.

E-mail: email.of.corresponding_vitapok@i.ua

A study and analysis of determination of organic molecules-biomarkers in a gas-vapor medium, which are presented in trace amount concentrations, is an intricate analytical problem and requires a high sensitiveness, fast-acting and selectivity of instrumentations.

Optical sensory changes team of electronic absorption spectra and a bloom (luminescence) of luminophors molecules in polymeric medium were used; their optical response to presence of foreign molecules or ions, which consists in essential change of the spectral-luminescent properties depending on their medium.

Receiving and research of polymeric films properties, doped with a sensitive complex (type organic dye + quantum dots), their optical activity and selectivity to volatile organic compounds traces were under investigation.

It is shown, that films, made on the basis of polyvinyl alcohol (PVA) ($[-CH_2CH(OH)-]_n$) with a broad wavelength range of transparency: from the ultraviolet to the infrared field was used for films making, and also with addition of luminophor (coumarin-6), and glycerin in particular ratios represent the registering fluorescent signals, which are dependent on concentration of a chromophore in a film.

Due to increasing in a chromophore concentration in films, intensity of a fluorescent signal enlarging.

Films, made with addition of the colloidal quantum dots CdTe/TGA (QD) solution, stabilized by thioglycolic acid, (productions of the Bukanotekh enterprise) significantly increase the fluorescent response, measured by a fluorometer FLx800T.

The reference changes of a fluorescent signal on changes of concentration of ammonia in gaseous medium contacting to a film are revealed.