

Nanostructured surfaces

The surface relief grating based on films of methacrylic azobenzene polymers

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The interest into surface relief grating (SRG) photofabrication is thus rapidly increasing and is emerging at the forefront of photonic and nanotechnology research. The surface relief grating mechanism, however, is not fully understood. The photo-plasticization process is postulated, which is thought to occur via the azo-chromophores photo isomerization [1].

The polymers of different photochromic functionalization were designed and synthesized to understand the chemical and physical regularities involved at the molecular level in the photofabrication of surface relief grating. These methacrylic azobenzene-containing copolymers were obtained by free-radical polymerisation.

The novel photosensitive thin films structures ($d \approx 1\mu\text{m}$) based on synthesised copolymers have been prepared. Their spectral, photophysical and information properties have been investigated. It was shown, that investigated film structures exhibit photoconductive properties under illumination by light from the azochromophores absorption region and can be applied as the holographic recording media (HMR). The features of information properties, as well as the nature of observed photoconductivity effect in obtained HMR are discussed.

Three perspective phenomenological model for internal photoeffect and holographic image recording mechanism in the investigated thin film structures was proposed [2].

1. *Nadtoka O., Syromyatnikov V, Tarasenko V.* Photoinduced Orientation of Azobenzene Groups in Polymer Films. Characterization by UV/Visible Spectroscopy // *Molecular Crystals and Liquid Crystals*. – 2011. - **536**, N. 1. - P. 122-129.
2. *Krupka O., Smokal V., Studzinsky S., Davidenko N., Biitseva A.* Electro-Optical Properties in Thin Films of New Azobenzene Polymers // *Chemistry & Chemical Technology*. - 2015. - **9**, N 2. - P. 137- 141.