was formed at the position of p-polarization state (polarization direction of recording light is paralel to grating vector) in the polarization modulated interference pattern of $+45^0/-45^0$ recording beam configuration. The experiments performed on azobenzene containing organic compounds showed that in this case the direction of the photoinduced matter transport is opposite to that obtained with As2S3 films.It was shown that the efficiency and direction of mass displacement is determined by a value and sign of photoinduced birefringence in amorphous films. This fact is crucial to clarify the direction of the forces in SRG formation processes.

Holographic as well as the one beam method for the grating recording enables a fabrication of the gratings with a period from 100 nm up to 50 μm. A practical application of organic and inorganic optical recording photoresists for surface *direct* patterning will be discussed.

The mechanism of the direct recording of surface-relief on amorphous films based on the photoinduced softening of the matrix, formation of defects with enhanced polarizability, and their drift under the optical field gradient forces is discussed [2].

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Surface relief recording-erasing in amorphous chalcogenide layers and nanocomposites

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New materials and technologies are under intensive research and development last time for fabrication of separate or integrated photonic elements, matrices, photonic crystals, and metasurfaces in our laboratories [1,2] and worldwide. Among the wide number of inorganic and organic materials and proper fabrication methods by optical or e-beam lithoghraphy, imprint technology the holographic recording is one of the most known, although the selective etching, development of optical reliefs in standard resists causes essential shortcomings. The spectral range of applicability, stability or reversibility of the recorded reliefs are also important.

The goal of the present work was the development, selection of efficient light sensitive chalcogenide layers made of As(Ge)-S(Se) glass compositions and their application for optical, holographic recording in one step, direct process of 1- or 2D-photonic structures formation. Functional acrylate nanocomposites, which contain chalcogenide nanoparticles and which are sensitized to blue and green laser illumination were also developed and applied for one step optical recording of amplitude-phase reliefs.

Investigations of stability/erase ability of the recorded reliefs under the influence of different illuminations in a rather wide range of temperatures from 100 to 400 K gave us additional information about the stimulated mass-transport processes during recording-erasing as well as the optimal conditions of relief formation, erasing, it's reversibility.

It is essential, that no additional treatments of the material after the recording are necessary and the elements possess high transparency and low scattering levels. New functionalities can be added to the recorded structures this way, enabling the creation of photonic, sensor structures with switchable parameters.

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Influence of soft and rigid low frequency vibrations of As_nS_m chains and rings in g-As_2S_3 on the low temperature anomalies

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The study of the *g*-As_2S_3 thermal conductivity $k\ (T)$ revealed the temperature hysteresis at low temperature in the temperature range between 11 and 60 K with cooling and heating rates, $v_1 = 6.4 \times 10^{-3}$K/s and $v_2 = 6.9 \times 10^{-3}$ K/s, respectively. The difference curve $\Delta k(T) = k_{\text{heating}}(T) - k_{\text{cooling}}\ (T)$ indicate that the position of the energy maximum $\Delta k\ (T)$ has comparable energy as the position of the maximum in density of states ($g\ (\omega)$) of low frequency (LF) Raman "Boson Peak" ("BP") using scale $g\ (\omega)/\ \omega^2$, $E_{\text{BP}} \approx 2.0$ meV. The existence of "plateau" was observed in the temperature dependence of the thermal conductivity in the temperature interval from 3.6 to 10.7 K [1]. What is more, the temperature dependence of the specific heat $C\text{p}/T^3$ shows a broad maximum at 5.1 K in the same temperature region. This maximum is known in literature as thermometric "BP". Contradictory with other studies, energy range of "plateau" in $k\ (T)$ and $C\text{p}/T^3$ maximum have different origin. LF Raman spectra suggest quasi-elastic scattering (QES) in sub-meV could be responsible for these phenomenon [2]. The computer simulations of As_nS_m clusters vibrations at very low-frequency range demonstrate that the quasi-localized vibrations depends on the number of the of fixation points which are connections between "defect" cluster and glassy matrix. Energy of LF modes rise with number of fixation points in As_6S_{12} rings and