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 $\Delta k(T) = k_{\mathrm{heating}}(T) - k_{\mathrm{cooling}}\ (T)$ 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 $g\ (\omega)/\ \omega^2$, $E_{\mathrm{BP}} \approx 2.0$ 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 $C\mathrm{p}/T^3$ 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 $C\mathrm{p}/T^3$ 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 energy of LF modes correlate with position of the "plateau" region, where $k(T) \approx$ const: 7.7 cm^{-1} (1 fixation point); 4.8 cm^{-1} (2); 2.0 cm^{-1} (3); 3.7 cm^{-1} (4). Soft vibrations can serve as an additional source of resonant scattering of phonons and could be responsible a known universal weak dependence of $k\,(T)$, maximum of specific heat and contribute to the formation of QES in LF Raman spectra. The frequency position of rigid vibration of As_nS_m clusters (rings and chains fully terminated by extra heavy dummy hydrogen) is located near 26 cm^{-1} in the central part of the LF Raman "BP" [2].

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The direct laser writing micro relief structures on chalcogenide glass by laser beam recorder of master discs

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The area of the direct laser writing application is much wider than only recording of optical discs The direct laser writing in photoresist enables to be fabricate a wide range of continuous micro relief phase elements .Recording systems with precise rotating devices, positioning of optical heads, and stabilizing of the power of recording lasers allow the creation of various devices for writing micro-optical elements[1,2].The method of direct laser writing of the diffractive optical elements has significant advantages over other technologies for the formation of phase optical elements like accurate control of the process parameters, flexibility in fabricating continuous-relief micro-optical elements via a single exposure scan and development , allows to exercise fabrication of diffractive optical elements with arbitrary surface-relief profile [2].The requirements for the accuracy of the manufacture of the micro-optics elements have increased considerably in recent years and suggest the transition to a submicron and nano -size range of the dimensions of the optical structures elements. Inorganic photoresists based on chalcogenide semiconductors are widely used in direct laser writing [3-5]. On chalcogenide semiconductors micro relief images by direct laser writing can be obtained by various methods: local evaporation of the absorbing material , due to a change in the volume of the material in the irradiation zone, photo-structural transformations with subsequent selective chemical etching. Micro relief images on chalcogenide semiconductor films can be formed under the action of laser pulses of various durations. Photo-structural transformations in chalcogenide semiconductors allow you to create multi-level micro-relief images . An analysis was made of the possibilities of using standard laser beam recorder of master discs for direct laser writing of diffractive optical elements over a large