

## Surface Potential Variation under e-Beam and/or Light Induced Mass-Transport in As-Se Films

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Chalcogenide glasses (ChG) exhibit a number of remarkable structural and optical changes when exposed to light or electron beam. One of them is mass-transport induced by band-gap laser light [1] or electron beam irradiation with moderate energy (10-30 kV, 3-10 nA) [2], which opens capabilities for one-step, direct microfabrication of ChG.

The transformation of the mass-transport in ChG into commercially viable applications could be realized with the improvement of our knowledge on the basic mechanisms underlying the effect. This mechanism, however, is still not well studied, despite some attempts to develop appropriate model with a complete description of the basic microscopic mechanism [3]. The scanning Kelvin probe force microscopy is a unique technique for direct measurements of surface topography and corresponding surface potential (SP) mapping. We present unusual behavior of surface relief gratings (SRGs) preliminarily written in a-Se and  $As_{20}Se_{80}$  films by photoinduced mass-transport and further treated by electron beam. Gratings of small periods smoothed whereas gratings of larger periods increased their amplitudes. Peculiarities of light-induced lateral mass transport in Se and  $As_{20}Se_{80}$  ChG films under e-beam and band-gap light excitation will be discussed in the frame of *in-situ* and *ex-situ* measurements of SP transformations.

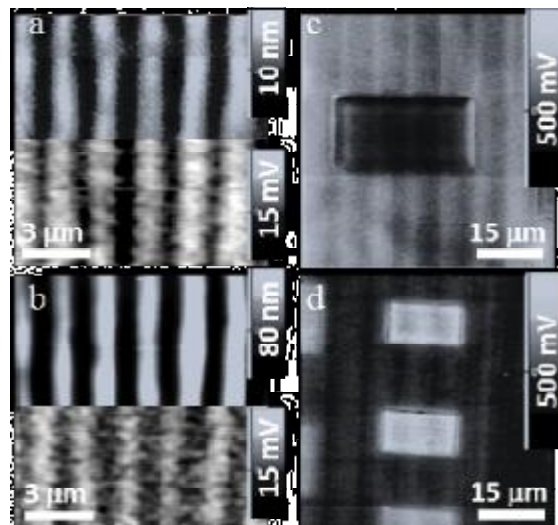


Fig.1. SP transformations in Se (a,c) and  $As_{20}Se_{80}$  (b,d) SRGs inscribed optically (a,b) and e-beam treated (c,d). Topography and SP maps of the same areas presented in top and bottom of (a,b), correspondingly.

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1. Trunov M.L. Polarization-dependent laser-induced giant mass transport in glassy semiconductors // JETP Letters.-2007.- 86.-P. 313-316.
2. Trunov M.L, Cserhati C., Lytvyn P.M., Kaganovskii Y., Kokenyesi S. Electron beam-induced mass transport in As-Se thin films //J. Phys. D: Appl. Phys.- 2013.- 46. –P. 245303 (9pp).