THE LATERAL DISTRIBUTION OF OPTICAL PROPERTIES OF CHALCOGENIDE GLASSES MEASURED BY SPECTROSCOPIC IMAGING ELLIPSOMETRY

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Chalcogenide glasses exhibit a variety of properties applicable to optical devices. The vast majority of them are based on photoinduced changes created with band-gap illumination. In particular, the photodarkening, photoinduced surface corrugations and refractive index change are of renewed interest, especially for fabrication of diffractive optical elements or optical fibers.

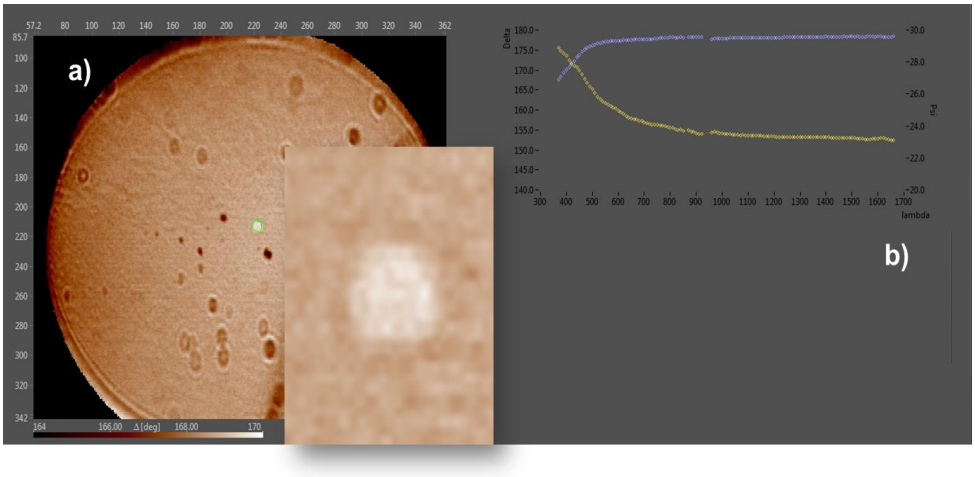

Fig. 1. Delta map (a) and Delta, Psi spectra **(b)** of As_2S_3-Fiber with a core size of 6 µm.

Chalcogenide fibers with core sizes down to 6 µm and holographic gratings with different phase profiles depending on the exposure conditions were characterized by imaging ellipsometry. Ellipsometric enhanced contrast micrographs were used for fast surface inspections. Optical properties of distinctive surface areas were obtained based on regions of interest (ROI) concept. Pattern and profiles of the optical properties were obtained from Delta- and Psi-maps.

To express the dispersion function of chalcogenide glasses mainly a Tauc-Lorentz term was used. In case a roughness layer must be taken into account, a Bruggemann effective medium layer containing chalcogenide glass as host was applied. A main point of view of the work was the characterization of diffraction gratings prepared under parameters that differ from the optimal procedure.

Keywords: Chalcogenide glasses, Imaging Ellipsometry

References

[1] Röling C, Thiesen P, Meshalkin A, Achimova E, Abaskin V, Prisacar A, Journal of Non-Crystalline Solids 365(1):93–98, 2013