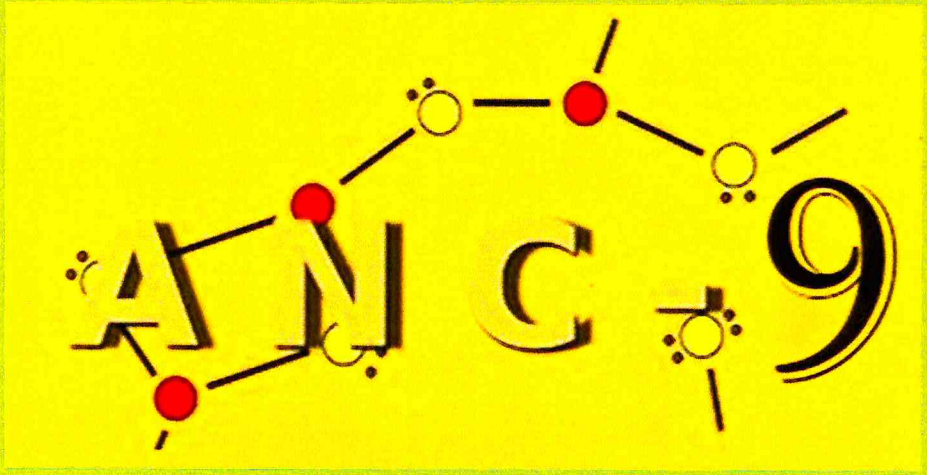

Abstract Book

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rate of 10°C/min are in the range of 330–340°C. The obtained glasses are thermally stable – the crystallization temperatures are around 450°C in the case of $BaCl_2$-TeO_2 binary glasses and higher than 480-500°C in the case of ternary glasses. The composition of the batch slightly changes during melting; generally the concentration of Bi and Cl decreases. The density of the prepared glasses is between 5.2 and 6.1 g/cm^3, the refraction index estimated using optical microscopy is approximately 2.3. The window of optical transparency of investigated glasses is between 350 nm and 6.5 μm and their transmittance reaches up to 70%. Unfortunately the OH^- groups are present in the prepared glasses; they are manifested by strong absorption band located at 3 μm in the infrared part of spectra.

Structure of nanosized $Ge_2Sb_2Te_5$ films with silver impurity

K. Turmanova[1], A. Zhakypov[1], O. Prikhodko[1], Z. Tolepov[1], S. Kozyukhin[2], G. Ismailova[1], S. Maksimova[1]

[1]*Institute of Experimental and Theoretical Physics, al-Farabi Kazakh National University, Almaty 050040, Kazakhstan*
[2]*Kurnakov Institute of General and Inorganic Chemistry, Russian Academy of Sciences, Moscow 119991, Russia*

Corresponding author: szhakupovalibek@gmail.com

The paper presents the results of studying the structure of nanosized films $Ge_2Sb_2Te_5$ with silver impurity ($Ge_2Sb_2Te_5$<Ag>). The films were obtained by the method of ion-plasma high-frequency magnetron sputtering. Upon receipt of the films, a combined target was used, consisting of the composition $Ge_2Sb_2Te_5$ of AciAlloys (USA) and Ag. The composition of the films was controlled by energy-dispersion analysis (EDXA) on the SEM Quanta 3D 200i. The film thickness was determined by scanning on SEM cleavage of c-Si / $Ge_2Sb_2Te_5$ <Ag> film and ranged from ~ 50 to ~ 100 nm. The concentration of silver impurities in the $Ge_2Sb_2Te_5$ <Ag> films reached 12.3 at.%.

The morphology and structure of the films was studied by using SEM, TEM (JEM 2100 JEOL) and Raman spectroscopy (Solver Spectrum 600/600). From the analysis of the results of EDXA and SEM, it follows that $Ge_2Sb_2Te_5$ and $Ge_2Sb_2Te_5$ <Ag> films are solid, homogeneous, and there are no defects of micron size in them. The maximum deviation of the components Ge, Sb, and Te from the formula ratio does not exceed 5 at.%. Based on the data of elemental analysis of $Ge_2Sb_2Te_5$ <Ag> films, we can conclude that Ag atoms in the matrix of $Ge_2Sb_2Te_5$ films replace mainly Te atoms.

Using Raman spectroscopy (RS) and transmission electron microscopy (TEM) methods, it has been established that freshly prepared $Ge_2Sb_2Te_5$ <Ag> films have an amorphous structure for all the silver impurity concentrations studied. It is shown that $Ge_2Sb_2Te_5$ films are characterized by a cellular structure. In the $Ge_2Sb_2Te_5$ <Ag> films with increasing concentration of the Ag impurity, the transformation of the cellular structure into the cluster one is observed.
When studying the structure of $Ge_2Sb_2Te_5$ <Ag> films by RS and SEM in a crystalline state, it was found that their structure is granular, polycrystalline and hexagonal. With an increase in Ag concentration in $Ge_2Sb_2Te_5$ <Ag> films, an increase in the grain size from ~ 2.5 to ~ 10 nm occurs and a single-crystal phase is observed.

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Nonvolatile resistance switching in monolayer transition metal dichalcogenides: an explanation

F. Sava, A. Velea, C. O. Mihai, A. T. Buruiana

National Institute of Materials Physics, Atomistilor 405A, 077125, Magurele Romania

Corresponding author: fsava@infim.ro

Recently, Ge et. al. [1] showed that in atomic sheets of transition metal (from the group VI B) dichalcogenides (TMD) (Fig. 1) (MoS_2, $MoSe_2$, WS_2 and WSe_2) nonvolatile resistance switching occurs.

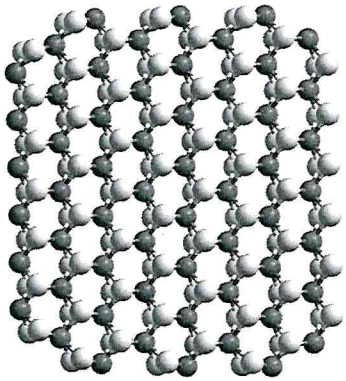

Fig. 1. An oblique view from above of the TMD structure three-dimensional model, with the chalcogen atoms in yellow and the transition metal atoms from the group VI B in red.

In order to understand this behaviour of mono-layer TMD, at these very intense electric fields ($E = 1.43*10^9$ V/m), we advance the hypothesis (and structural models) that the nonvolatile resistance switching might occur by two successive structural transformations due to local coordination changes of the transition metal and the chalcogen atoms.

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