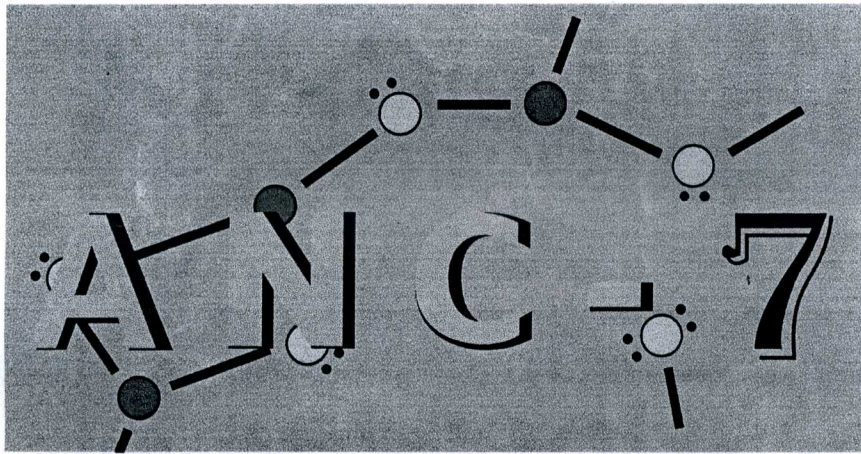


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Abstract Book

**7th International Conference on Amorphous and
Nanostructured Chalcogenides**

Cluj - Napoca, Romania, July 5 - 10, 2015

The local structure of amorphous Ga₂Se₃ thin films

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The I–V characteristic curves for amorphous Ga₂Se₃ thin films were found to be typical for a memory switch [1], while the crystalline Ga₂Se₃ thin films are promising materials for use in optoelectronic devices [2]. We have been prepared amorphous Ga₂Se₃ thin films by pulsed laser deposition (PLD) using a KrF^{*} laser operated at a repetition rate of 5 Hz. The local structure of these amorphous thin films has been investigated by X-ray diffraction (XRD) using Mo K_α radiation and by extended X-ray absorption fine structure (EXAFS) techniques. The EXAFS measurements were performed in fluorescence mode, using a single element Si diode detector, at Ga and Se K edges. The local environments of Ga and Se atoms derived from the EXAFS data and from X-ray diffraction radial distribution function are in good agreement. The nearest mean neighbor interatomic distance was found to be 2.30 Å.

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Compositional peculiarities of physical ageing in glassy As/Ge-Se alloys

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Physical aging is known to be an important attribute of glassy-like alloys, which have been always in technologically-frozen metastable state resulting in uncontrolled drift of their physical-chemical properties [1]. In this work, the kinetics of physical aging determined in enthalpy losses $\Delta H(t)$ were compared for under-constrained Se-rich glasses, allowing considerable deviation in average covalent bonding Z and Lagrangian constraints per atom n_c , in part, Ge₅Se₉₅ ($Z = 2.1$, $n_c = 2.25$), As₁₀Se₉₀ ($Z = 2.1$, $n_c = 2.25$), As₂₀Se₈₀ ($Z = 2.2$, $n_c = 2.5$) and As₃₀Se₇₀ ($Z = 2.3$, $n_c = 2.75$). The glass samples were prepared by conventional melt-quenching route in evacuated quartz ampoules from a mixture of high purity (no worse than three nines) precursors. The furnace was rocked to obtain the most homogeneous melt. Amorphous state and chemical compositions were controlled visually by characteristic conch-like fracture, data of X-ray diffractometry and photoelectron spectroscopy.

It was established that kinetics of enthalpy losses $\Delta H(t)$ caused by natural physical aging in Se-rich chalcogenide exhibits a well-expressed step-wise character, its features being adequately explained by structure-topological nature of a glass revealed in strong dependence on -Se-Se-Se-, =As-Se-Se- and =As-Se-As= structural entities with different preferential chemical environment around Se atoms. The characteristic time constant of aging kinetics enhances for more topologically constrained network affected by relaxation. Significant dominance of quick-relaxing -Se-Se-Se- environment in Se-rich chalcogenide glasses (Ge₅Se₉₅) allows to detect the plateau-like behavior at the initial early stages of physical aging, whereas further plateaus

were caused by =As-Se-Se- fragments. The growing step-plateau behavior is hidden in glasses possessing multichemical environment around Se atoms and essential intermixing between different structural fragments, such as -Se-Se-Se- and =As-Se-Se- sites in $As_{20}Se_{80}$ glass.

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Green synthesis, characterization and investigation of antibacterial activity of silver oxide (Ag_2O) nanoparticles

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In this work starch capped silver oxide nanoparticles have been synthesized at room temperature using a green synthetic method and water as the solvent. Starch was used as a capping as well as a reducing agent. This method resulted from the growing need to develop low cost, non-toxic and environmentally friendly procedures for nanoparticles synthesis. The effect of precursor concentration and capping agent concentration were investigated for their influence on the size and shape of the synthesized nanoparticles. The UV-Vis spectrum of Ag_2O showed the absorbance maximum at 366 nm. TEM analysis average particle size diameter of 2-14 nm and XRD as well as EDX confirmed phase and elemental composition of Ag_2O . FT-IR spectrum confirmed that the nanoparticles were successfully capped with starch. TGA thermogram showed that the synthesized nanoparticles were pure and thermally stable throughout the temperature used. The increase in precursor concentration showed an increase in nanoparticle size while increasing the capping agent concentration resulted in reduced size. Increasing capping concentration resulted in a change in nanoparticles shape from spheres to rods. The characterized nanoparticles were then tested for their antimicrobial activities on gram positive *Staphylococcus aureus* and gram negative *Escherichia coli* bacteria species. The nanoparticles showed to have antibacterial effects towards both bacteria strains. The zone of inhibition measured was 14 ± 0.11 mm for *Escherichia coli* and 15 ± 0.19 mm for *Staphylococcus aureus*.

Keywords: silver oxide nanoparticles, starch, sodium hydroxide, antibacterial activity

Temperature studies of optical parameters in copper enriched thin films based on Cu_6PS_5I superionic conductors

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Cu_6PS_5I crystals at room temperature possess high ionic conductivity and therefore they are the promising materials for applications as an electrochemical energy source. It should be noted that the investigations of physical properties of Cu_6PS_5I thin films are only being started. The thin films were deposited onto silicate