LAMOX, the new family of oxide conductors, obtained on the basis of $La_2Mo_2O_9$ compound with the use of different substitutions is the object for intensive studies. In 2005 year single crystals of the anionic conductor $La_2Mo_2O_9$ were grown by crystallization from the nonstoichiometric flux [1]. Their polymorphism, domain structure and temperature dependences of conductivity and permittivity were studied [1]. Conductivity of these crystals at 750-600 ℃ reaches 10^{-1}-10^{-2} $Om^{-1}sm^{-1}$. It was established that in dependence of the cooling rate and of the admixture content, these crystals can exist at the room temperature as stable monoclinic A-phase or metastable cubic B_1-phase or as their mixture. Obtaining of the most complete and precise structural data about the crystals of cubic metastable B_1-phase from X-ray experiment was the purpose of the present study. It is important that these studies were done for the first time for single crystals. Cubic cell with a=7.158(1)Å, which was found for the studied single crystal, allowed to index about 84% of measured reflections. While solving the structure (in sp.gr. $P2_13$) it was established that La and Mo atoms are shifted from the threefold axes. Occupation of three positions of La and Mo atoms was found to be equal to 100%. Two of the three independent oxygen positions in this crystal are not fully occupied, have quite large thermal parameters and are located at the short distances from each other. Concluding R-factor for this structure was 2.46%. The work was done with the partial support of the grant RFBR No.07-02-00180, Grant for the Leading Scientific Schools NSh-2192.2008.5 and "Russian Science Support Foundation".

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Keywords: conducting materials, crystal structure analysis, structure-properties relationships

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Pulse laser deposition of $AgInSe_2$ films

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High quality $agInSe_2$ (AIS) films were grown on Si and glass substrates by the ultra-high-vacuum pulsed laser deposition technique from the AIS target synthesized from high-purity materials. The X-ray diffraction and microscopic studies of the films show that films are textured in (112) direction. The effect of substrate temperature on growth on Si and glass substrates was observed. The substrate temperature appears to influence the properties of films. The films prepared on Si show more crystallinity than on glass showing good lattice matching. Chalcopyrite phase (112) is dominant up to 3000 ℃. The optical studies of the films show that the optical band gap is about 1.24 eV, which also show change with change in temperature. This shows that AIS films are very good absorber material for solar cell technology.

Keywords: pulse laser deposition, thin films, optical properties

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Modified 6-deoxyclitoriacetal and their crystal structures as anticancer agents

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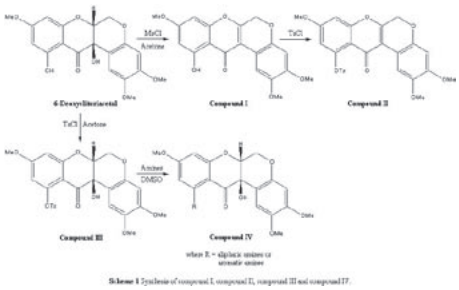
6-Deoxyclitoriacetal is a substance extracted from the dried roots of *Stemona collinsae* Craib. It has been known to have a cytotoxic activity against various types of human carcinoma possibly due to by its ability to intercalate with DNA as evidenced *in vitro* assay. In order to enhance its activity, 6-deoxyclitoriacetal was derivatised to contain a functional group with more flexible and can be participated hydrogen bonding with DNA. The derivatives of 6-deoxyclitoriacetal were prepared as shown in scheme 1. In this work, we studied the relationship between crystal structures, hydrogen bonding and cytotoxic activity of 6-deoxyclitoriacetal and its derivatives based on spectroscopic and X-ray crystallographic techniques.



Keywords: 6-deoxyclitoriacetal, hydrogen bonding, cytotoxic activity

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Using electron microscopy techniques studies in microstructure of NdFeCoAl-(B,C) based alloys

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Magnetic materials on basis of the NdFeAl alloys have been intensively studied because of their interesting physical properties and application potential. The magnetic measurements reveal that the samples exhibit hard-magnetic characteristics quite good at room temperature. However, the relationship between hard magnetic properties and microstructure in these alloys are still not well understood. We present here the results of studies on the microstructure of some NdFeCoAl-(B,C) alloy system by the electron microscopy techniques as TEM, HRTEM, SEM, SAED, EDX and EBSD. Rods and ribbons of the NdFeCoAl-(B,C) alloys were prepared from the pure elements Nd, Fe, Co, Al, B and C by rapid-quenching methods. We used a Philips CM20-FEG TEM and a FEI NovaNanoSEM 200 SEM to characterize the microstructure of these alloys. We found the different crystalline phases in the alloys. In the NdFeCoAlB samples, the tetr. $Nd_2(Fe,Co)_{14}B$ (2:14:1), fcc Nd rich, hcp Nd, alpha-Fe and in the NdFeCoAlC samples, the tetr.