SEMINAR

NEW MULTIFEROICS AND SUPERIONIC CONDUCTORS FOR ACUSTOELECTRONICS AND SOLID STATE IONICS

PROGRAM AND BOOK OF ABSTRACTS

10 OCTOBER 2017

VILNIUS / LITHUANIA

PROGRAM

(NFTMC, Saulėtekio av. 3)

10:00–10:10 Opening remarks (prof. J. Banys)

10:10–10:30 R. Yevych, M. Medulych, I. Zamaraite, A. Dziaugys, J. Banys, **Yulian Vysochanskii**

Nonlinear dynamics of phosphorous chalcogenide ferroelectrics with many-well local potentials

10:30–10:50 **Andrius Džiaugys**, M. Chyasnavichyus, A. Belianinov, Q. He, A. Borisevich, A. N. Morozovska, E. A. Eliseev, J. Banys, Y. Vysochanskii, S.V. Kalinin, P. Maksymovych

Polarization domains in the layered ferroelectrics $CuInP_2(S,Se)_6$

10:50–11:20 **Edvardas Kazakevičius**, V. Venckutė, S. Kazlauskas, A. Kežionis, R. Korobko, T. Šalkus

High frequency impedance spectroscopy study on Gd-DOPED CeO_2 thin films

11:20–12:00 *Coffee break*

12:00–12:20 **Ihor Studenyak**, M. Luchynets, V Izai, A. Pogodin, O. Kokhan, A. Kežionis, T. Šalkus, J. Banys

Phase transitions in Cu_6PS_5Br-Cu_7PS_6 mixed crystals

12:20–12:40 I. Anusca, S. Balčiūnas, P. Gemeiner, Š. Svirskas, M. Sanlialp, G. Lackner, C. Fettkenhauer, J. Belovickis, V. Samulionis, M. Ivanov, B. Dkhil, **Jūras Banys**, V. V. Shvartsman, D. C. Lupascu

Dielectric Response of the Methylammonium Lead Halide Solar Cell Absorbers

12:40–13:00 **Saulius Kazlauskas**, E. Kazakevičius, A. Kežionis

Electrical properties of scandia- and ceria-stabilized zirconia ceramics

13:00–14:00 *Lunch*

14:00–14:20 **Alexander Grabar**, M. V. Tsyhyka, and I. M. Stoika

Dynamic interferometry using Sb-doped $Sn_2P_2S_6$ photorefractive crystals

14:20–14:40 **Ilona Zamaraite**, A. Dziaugys, J. Banys, Yu. Vysochanskii

Investigation of physical properties of phosphorous chalcogenide crystals

14:40–15:10 *Coffee break*

15:10–17:00 Poster session

17:00 *Dinner*

ORAL

PRESENTATIONS

PHASE TRANSITIONS IN Cu_6PS_5Br-Cu_7PS_6 MIXED CRYSTALS

Ihor Studenyak[1], Mykhailo Luchynets[1], Vitalii Izai[1], Artem Pogodin[1], Olexander Kokhan[1], Algimantas Kežionis[2], Tomas Šalkus[2], Jūras Banys[2]
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Cu_6PS_5Br crystals belong to the family of compounds with argyrodite structure. At room temperature Cu_6PS_5Br crystals belong to the cubic syngony ($F\bar{4}3m$ space group) while at low temperatures two phase transitions (PTs) occur: a ferroelastic one at T_{II} =(268±2) K and a superionic one at T_I=(166–180) K. Below the ferroelastic PT temperature Cu_6PS_5Br crystals belong to the monoclynic syngony (*Cc* space group), and the superionic PT reveals the features of an isostructural transformation. In Cu_7PS_6 a PT is observed at 515 K from the high-temperature phase with $F\bar{4}3m$ symmetry to the low-temperature phase with $P2_13$ symmetry. Here we present results of the isoabsorption and polarization studies of PT in $(Cu_6PS_5Br)_{1-x}(Cu_7PS_6)_x$ mixed crystals.

$(Cu_6PS_5Br)_{1-x}(Cu_7PS_6)_x$ mixed crystals were grown by chemical vapour transport technique. It is shown that at $x \leq 0.2$ in $(Cu_6PS_5Br)_{1-x}(Cu_7PS_6)_x$ mixed crystals the solid solutions based on Cu_6PS_5Br with $F\bar{4}3m$ symmetry are obtained. Isoabsorption and polarization studies of optical absorption edge were carried out in the temperature range 77–320 K.

On the isoabsorption curves in the range of ferroelastic second-order PT a specific knee is observed that is smeared with increase of Cu_7PS_6 content in $(Cu_6PS_5Br)_{1-x}(Cu_7PS_6)_x$ mixed crystals. Polarization studies have shown that at PT at $T=T_{II}$ the light transmission in the polarizer-crystal-analyzer system is observed (Fig.1). This PT is accompanied by the transition from isotropic paraelastic phase to anisotropic ferroelastic phase. As a result of isoabsorption and polarization measurements the dependence of ferroelastic PT temperature on Cu_7PS_6 content in $(Cu_6PS_5Br)_{1-x}(Cu_7PS_6)_x$ crystals (Fig. 1, inset) is obtained. It is shown that the increase of Cu_7PS_6 content leads to decrease of the PT temperature at $T=T_{II}$ from 265.6 K in Cu_6PS_5Br crystal to 255 K in $(Cu_6PS_5Br)_{0.9}(Cu_7PS_6)_{0.1}$ mixed crystal.

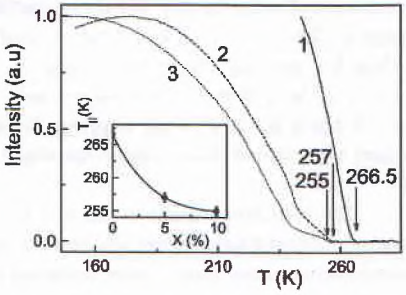

Fig. 1. Temperature dependences of light intensity in system of polarizer-crystal-analyzer for the Cu_6PS_5Br (1), $(Cu_6PS_5Br)_{0.95}(Cu_7PS_6)_{0.05}$ (2), and $(Cu_6PS_5Br)_{0.9}(Cu_7PS_6)_{0.1}$ (3) crystals. The inset shows the dependence of the temperature of ferroelastic PT at $T = T_{II}$ on the Cu_7PS_6 content in $(Cu_6PS_5Br)_{1-x}(Cu_7PS_6)_x$ mixed crystals.

Acknowledgement
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