CNM-4
2015

International Meeting

CLUSTERS AND NANOSTRUCTURED MATERIALS (CNM'4)

PROGRAM
and
MATERIALS

Uzhgorod Ukraine
12 – 16 October, 2015

National Academy of Sciences of Ukraine
Institute of Physics
G.V.Kurdyumov Institute for Metal Physics
V.E. Lashkaryov Institute for Semiconductor Physics
Institute for Information Recording
Uzhgorod Scientific-Technological Center of the Institute for Information Recording
Uzhgorod National University

INTERNATIONAL MEETING

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Materials of the International Meeting "Clusters and nanostructured materials (CNM-4)" – Uzhgorod, Ukraine, 2015 – 152 p.

The materials represent the contents of meeting's reports based on the results of fundamental and applied works on topical questions in the field of nanostructured systems, nanomaterials and nanotechnologies. Main attention is given to the consideration of problems of nanophysics and nanoelectronics, to atomic and electronic structure of cluster and nanostructured materials, amorphous alloys, nanostructured films and coatings, colloidal and biofunctioal materials, to study of their properties. The results of investigations in the field of supramolecular chemistry, synthesis of nanoparticles, nanostructores and multifunctional nanomaterials, physico-chemistry of superficial phenomena and diagnostics of nanosystems are presented.

The edition is designed for scientists, engineers, higher school lecturers, post-graduates and students of corresponding specialities.

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THURSDAY, 15TH OF OCTOBER, 2015

8^{00} – 9^{00} – breakfast

SECTION

Chairman: Uvarov V.M.

9^{00}– 9^{20} – OPTICAL CONDUCTIVITY OF ELLIPTICAL METAL NANOWIRES
Korotun A. V., Pogosov V. V. and Koval A. O.
Zaporizhzhya National Technical University, Zaporizhia, Ukraine.

9^{25} – 9^{45} – POSITRON AND POSITRINIUM IN METAL-DIELECTRIC NANOSANDWICHES
Babich A. V., Vakula P. V., Reva V. I., Pogosov V. V.
Zaporizhzhya National Technical University, Zaporizhia, Ukraine.

9^{50} –10^{10} – MULTYLAYER NANOSCALE CARBON CLUSTER – THE LATEST MODERN MULTIFUNCTIONAL ADDITIVES TO THE MOTOR FUELS
Polunkin E.V.
Institute of Bioorganic Chemistry and Petrochemistry NASU, Kyiv, Ukraine.

10^{15} –10^{35}– CARBON NANOSTRUTURES, NANOPORES AND METAL NANOPARTICES IN ADVANCED OPTOELECTRONIC MATERIALS FABRICATED BY LOW-ENERGY ION IMPANTATION
Kavetskyy T.S. and Stepanov A.L.
Drohobych Ivan Franko State Pedagogical University, Drohobych, Ukraine.

10^{40} – 11^{00}– ENVIRONMENTAL EFFECT ON DEFECT INTRODUCTION EFFICIENCY INTO CARBON NANOTUBES
Danilchenko B.A., Lev S.B., Tripachko N.A., ***Uvarova I.Y.***, Voitsihovska E.A., Yaskovets I.I.
Institute of Physics, NASU, Kyiv, Ukraine.

11^{00} – 11^{30}– coffee-break

SECTION

Chairman: Prokopenko I.V.

11^{30} – 11^{50} – ELECTRON-PHONON INTERACTION IN RESONANT TUNNELING STRUCTURES – KEY FACTOR OF QUANTUM CASCADE DETECTORS OPERATING
Tkach M.V., Seti Ju.O., ***Grynyshyn Y.B.***
Chernivtsi National University, Chernivtsi,Ukraine.

11^{55} – 12^{15} – **ON THE PRESSURE AND TEMPERATURE DEPENDENCES OF THE DYNAMIC VISCOSITY AND SELF-DIFFUSION COEFFICIENTS FOR CLUSTERED SIMPLE LIQUIDS**
Lugovskiy S. S., Tatarenko V. A.
G. V. Kurdyumov Institute for Metal Physics, NASU , Kiev, Ukraine.

12^{20} – 12^{40} – LOW TEMPERATURE THERMAL CONDUCTIVITY IN NANOSTRUCTURED Ge-As-S GLASSES ABOVE THE PLATEAU
Petretskij S., Feher A., Mitsa V., Holomb R., Rigo I., Tkach V.
Uzhgorod National University, Uzhgorod, Ukraine.

12^{45} – 13^{15} – COMPARISON OF HOLOGRAPHIC RECORDING IN As_2S_3 LAYERS AND As_2S_3-Se NANOMULTILAYER STRUCTURES
Meshalkin A., Triduh G., Prisacar A., Achimova E., Abashkin V., Paiuk O., Stronski A.
Institute of Applied Physics of the ASM, Chisinau, Moldova.

13^{30} – 15^{00} – lunch

LOW TEMPERATURE THERMAL CONDUCTIVITY IN NANOSTRUCTURED Ge-As-S GLASSES ABOVE THE PLATEAU

Petretskij S.[1], Feher A.[2], Mitsa V.[1], Holomb R.[1], Rigo I.[1], Tkach V.[2]
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[2] *Pavol Jozef Šafárik University in Košice, 041 54 Košice, Slovak Republic*

According to the topologic - cluster Phillips-Thorpe model in semiconductor glasses at the value of the mean coordination number z = 2.4 has to be a transition from one-dimensional to two-dimensional 1D -2D matrix structure [1], with further growth of connectivity of glasses to 3D with increasing z.

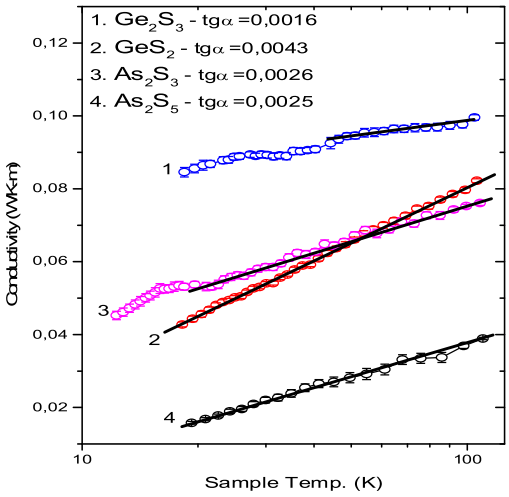

Fig.1. Temperature dependence of thermal conductivity in Ge-As-S glasses

In this report we presents the results of investigations of coordination dependences of low thermal conductivity Ge-As-S glasses in the temperature range 10 < T <100 K. In As_2S_3 (z=2.4) and Ge_2S_3 (z=2.8) glasses depending k (T) revealed two distinct plateau k (T) = const (Fig.1). In the measured temperature range the plateau k (T) = const is extends up to 20 K for As_2S_3 K and 40 K for Ge_2S_3 (Fig. 1) and extending plateau to higher temperature in g-Ge_2S_3 correlated with high frequency shifting of Boson peak from 26(As_2S_3) to 33 (Ge_2S_3) cm^{-1}[2] . Temperature dependence above the plateau can be extrapolated by straight lines (Fig.1). At temperatures above the plateau an additional channel associated with sl mode hopping becomes important, accounting for the increase in k (T) ∞ T above the plateau temperature [2].Theoretically has been estimated for GeS_2 (z=2.66) that k (T) = 0.0065 T (W / K m) [2]. It is easy to see that the experimental data for GeS_2 k (T) = 0.0043 T (W / K m) (Fig.1) are close to the theoretical estimation. At the level of 100 K the value of k for measured samples (Fig.1) is depends on mean coordination number z and sound velocity (v_l) in glasses. The highest value of k is corresponds to g-Ge_2S_3, z=2.8 and v_l=3,12*10^3 m/sec .

1. Thorpe M., Cai J. J. Non–Cryst. Sol. 114 (1989)19–24.
2. Mitsa V. , Holomb R. , Veres M. , Marton A. , Rosola I. , Fekeshgazi I. , Koós M. Phys. Stat. Sol. C. 8(2011) 2696-2700.
3. Tsuneyoshi Nakayama. Rep. Prog. Phys. 65 (2002) 1195–1242.