

National Academy of Sciences of Ukraine

Institute for Information Recording of the NAS of Ukraine

Institute for Information Recording Uzhgorod laboratory of optoelectronics and photonics
materials of the Institute for Information Recording of the NAS of Ukraine

Technical Center of the NAS of Ukraine

Uzhgorod National University

INTERNATIONAL MEETING

**CLUSTERS AND NANOSTRUCTURED
MATERIALS
(CNM-6)**

**Uzhgorod *Vodograj* Ukraine,
5-9 October 2020**

**PROGRAM & MATERIALS
OF THE MEETING**

**Uzhgorod
2020**

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Materials of the International Meeting "Clusters and nanostructured materials (CNM-6)" – Uzhgorod, Ukraine, 2020 – 374 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 biofunctional materials, to study of their properties. The results of investigations in the field of supramolecular chemistry, synthesis of nanoparticles, nanostructures 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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PROGRAM

MONDAY, 5TH OF OCTOBER, 2020

8⁰⁰ – 13⁰⁰ – registration of CNM'6 participants

13⁰⁰ – 14⁰⁰ – lunch

15⁰⁰ – 15¹⁵ – Opening MEETING (official speakers)

PLENARY

Chairman: **Karbivskyy V.**

15¹⁵ – 15⁵⁵ – **THERMAL TRANSPORT IN VAN DER WAALS CRYSTALS
MM'P2(S,Se)6 (M - Cu, Ag; M' - In, Bi) WITH DIFFERENT DIPOLE
ORDERING**

Liubachko V., Oleaga A., Salazar A., Glukhov K., Kohutych A.,
Pogodin A., Vysochanskii Yu.

15⁵⁵ – 16³⁰ – coffee-break

16³⁰ – 17¹⁰ – **PHOTORREFRACTIVE AND DIELECTRIC PARAMETERS OF
DOUBLE-DOPED Sn₂P₂S₆ CRYSTALS**

M. Tsyhyka, S. Hasynets, A. Molnar, R. Pavlyshyn, K. Glukhov, A. Kohutych,
A. Grabar

17¹⁰ – 17⁵⁰ – **COMPUTER-INTEGRATED MODEL OF As-S ATOMIC CLUSTERS
CONDENSATION**

Ivanitsky V.P., Kovtunenکو V.S., Ryaboschuk M.M.

17⁵⁰ – 18²⁰ – **LASER RECORDING OF NANOSIZED ELEMENTS ON THIN FILMS
OF CHALCOGENIDE GLASSY SEMICONDUCTORS**

KryuchynA.A., Petrov V.V., Rubish V.M., Kostyukevych S.O.

18²⁰ – 18⁵⁰ – **INNOVATIVE NANOMATERIALS AND DEVELOPMENTS AT THE
NATIONAL ACADEMY OF SCIENCES-USE AND OPPORTUNITIES
FOR COMMERCIALIZATION**

Bespalov S.A., Malchevsky I. A., Uvarov V. N.

19⁰⁰ – 20⁰⁰ – dinner

TUESDAY, 6TH OF OCTOBER, 2020

8⁰⁰ – 9⁰⁰ – breakfast

PLENARY

Chairman: **Rubish V.**

9⁰⁰ – 9⁴⁰ – **MODEL CALCULATIONS OF THE COMPLEX CRYSTALS
PHONON SPECTRUM DISPERSION**
Nebola I.I.

SECTION

9⁴⁰ – 10⁰⁰ – **OPTICALLY ACTIVE COATING BASED ON CHALCOGENID
GLASSES FOR MIDDLE IR RANGE PHOTODETECTORS**
Kabatsii V.M.

10⁰⁰ – 10²⁰ – **GOLD NANOPARTICLES FOR BIOMEDICAL APPLICATION**
Mukha Iu., Vityuk N., Khodko A., Severynovska O., Eremenko A.

10²⁰ – 10⁵⁰ – coffee-break

SECTION

Chairman: **Nebola I.**

10⁰⁰ – 12²⁰ – **ON THE GROWTH AND PROPERTIES OF PURE AND Ag-DOPED
ZnO NANOCOMPOSITES**
Ievtushenko A., Karpyna V., Shtepliuk I., Ericksson J., Yakimova R.,
Khranovskyy V.

12²⁰ – 12⁴⁰ – **THE MORPHOLOGY, ELECTRONIC STRUCTURE, OPTICAL
PROPERTIES AND CYTOTOXICITY OF Ag-DOPED ZnO
NANOSTRUCTURES**
Ievtushenko A., Khyzhun O., Karpyna V., Bykov O., Zahornyi M., Dzhagan
V., Yukhymchuk V., Valakh M., Zagorodnya S., Naumenko K.3, Zarembo P.,
Khranovskyy V.

12⁴⁰ – 13⁰⁰ – **GLUCURONIC ACID-BASED HYDROGELS**
Dil K.V., Okovityy S.I., Kondratyuk N.V.

13⁰⁰ – 14⁰⁰ – lunch

SECTION

Chairman: **Barabash M.**

14⁰⁰ – 14²⁰ – **EPR STUDY OF MAGNETIC NANOPARTICLES ENSEMBLES
PROMISING FOR BIOMEDICAL APPLICATIONS**
Konchits A.A., Shanina B.D., Krasnovyd S.V., Shevchenko Yu.B.,
Petranovs'ka A.L., Rieznichenko L.S.

14²⁰ – 14⁴⁰ – BINDING OF CALIX[4]ARENE TO THE A-KNOB OF FIBRIN: IN SILICO PROVES IN VITRO

Didkivkyi V.A., Hrabovskiy O.O., Humenyuk A.S., Selikhova A.I., Banya M.O., Cherenok S.O., Chernyshenko V.O.

14⁴⁰ – 15⁰⁰ – OBTAINING TECHNOLOGY OF HYBRID NANOMATERIALS CARBON NANOTUBES - GRAPHENE NANOPARTICLES

Sementsov Yu.I., Ivanenko K.O., Grebelna Yu.V., Kartel M.T., Karachevtseva L.A., Makhno S.M., Zhuravskiy S.V., Wang Bo, Yang Weiyou

15⁰⁰ – 15³⁰ – coffee-break

SECTION

Chairman: **Ivanitsky V.**

15³⁰ – 15⁵⁰ – MANIFESTATION OF FERROELECTRIC PROPERTIES OF ALUMINUM-SUBSTITUTED NANOSIZED LITHIUM-IRON SPINELS
Kaykan L.S., Sijo A.K., Mazurenko J.S., Ostapovych N.V.

15⁵⁰ – 16¹⁰ – INVESTIGATION OF THE MORPHOLOGY AND LUMINESCENCE PROPERTIES OF MG-DOPED ZnO NANOSTRUCTURES GROWN AT DIFFERENT SUBSTRATE TEMPERATURES

Myroniuk D. V., Karpyna V. A., Myroniuk L. A., Khranovskyy V. D., Ievtushenko A. I.

16¹⁰ – 16³⁰ – ULTRASONIC AND MAGNETIC-FIELD-ASSISTED ARRANGEMENT OF NANOSIZED CRYSTALLITES OF COBALT-CONTAINING LAYERED DOUBLE HYDROXIDES

Pashkevich Yu. G., Salak A. N., Vieira D. E. L., Lukienko I. M., Shapovalov Yu. O., Fedorchenko A. V., Fertman E. L., Babkin R. Yu., Shilin A. D., Rubanik V.V., Rubanik V. V. Jr., Ferreira M. G. S., Vieira J. M.

16³⁰ – 18⁰⁰ – POSTER SECTION (DISCUSSION)

19⁰⁰ – 20⁰⁰ – dinner

WEDNESDAY, 7TH OF OCTOBER, 2020

8⁰⁰ – 9⁰⁰ – breakfast

PLENARY

Chairman: **Rubish V.**

9⁰⁰ – 9⁴⁰ – **THE SPECIAL TECHNOLOGIES OF SYNTHESIZING MATERIALS WITH SPECIFIC PROPERTIES**
Zhiguts Yu.Yu.

SECTION

Chairman: **Zhiguts Yu.**

9⁴⁰ – 10⁰⁰ – **NEW TECHNOLOGIES OF DIFFUSION SATURATION TITANIUM OF STEEL SURFACE**
Zhiguts Yu.Yu., Krajnjaj I.I., **Karpovych V.A.**

10⁰⁰ – 10²⁰ – **RESEARCH OF TECHNOLOGIES FOR PRODUCING FUNCTIONAL COATINGS BY COMBINED METHODS OF SHS-ALLOYING SURFACES OF STEEL BY METALS**
Zhiguts Yu.Yu., Segeda Yu.V., **Kasynetsj S.O.**

10²⁰ – 10⁴⁰ – **EQUIPMENT FOR PLASMA SPRAYING**
Zhiguts Yu.Yu., Legeta Ya.P., **Strukov B.M.**

10⁴⁰ – 11¹⁰ – coffee-break

SECTION

Chairman: **Zhiguts Yu.**

11¹⁰ – 11³⁰ – **INTEGRATED DIFFUSION SATURATION OF THERMITE STEEL SURFACE BY POLYMERS**
Zhiguts Yu.Yu., **Zub I.M.**

11³⁰ – 11⁵⁰ – **PONDEROMOTIVE FORCES AS A REASON FOR DESTRUCTION OF VIRUS INTERACTING WITH NANOPARTICLES**
V. Lozovski, **N. Rusinchuk** and V. Lysenko

11⁵⁰ – 12¹⁰ – **JOINT ADSORPTION OF METHANE AND WATER ON HYDROPHOBIC AND HYDROPHILIC SILICA ADSORBENTS**
Turov V.V., Gun'ko V.M., **Krupska T.V.**

12¹⁰ – 12³⁰ – **PHOTOCHEMICAL SYNTHESIS OF METAL-SEMICONDUCTOR COMPOSITES BASED ON CRYSTALLINE GRAPHITIC CARBON NITRIDE FOR PHOTOCATALYTIC HYDROGEN PRODUCTION**
Shvalagin V.V., Korzhak A.V., Kutsenko O.S., Kuchmiy S.Ya.

12³⁰ – 12⁵⁰ – SERS SUBSTRATES BASED ON LATERALLY ORDERED GOLD NANOSTRUCTURES FOR DETECTING ORGANIC MOLECULES
Hreshchuk O.M., Yukhymchuk V.O., Dzhagan V.M., Indutnyi I.Z.,
Min'ko V.I., Lytvyn P.M., Danko V.A.

13⁰⁰ – 14⁰⁰ – lunch

14⁰⁰ – 14²⁰ – METALLIC REPLICA OF THE NANOSTRUCTURED TEMPLATE SURFACE AS A TOOL FOR SMART TEXTILES
Barabash M.Yu., Suprun N.P., Pozhilov-Nesmiyan G.M., Martynchuk V.E.,
Kolesnichenko A.A., Rybov L.V., Litvin R.V.

14²⁰ – 14⁴⁰ – FESEM STUDY OF SURFACE MORPHOLOGY OF ARRAYS OF NOBLE METALS NANOPARTICLES
Makar L.I., Mudry S., Rubish V.M., Shtablavyi I., Yasinko T.I.

14⁴⁰ – 15¹⁰ – coffee-break

15¹⁰ – 18⁰⁰ – POSTER SECTION (DISCUSSION)

19⁰⁰ – 20⁰⁰ – dinner

THURSDAY, 8TH OF OCTOBER, 2020

8⁰⁰ – 9⁰⁰ – breakfast

PLENARY

Chairman: **Karbivskyy V.**

9⁰⁰ – 9⁴⁰ – **FORMATION OF Ag AND Au NANOPARTICLES ARRAYS AND SOME ASPECTS OF THEIR PRACTICAL USE**
Rubish V.M.

9⁴⁰ – 10²⁰ – **ON THE LONGITUDINAL ELECTRO-SCALAR WAVE IN THE NANOSTRUCTURES, WAVE GUIDES AND MAXWELL ELECTRODYNAMICS**
Simulik V.M., Zajac T.M.

10²⁰ – 10⁵⁰ – coffee-break

SECTION

Chairman: **Simulik V.**

10⁵⁰ – 11¹⁰ – **MULTIPLE MECHANISMS OF HOLOGRAPHIC GARTING RECORDING IN POLYMER NANOCOMPOSITES WITH GOLD NANOPARTICLES**
S. Kokenyesi, I.Csarnovich, S.Molnar, A. Bonyar, D. Alkhalil, A.Burunkova

11¹⁰ – 11³⁰ – **THE POLARIZABILITY OF METAL NANOISLANDS ON A DIELECTRIC SUBSTRATE**
Korotun A.V., Titov I.M., Rubish V.M.

11³⁰ – 11⁵⁰ – **INNOVATIVE NANOLAYER VACUUM ARC COATINGS FOR SURFACE HARDENING OF PRODUCTS THAT OPERATE IN DIFFICULT CONDITIONS**
Stolbovoy V.A., Andreev A.A., Voevodin V.N., Serdiuk I.V., Dolomanov A.V.

11⁵⁰ – 12¹⁰ – **THERMOMAGNETIC EFFECT IN NANOFILMS AND CAPILLARIES**
Shevchenko S.I., Konstantinov A.M.

12¹⁰ – 12³⁰ – **FORMATION OF THIN DRY DRAWN GRAPHITE FILMS AND PROPERTIES OF PHOTSENSITIVE GRAPHITE/n-InSe JUNCTIONS**
Savitskii P.I., Kovalyuk M.Z., Tovarnitskii M.V., **Kovalyuk Z.D.**

12³⁰ – 12⁵⁰ – **SAPATIALLY MODULATED PHASES IN ANTIFERRODISTORTIVE MULTIFERROICS**
Anna N. Morozovska, Eugene A. Eliseev, Deyang Chen, **Vladislav Shvetz**, Christopher T. Nelson, and Sergei V. Kalinin

13⁰⁰ – 14⁰⁰ – lunch

SECTION

 Chairman: **Zajac T.**

- 14⁰⁰ – 14²⁰ – OPTICAL CUBIC NONLINEARITY OF THIN FILMS OF PALLADIUM OXIDE: VALUE, DYNAMICS AND NATURE**
V. Liakhovetskyi, A. Brodin, V. Rudenko, M. Brodyn, V. Styopkin
- 14²⁰ – 14⁴⁰ – MANIFESTATION OF FERROELECTRIC PROPERTIES OF ALUMINUM-SUBSTITUTED NANOSIZED LITHIUM-IRON SPINELS**
Kaykan L.S., Sijo A.K., Mazurenko J.S., Ostapovych N.V.
- 14⁴⁰ – 15⁰⁰ – SYNTHESIS AND CHARACTERIZATIONS OF COLLOIDAL Ag₂ZnSnS₄ AND Cu₂ZnSnS₄ NANOCRYSTAL THIN FILMS DEPOSITED BY SPIN-COATING**
Mazur N.V., Dzhagan V.M., Havrylyuk Ye.O., Valakh M.Ya., Kapush O.A., Hreshchuk O.M., Yukhymchuk V.O.
- 15⁰⁰ – 15²⁰ – THE MECHANISMS AND DYNAMICS OF ANTIOXIDANT ACTION OF NANOCERIA AND CERIA-BASED NANOPARTICLES**
Vladyslav Seminko, Pavel Maksimchuk, Ganna Grygorova, Elena Okrushko, Yuri Malyukin
- 15²⁰ – 15⁵⁰ – coffee-break**

SECTION

 Chairman: **Ivanitsky V.**

- 15⁵⁰ – 16¹⁰ – ELECTRICAL PROPERTIES OF MERCURY MODIFIED AMORPHOUS SELENIUM**
Kyrylenko V.K., Rubish V.M., Nykyruy L., Pisak R.P., Durkot M.O., Zapukhlyak Z.R., Fedelech V., Uvarov V.N.
- 16¹⁰ – 16³⁰ – AMORPHOUS CHALCOGENIDES WITH PHASE-CHANGE EFFECT**
Durkot M.O., Kyrylenko V.K., Kryuchyn A.A., Petrov V.V., Pop M.M., Rubish V.M., Yurkin I.M.
- 16³⁰ – 18⁰⁰ – POSTER SECTION (DISCUSSION)**
- 19⁰⁰ – 20⁰⁰ – dinner**

FRIDAY, 9TH OF OCTOBER, 2020

8⁰⁰ – 9⁰⁰ – breakfast

Satellite conference **ACCELERATE**

Invited lectures:

Chairman **V. Rizak**

9⁰⁰ **Grand opening of the ACCELERATE Satellite Session**

9³⁰ Vladimir Matolin, Salma Baghdadi, Natalia Popovych, Vitalii Bilanych, Oleksandr Chobal, Vasyl Rizak

The outpost CERIC-ERIC in Ukraine: Current State and Prospects

10⁰⁰ Matúš Orendáč, Slavomír Gabáni, Pavol Farkašovský, Emil Gažo, Jozef Kačmarčík, Gabriel Pristáš, Konrad Siemensemeyer, Natalya Shitsevalova, and Karol Flachbart
Magnetic phases in two-dimensional geometrically frustrated Shastry-Sutherland system TmB₄

10³⁰ Vladimir Matolin, Natalia Tsudi, Natalia Popovych, Vasyl Rizak
Investigating the short range order of chalcogenide amorphous materials by photoelectron spectroscopy

11⁰⁰ Leonid Dubrovinsky, Iryna Chobal, Anna Pakhomova, Oleksandr Chobal, Aleksandr Kurnosov, Volodymyr Adamiv, Vasyl Rizak
Structural, mechanical and thermodynamic properties of lithium potassium tetraborate crystals under high pressure: DFT calculations and synchrotron radiation X-ray diffraction

11³⁰ M. Vorokhta, L. Piliai, I. Khalakhan, D. Tomeček, P. Fitl, M. Vršata, J. Lančok, I. Matolínová,
V. Matolín
Near ambient pressure XPS for in operando study of gas sensors

12⁰⁰ Bih.L., Guranich P.P., Mykaylo O.A., Pisak R.P., Rizak I.M., Rubish V.M., Solomon A.M., Tsiple M.
Structure and properties of chalcogenide glasses and composites on their basis

12³⁰ Elouadi B., Barj M., Gasinets S.M., Guranich P.P., Makar L.I., Mykaylo O.A., Pop M.M., Rizak I.M., Rubish V.M., Solomon A.M.
Nanocomposites with ferroelectric properties in As(Ge)-Sb-S(Se)-I system

13⁰⁰ -14³⁰ Dinner

Chairman **V. Rubish**

- 14³⁰ Latyshev V., Kozejova M., Vorobiov S., Shylenko O., You. H., Komanicky V.
Non-precious metal catalyst systems prepared by magnetron sputtering for hydrogen evolution reaction
- 15⁰⁰ Kostyuk O.B., Głowa Ł., Naidych B.P., Tsymbalyuk T.P., Mezhylovska L.Y., Nykyruy L.I.
Analysis of the Growth and Crystal Structure for Pb_{0.9}Cd_{0.1}Te:Pb Thin Films
- 15³⁰ Lofaj F., Shilenko O., Bilanych V.S., Bilanych B.V., Komanicky V., Feher A., Rizak V.M.
Investigation of laser induced effects in As-Se glasses and films based on them by nano- and microindentation methods
- 16⁰⁰ Korposh S. O., Trikur I. I., Sichka M.Y., Tsoma I. Y., Rizak V. M.
Bacteriorhodopsin as a biological material for optical recording, processing and security information.
- 16³⁰ Zapukhlyak Z.R., Rubish V.M., Wisz G., Yavorskyi R.S., Nykyruy L.I.
SCAPS simulation of ZnO/CdS/CdTe/CuO heterostructure for photovoltaic application
- 17⁰⁰ Csach K., Bilanych V.S., Jurikova A., Miskuf J., Bilanych V.V., Rizak V.M.
Studies of As-Se glasses and films based on them by differential scanning calorimetry
- 17³⁰ Popovych N., Gažova Z., Rizak V.M.
Application of the photoelectron spectroscopy to study the organic materials properties: adenine molecules and amyloid fibers
- 18⁰⁰ **Discussion of invited lectures and closing ceremony of the ACCELERATE Satellite Session**
- 18²⁰ **Closing MEETING**

POSTERS

EFFECT OF Se-CONTENT DOPING ON ELECTRONIC, DYNAMICAL AND MECHANICAL PROPERTIES OF TiInS_2 LAYERED CRYSTAL

T. BABUKA, O.O. GOMONNAI, K.E. GLUKHOV, L.YU. KHARKHALIS, A.V. GOMONNAI, D.R.T. ZAHN, M. MAKOWSKA-JANUSIK

DEVELOPMENT OF HIGH-EFFICIENT SOLAR CELLS WITH PYRAZOLINE LUMINOPHOR COATING LAYER

IE.V. BELIAK, D.YU. MANKO

MIXING AND SELF-ORGANIZATION OF THE STRUCTURE OF MATERIALS UNDER SEVERE PLASTIC DEFORMATION

BEYGELZIMER Y., KULAGIN R., DAVYDENKO O., DMITRENKO V.

ELECTROCHEMICAL SYNTHESIS OF NANOCRYSTALLINE Mo-RICH SUPERALLOYS

BERSIROVA O.L., KUBLANOVSKY V. S.

INDENTATION SIZE EFFECTS AND MECHANICAL PROPERTIES OF SUPERIONIC MIXED CRYSTALS WITH ISOVALENT CATION SUBSTITUTION

BILANYCH V.S., SKUBENYCH K.V., BABILYA M.I., POGODIN A.I., STUDENYAK I.P.

ELECTRONIC STRUCTURE OF Na_2GeSe_3 CRYSTALS

BLETSKAN D.I., VAKULCHAK V.V., STUDENYAK I.P.

THIN FILMS OF SAMARIUM VANADATE NANOPARTICLES FOR ENHANCED LIGHT HARVESTING OF NEAR UV AND VISIBLE LIGHT

CHUKOVA O.V., DOROFEEVA A.I., NEDILKO S.A., NEDILKO S.G., VOITENKO T.A., PASZKOWICZ W., RAHIMI MOSAFER H.S., MANOUSAKI M., SAVVA K., STRATAKIS E.I.

PROXIMITY-INDUCED TRIPLET SUPERCONDUCTIVITY IN $\text{Bi}_2\text{Sr}_2\text{Ca}_2\text{Cu}_3\text{O}_{6+x}:\text{La}_{2/3}\text{Sr}_{1/3}\text{MnO}_3$ NANOCOMPOSITES

DMITRENKO V.YU., KRIVORUCHKO V.N., TARENKOV V.YU.

SURFACE MORPHOLOGY AND OPTICAL CHARACTERISTICS OF ARRAYS OF RANDOMLY DISTRIBUTED GOLD NANOPARTICLES

DURKOT M.O., KYRYLENKO V.K., TARNAJ A.A., VLAYKOV G.G., KREMENTITSKY V.V., NOVICHENKO V.M.

DIELECTRIC PROPERTIES OF $\text{Cs}_2\text{Ag}_2\text{P}_2\text{Se}_6$ CRYSTALS

MOLNAR A., GAL D., BAN H., HAYSAK A.

THERMOKINETICS OF FORMATION AND OXIDATION OF CARBON NANOFORMS

GARBUZ V.V., SILINSKA T.A., KUZMENKO L.M., PETROVA V.A.

FIRST PRINCIPLES STUDY OF FERROELECTRIC AND ANTIFERROMAGNETIC STATES IN MIXED $\text{M}_1\text{M}_2\text{P}_2\text{S}(\text{Se})_6$ CRYSTALS

GLUKHOV K.E., BABUKA T.YA., KHARKHALIS L.YU., VYSOCHANSKII YU.M.

DETERMINATION OF TOXICITY OF HYBRID NANOCOMPLEXES COMPRISING NANOPARTICLES OF GADOLINIUM ORTHOVANADATE AND CHOLESTEROL

GOLTSEV A.M., MALYUKIN YU.V., BONDAROVYCH M.O., BABENKO N.M., GAYEVSKA YU.O., DUBRAVA T.G., VOLKOVA N.O., KLOCHKOV V.K., OSTANKOVA L.V.

INVESTIGATION OF RADIOPROTECTIVE ACTIVITY OF CERIUM OXIDE CeO_{2-x} AND ORTHOVANADATE $\text{Gd}_{0.9}\text{Eu}_{0.1}\text{VO}_4$ NANOPARTICLES *IN VIVO*

GRYGOROVA G.V., KLOCHKOV V.K., YEFIMOVA S.L.

EFFECT OF INCREASING THE THERMAL CONDUCTIVITY OF SOME MOLECULAR CRYSTALS

YU.V. HORBATENKO, O.O. ROMANTSOVA, A.I. KRIVCHIKOV, O.A. KOROLYUK

DIELECTRIC PROPERTIES CHANGES IN AGED GLASSY SELENIUM

HORVAT A.A., MIKLA V.V., MINKOVICH V.V., MOLNAR A.A., SOLOMON A.M., RUBISH V.M.

SYNTHESIS AND CRYSTAL STRUCTURE OF NEW MIXED ORTHOVANADATES $\text{Pr}_{0.5}\text{R}_{0.5}\text{VO}_4$ ($R = \text{Sm}, \text{Gd}, \text{Dy}, \text{Er}, \text{Yb}$)

HREB V.M., TUPYS A.M., VASYLECHKO L.O.

ORTHOVANADATE $\text{GdYVO}_4:\text{Eu}^{3+}$ NANOPARTICLES WITH SWITCHABLE REDOX-ACTIVITY

HUBENKO K. O., YEFIMOVA S. L., MAKSIMCHUK P. O., KAVOK N. S., KLOCHKOV V. K., MALYUKIN YU. V.

TEMPERATURE DEPENDENCE OF SURFACE-DOPED TiO_2 EMISSION

O. F. ISAEVA, V.I. DZHAGAN, V. SHYMANOVSKA, D.R.T. ZAHN, G.YU. RUDKO

THE DIELECTRIC FUNCTION OF THE COMPOSITE WITH THE METAL-GRAPHENE NANORODS

KARANDAS YA.V., KOROTUN A.V., TITOV I.M.

MECHANISMS OF FORMATION AND PHYSICAL PROPERTIES OF 2D-STRUCTURES Al AND In

KARBIVSKA L.I., SMOLYAK S.S., KARBIVSKYY V.L., ROMANSKY A.A.

TECHNOLOGICAL APPROACH TO ZnO NANOSTRUCTURES GROWTH FROM METALORGANIC COMPOUNDS FOR PHOTOCATALYTIC APPLICATIONS

KARPYNA V.A., MYRONIUK L.A., MYRONIUK D.V., BYKOV O.I., ZAHORNYI M.M., IEVTUSHENKO A.I.

TOPOLOGY OF BAND STRUCTURE AND SPATIAL DISTRIBUTION OF ELECTRON DENSITY IN SEMICONDUCTORS OF In-Se SYSTEM

KHARKHALIS L.YU., LIAKH M.V., GLUKHOV K.E., BABUKA T.YA.

***AB INITIO* INVESTIGATION OF STRUCTURAL AND ELECTRONIC PROPERTIES OF THE INSE DILUTED MAGNETIC MATERIALS**

KHARKHALIS L.YU., GLUKHOV K.E., BABUKA T. YA., KOROLEVYCH O.O.

CNTS FORMATION BY PRODUCTS OF METHANE AIR CONVERSION AT MODERATE TEMPERATURES

KHOVAVKO A., NEBESNIY A., SVYATENKO A., FILONENKO D., KOTOV V., BONDARENKO B., NIE G.

STRUCTURE AND MECHANICAL PROPERTIES OF VACUUM ARC V-O-N COATINGS

KLIMENKO I.O., BELOUS V.A., KOLODIY I.V., VASILENKO R.L., KUPRIN A.S., OVCHARENKO V.D., TOLMACHOVA G.N., GILEWICZ A., WARCHOLINSKI B.

IMPACT OF ABERRATIONS AND DEFOCUSING ON SPECKLE SUPPRESSION EFFICIENCY IN LASER PICO PROJECTORS WHEN USING NANO-STRUCTURAL DOE BASED ON THIN FILM

KLIUIEVA T.YU.

MAGNETICALLY SENSITIVE NANOCOMPOSITES WITH CARBON-CONTAINING SURFACE

GORBYK P.P., PETRANOVSKA A.L., DZYUBENKO L.S., ORANSKA O.I., ABRAMOV M.V., PALYANYTSYA B.B., KULYK T.V., **KORNIICHUK N.M.**, KUSYAK A.P., KUSYAK N.V.

THE MAPS OF THE ELECTROMAGNETIC WAVES IN THE NANOCOMPOSITE WITH METALLIC 1D-INCLUSIONS

KOROTUN A.V., PAVLISHCHE N.I.

THE MECHANISM OF FORMATION OF POROUS STRUCTURE OF THE DERMIS COLLAGEN MODIFIED ECOSAFETY DIFFERENT CRYSTALS OF NATURAL MINERALS

KOZAR OKSANA

X-RAY LUMINESCENCE OF CADMIUM-MODIFIED THIN FILMS OF ARSENIC DISULFIDE

KRASILINETS V.M., LOYA V.YU., CHYCHURA I.I., BIROV M.M., POPOVICH K.P., EDINAK O.V.

ELECTROCHEMICAL PARAMETERS OF THIN TIN FILMS IN CYCLING IN LITHIUM-ION BATTERIES

KUBLANOVSKY V., GLOBA N., NIKITENKO V., BABENKOV E., SHMATOK YU., BERSIROVA O.

ACID TREATED CRYSTALLINE GRAPHITIC CARBON NITRIDE, A NEW MATERIAL FOR VISIBLE LIGHT SELECTIVE ORGANIC COMPOUNDS PHOTO-OXIDATION

KUCHMIY S.YA., SHVALAGIN V.V., KOMPANETS M.O.

EFFECT OF SILVER BY COPPER SUBSTITUTION ON FERRIELECTRIC PROPERTIES IN CuInP_2X_6 LAYERED COMPOUNDS

LIUBACHKO V., OLEAGA A., SALAZAR A., VYSOCHANSKII YU., KOHUTYCH A., POGODIN A.

FORMATION OF HGSE NANOCRYSTALLINE INCLUSIONS IN THE MATRIX OF AMORPHOUS SELENIUM FILMS

MAKARL.I., MUDRY S., NYKYRUY L., PISAK R.P., RUBISH V.M., SHTABLAVYI I., BESPALOV S.A., SOLOMON A.M., YAVORSKYI R.S.

IMPROVING HYDROXYL RADICAL SCAVENGING PROPERTIES OF CeO_{2-x} NANOCRYSTALS BY DOPING AND UV PRE-IRRADIATION

MAKSIMCHUK P.O., SEMINKO V.V., SEDYH O.O., ASLANOV A.V., MALYUKIN YU.V.

ATOMIC FORCE SPECTROSCOPY FOR SORPTION PROPERTIES ESTIMATIONS OF FILMS IN SENSOR APPLICATIONS

MALYUTA S.V., RUSAVSKY A.V., NAZAROV O.M., LYTVYN P.M.

ELECTRICAL AND MAGNETIC PROPERTIES OF POLYMER NANOCOMPOSITES BASED ON NICKEL FERRITE MODIFIED WITH COPPER SULFIDE

MAZURENKO R.V., PROKOPENKO S.L., ABRAMOV M.V., GUNJA G.M., MAKHNO S.M., GORBYK P.P.

GOLD NANOPARTICLES-COATED OPTICAL FIBRE-TIP PROBES FOR COMMON AND ULTRAFAST SERS

MOROZOV YE.M.

AB INITIO CALCULATIONS OF CRYSTAL AND ELECTRONIC STRUCTURE OF SOLID SOLUTIONS BASED ON LEAD CHALCOGENIDES

NYKYRUY L.I., NAIDYCH B.P., KOSTYUK O.

PHONON SPECTRA OF THE $\text{Cu}_7\text{SiS}_5\text{I}$ AND $\text{Ag}_7\text{SiS}_5\text{I}$ CRYSTALS

NEBOLA I.I., KATANYTSIA A.F., SHTEYFAN A.YA., SIDEY V.I., OCHKAY I.I., STUDENYAK I.P.

PECULIARITIES OF DOUBLE ELECTRON-PHONON RESONANCE IN RAMAN SPECTRA OF GRAPHENE AND SINGLE-WALLED CARBON NANOTUBES

NIKOLENKO A.S., STRELCHUK V.V., STUBROV YU.YU. AND GUBANOV V.O.

PHOTOLUMINESCENT AND STRUCTURAL PROPERTIES OF THIN ZnO FILMS DOPED WITH RARE EARTH METALS

OBEREMOK O.S., DUBIKOVSKYI O.V, SABOV T.V, KOSULYA O.V, MELNIK V.P, KLADKO V.P, ROMANYUK B.M, POPOV V.G, GUDYMENKO O.YO.

MASS SPECTROMETRY STUDY OF CLUSTERS FORMATION BETWEEN DIMETHYL SULFOXID AND ANTIBIOTICS

PASHYNSKA V.A., KOSEVICH M.V., GOMORY A.

OPTICAL PROPERTIES OF X-RAY IRRADIATED $(\text{Ga}_{0.4}\text{In}_{0.6})_2\text{Se}_3$ FILMS

STUDENYAK I.P., **POP M.M.**, KRANJIČEC M., SOLOMON A.M., SUSLIKOV L.M.

X-RAY AND FESEM STUDY OF MERCURY MODIFIED CRYSTALLIZED SELENIUM FILMS

RUBISH V.M., MAKAR L.I., MUDRY S., **PISAK R.P.**, SHTABLAVYI I., SOLOMON A.M., KATANOVA L.

ELECTRICAL CONDUCTIVITY OF SUPERIONIC CERAMIC BASED ON $\text{Ag}_7\text{SiS}_5\text{I}$ NANOPOWDER

POGODIN A.I., **SHENDER I.O.**, FILEP M.J., KOKHAN O.P., STUDENYAK I.P.

USING MECHANICAL ALLOYING FOR MAX PHASES FORMATION AS PRECURSORS OF GRAPHENE-LIKE CARBIDES OF MXENES TYPE

SOLONIN YU.M., **SAVYAK M.P.**, KORABLOV D.S.

MODEL CALCULATIONS OF THE LAWS OF DISPERSION OF THE PHONON SPECTRUM OF BaTiO_3 CRYSTALS WITH PARTIAL INHABITANCE OF DIFFERENT CRYSTALLOGRAPHIC POSITIONS

I.M. SHKYRTA, I.I. NEBOLA

INFLUENCE OF MONOMER STRUCTURES ON THE MORPHOLOGIES AND OPTICAL PROPERTIES OF J-AGGREGATES

ALEXANDER SOROKIN, ROMAN GRINYOV, IRINA ROPAKOVA, IGOR BOROVOY,
SVETLANA YEFIMOVA, YURI MALYUKIN

COOLING OF SUPERHEATED SURFACES BY NANOFUIDS AND IT SIMULATION BY CFD.

EUGENE STRATIVNOV

MODIFICATION OF TEXTILE MATERIALS FOR MEDICAL PURPOSE BY NATURAL NANOTUBES

SUPRUN N.P., IVANOV I.O., BRICHKA A.V., REDKO YA.V.

CRIOCHEMICAL SYNTHESIS OF $Ni_xZn_{1-x}Fe_2O_4$ NANOPARTICLES AND STUDY OF THEIR PROPERTIES

TIMASHKOV I.P., SHLAPA YU.YU., SOLOPAN S.O.

FORMATION OF SURFACE RELIEF GRATINGS IN AMORPHOUS As-Se FILMS BY POLARIZATION HOLOGRAPHY

M.L.TRUNOV AND V.K. KYRYLENKO

DYNAMICS OF PHOTOREFRACTIVE EFFECT IN $Sn_2P_2S_6$ CRYSTALS STUDIED BY MODULATION TECHNIQUE

M. TSYHYKA, S. HASYNETS, A. KOHUTYCH, A. GRABAR

POLARIZATION STATES IN CORE-SHELL FERROELECTRIC NANOPARTICLES FOR ADVANCED APPLICATIONS

MOROZOVSKA A.N., TUL AidAN V.V., ELISEEV E. A., HERTEL R., RESHETNYAK V. YU., EVANS D.R.

AUTOMATATION OF FIBER OPTIC THERMOMETERS WITH GaAs NANOPOWDER AS TEMPERATURE SENSITIVE ELEMENTS

TURIANYTSIA I.I., CHYCHURA I.I. KUTCHAK S.V.

PROBIOTIC LACTOBACTERIA FOR CREATION OF SELENIUM CONTAINING DIETARY SUPPLEMENT

TYMOSHOK N.O., BITUTYKY V.S., KHARCHUK M.S., KHARCHYSHYN V.M., LAZARENKO L.M., KALINICHENKO S.V., SPIVAK M.YA.

CALIX[4]ARENE C-956 INHIBITORY ACTION KINETIC ON PLASMA MEMBRANE Ca^{2+} , Mg^{2+} -ATPASE ACTIVITY OF SMOOTH MUSCLE CELL

VEKLICH T.O., SHKRABAK O.A., GOLDEN O.V., KARDASH O.O., KOSTERIN S.O.

THE EFFECT OF GOLD NANOPARTICLES ON SEMINIFEROUS TUBULES OF THE TESTES AFTER VITRIFICATION

VOLKOVA N.O., YUKHTA M.S., GOLTSEV A.M.

OPTICAL PROPERTIES OF As_2S_3 - Bi_2S_3 NANOCRYSTALLINE COMPOSITE

VOYNAROVYCH I.M.

RAMAN SPECTROSCOPIC STUDY OF NANO-SIZED AMORPHOUS LAYERS OF SELENIUM AND PLASMON STRUCTURES “Au NPS/ Se FILM”

YASINKO T.I., YUKHYMCHUK V.O., RUBISH V.M., MINKOVICH V.V., MIKLA V.I., MAKAR L.I., HRESHCHUK O.M., HORVAT A.A.

SURFACE NANOSCALE STRUCTURE OF SUPERCONDUCTING FILMS PROBED BY JUNCTION SPECTROSCOPY

ZHITLUKHINA E.S.

SOME APPLICATIONS OF NANOSTRUCTURED MATERIALS AS INTERMEDIATE LAYER FOR RESISTANCE BUTT WELDING OF HIGH TEMPERATURE ALLOYS

ZIAKHOR I.V., KUCHUCK-YATSENKO S.I., ZAVERTANNYI M.S., NAKONECHNYI A.O., RADCHENKO L.M.

VACUUM DIFFUSION WELDING OF HIGH NB CONTAINING TIAL ALLOY WITH NI-BASED ALLOY

PETRUSHYNETS L.V., FALCHENKO I.U.V., ZIAKHOR I.V., FEDORCHUK V.E., NAKONECHNYI A.O.

FEATURES OF PHOTOELEKTRON SPEKTRUM OF As(Sb)-S-J COMPOUNDS IN THE ENERGY RANGE OF 5,0-11,3 eV

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In this work, we study the energy distribution curves of photoelectrons (EDCP) of compounds As_2S_3 , AsSJ, $As_1Sb_{1-x}J$, SbSJ in the amorphous state and for SbSJ -k, S_8 - k in the crystalline state in the energy range 5-11.3 eV. EDCP obtained by the method of delay potential, the accuracy of determining the position of the levels is not worse than ± 0.1 eV. At EDCP, the peculiarities of the density of electronic states of both the valence and conduction bands are observed. Conditionally, they are denoted by A_i for the valence band, and by P_i - the conduction band. For the possibility of comparison, all compounds are summarized relative to the Fermi level E_F . Data on S_8 are taken from [1]. The level W corresponds to the position of the top of the valence band relative to the vacuum level (photoelectrons threshold). The research results are presented in Table 1.

Table 1. Energy levels of compounds S_8 , As_2S_3 , AsSJ, $As_1Sb_{1-x}J$, SbSJ

Compound	E_F , eV	P_1 , eV	P_2 , eV	P_3 , eV	P_4 , eV	P_5 , eV	P_6 , eV	-W, eV	- A_1 , eV	- A_2 , eV	- A_3 , eV	- A_4 , eV	- A_5 , eV	- A_6 , eV
$S_8 - \kappa$ [1]	5,6					6,2		7,5	1,9			3,1		4,6
As_2S_3	4,4			5,5		6,3		6,2	1,8			3,2	3,95	4,7
AsSJ	4,4	4,8	5,1	5,5	5,8	6,3		5,8	1,85	2,2	2,65	3,15	3,90	4,7
$As_1Sb_{1-x}SJ$	4,4	4,6	5,0	5,3	5,6	6,4		5,9	2,0		2,50	3,50	4,10	
SbSJ	4,6		5,0		5,7	6,4		5,7		2,3	2,50	3,55		
SbSJ - κ	4,6		5,1		5,7		6,6	5,7	1,85		2,55	3,55	4,0	

The introduction of As atoms into sulfur leads to a significant reduction in the Fermi level and the work function, which is due to a decrease in the band gap from 2.6 eV to 2.36 eV, respectively, an increase in conductivity and a decrease in possible surface charging. The introduction of iodine atoms to As_2S_3 reduces the work function W to 5.8 eV. The introduction of AsSJ (10-30)% of Sb atoms leads to a slight shift in the features of EDCP in the conduction band and a decrease in the level of A_3 by 0.4 eV of the valence band. For crystalline SbSJ, the level of P_5 is observed, with an energy of 6.6 eV.

The investigated compounds are similar chain structures in which the role of chalcogen, as can be seen, is decisive. For all tested compounds, the energy levels of sulfur within the accuracy of the experiment are maintained. No A_6 level was detected in compounds $As_xSb_{1-x}SJ$ and SbSJ.

1. Nelsen P. Photoemission studies of sulfur. - Phys. Rev. B., 1974, v.10, № 4, p.1673-1682.