

Ф — Фізика і хімія
X — твердого тіла
T — Т

№ 1
2022
Том 23
Vol. 23

P — Physics and
C — Chemistry of
S — Solid
S — State



Міністерство освіти і науки України
Прикарпатський національний університет імені Василя Стефаника
Фізико-хімічний інститут
Навчально-дослідний центр напівпровідникового матеріалознавства

Ministry of Education and Science of Ukraine
Vasyl Stefanyk Precarpathian National University
Physical-Chemical Institute
Research & Education Center of Semiconductor Material Science

ISSN 1729-4428

ФІЗИКА І ХІМІЯ ТВЕРДОГО ТІЛА

PHYSICS AND CHEMISTRY OF SOLID STATE

**No 1
2022
Tom 23
Vol. 23**

PCSS Journal is indexed by the WoS (2017) and Scopus (2020)

PCSS Journal is included in category A of the Register of Professional Journals of Ukraine:
Branch of science: Chemical (02.07.2020), Technical (02.07.2020), Physical and Mathematical (24.09.2020)
Specialties: 102 (02.07.2020) 132 (02.07.2020) 104 (24.09.2020) 105 (24.09.2020)

Recommended for publication by the Academic Council of Vasyl Stefanyk Precarpathian National University

Свідоцтво про державну реєстрацію
КВ № 24247-14087ПР від 27.09.2019

Передплатний індекс: 22938

Certificate of State Registration
KB No. 24247-14087 ПР from 27.09.2019

Subscription index: 22938

© Vasyl Stefanyk Precarpathian National University, 2022
Physical-Chemical Institute, 2022

Адреса редакції:
Прикарпатський національний університет
імені Василя Стефаника,
вул. Шевченка, 57,
Івано-Франківськ,
76018, Україна
Тел.: +380 (342) 59-60-82
Факс.: +380 (342) 53-15-74
E-mail: pcss@pnu.edu.ua
<https://journals.pnu.edu.ua/index.php/pcss>

Editorial address:
Vasyl Stefanyk Precarpathian National University,
57, Shevchenko Str.,
Ivano-Frankivsk,
76018, Ukraine
Tel.: +380 (342) 59-60-82
Fax.: +380 (342) 53-15-74
E-mail: pcss@pnu.edu.ua
<https://journals.pnu.edu.ua/index.php/pcss>

Vasyl Stefanyk Precarpathian National University
Physical-Chemical Institute
Research & Education Center of Semiconductor Material Science

Scientific Journal
Physics and Chemistry of Solid State

EDITORIAL BOARD

EDITOR-IN-CHIEF

Volodymyr Prokopiv, (Ivano-Frankivsk, Ukraine)

EDITORS

Andriy Zagorodnyuk (Ivano-Frankivsk, Ukraine)

Bogdan Ostafiychuk (Ivano-Frankivsk, Ukraine)

Grzegorz Wisz (Rzeszów, Poland)

EDITORIAL BOARD MEMBERS

Physics&Mathematical Sciences

Belyaev O. (Kyiv, Ukraine), **Bester M.** (Rzeszów, Poland), **Budzulyak I.** (Ivano-Frankivsk, Ukraine), **Fodchuk I.** (Chernivtsi, Ukraine), **Ilchuk H.** (Lviv, Ukraine), **Galuschak M.** (Ivano-Frankivsk, Ukraine), **Gasyuk I.** (Ivano-Frankivsk, Ukraine), **Gurevich Yu.** (Mexico, Mexico), **Kladko V.** (Kyiv, Ukraine), **Klyui M.** (Changchun, China), **Korbutyak D.** (Kyiv, Ukraine), **Kovalenko O.** (Dnipro, Ukraine), **Labuz M.** (Rzeszów, Poland), **Lishchynskyy I.** (Ivano-Frankivsk, Ukraine), **Nykyryu L.** (Ivano-Frankivsk, Ukraine), **Malashkevich G.** (Minsk, Belarus), **Płoch D.** (Rzeszów, Poland), **Protsenko I.** (Sumy, Ukraine), **Rubish V.** (Uzhhorod, Ukraine), **Sabat K.** (Bhopal, India), **Saliy Ya.** (Ivano-Frankivsk, Ukraine), **Strikha M.** (Kyiv, Ukraine), **Swiatek Z.** (Krakow, Poland), **Wal A.** (Rzeszów, Poland)

Chemical Sciences

Babanly M. (Baku, Azerbaijani), **Fochuk P.** (Chernivtsi, Ukraine), **Gladyshevskii R.** (Lviv, Ukraine), **Gorichok I.** (Ivano-Frankivsk, Ukraine), **Lobanov V.** (Kyiv, Ukraine), **Myronyuk I.** (Ivano-Frankivsk, Ukraine), **Nedliko S.** (Kyiv, Ukraine), **Shyichuk O.** (Bydgoszcz, Poland; Ivano-Frankivsk, Ukraine), **Tatarchuk T.** (Ivano-Frankivsk, Ukraine), **Tomashyk V.** (Kyiv, Ukraine), **Turovska L.** (Ivano-Frankivsk, Ukraine), **Zinchenko V.** (Odessa, Ukraine)

Technical Sciences

Ahiska R. (Ankara, Turkey), **Anatychuk L.** (Chernivtsi, Ukraine), **Ascheulov A.** (Chernivtsi, Ukraine), **Dashevsky Z.** (Beer-Sheva, Israel), **Kharchenko M.** (Kharkiv, Ukraine), **Kogut I.** (Ivano-Frankivsk, Ukraine), **Kryuchyn A.** (Kyiv, Ukraine), **Novosyadlyy S.** (Ivano-Frankivsk, Ukraine), **Romaka V.** (Lviv, Ukraine), **Uhrin R.** (New Jersey, USA), **Zukowski P.** (Lublin, Poland)

Technical Editor

Yurchyshyn L. (Ivano-Frankivsk, Ukraine)

Content

Interaction of Light with matter: nonclassical phenomenon <i>Pramila Shukla, Shivani A. Kumar, Shefali Kanwar</i>	5
Carbon dioxide-assisted Torrefaction of Maize Cobs by Thermogravimetry: Product Yield and Energy Recovery Potentials <i>Bemgba B. Nyakuma, Samuel-Soma M. Ajibade, Victor B. Adebayo, Habib Alkali, Victor O. Otitolaiye, Jemilatu O. Audu, Faizah M. Bashir, Yakubu A. Dodo, Abubakar S. Mahmoud, Olagoke Oladokun</i>	16
Solid-phase equilibria in the GeBi₂Te₄-Bi₂Te₃-Te system and thermodynamic properties of compounds of the GeTe·mBi₂Te₃ homologous series <i>T.M. Alakbarova, E.N. Orujlu, D.M. Babanly, S.Z. Imamaliyeva, M.B. Babanly</i>	25
Features of cubic Ni₃C and NiC carbides obtained by HT-HP sintering <i>O.I. Nakonechna, D.A. Stratichuk, A.M. Kuryliuk, N.N. Belyavin</i>	34
Density of states and interband light absorption in Y₂O₃ and Sc₂O₃ thin films <i>O.M. Bordun, I.O. Bordun, I.M. Kofliuk, I.Yo. Kukharskyy, I.I. Medvid</i>	40
Growth, structural, optical and mechanical studies on Amino acids doped Nonlinear optical sodium acid phthalate single crystals <i>G. Marudhu, T. Baraniraj, S. Krishnan, G.V. Vijayaragavan, Karthik Kannan, Geetha Palani, V. Chithambaram</i>	45
First-principle calculations of band energy structure of CdSe_{0.5}S_{0.5} solid state solution thin films <i>A.I. Kashuba, B. Andriyevsky, I.V. Semkiv, H.A. Ilchuk, R.Y. Petrus, Ya.M. Storozhuk</i>	52
Phase equilibria, glass formation and optical properties of glasses in the Ag₂S-B^{IV}S₂-C^V₂S₃ systems (B^{IV}-Ge, Sn; C^V-As, Sb) <i>O.P. Berezniiuk, I.I. Petrus', I.D. Olekseyuk, O.V. Zamuruyeva, M.I. Skipalskiy</i>	57
Strong correlation effects in vanadium oxide films <i>Yuriy Skorenky, Oleksandr Kramar, Yuriy Dovhopolyat</i>	62
Tuning the Optical, Electronic and Thermal Characteristics of Si₃N₄/PVA/PEO Solid State Structures for Electronics Devices <i>Hind Ahmed, Ahmed Hashim</i>	67
Effect of magnetic field concentration <i>A.A. Ashcheulov, M.Ya. Derevianchuk, D.A. Lavreniuk</i>	72
Magnetite nanoparticles synthesized using grape fruit extract: synthesis, morphology, hyperthermia application and catalytic activity in hydrogen peroxide decomposition <i>Nazarii Danyliuk, Sofia Lischynska, Tetiana Tatarchuk, Volodymyr Kotsyubynsky, Volodymyr Mandzyuk</i>	77
Heavy hole scattering on intrinsic acceptor defects in cadmium telluride: calculation from the first principles <i>O.P. Malyk, S.V. Syrotyuk</i>	89
The Crystal Structure of La₃Pb_{0.1}Ga_{1.6}S₇ and Pr₃Pb_{0.1}Ga_{1.6}S₇ Compounds <i>N.M. Blashko, O.V. Smitiukh, O.V. Marchuk</i>	96
Synthesis and Characterization of Binary Reduced Graphene Oxide/Metal Oxide Nanocomposites <i>Baris Avar, Mrutyunjay Panigrahi</i>	101
What is the true value of bulk band gap of lithium tetraborate single crystal? <i>Ya.V. Burak, V.T. Adamiv, I.M. Teslyuk, I.Ye. Moroz, S.Z. Malynych</i>	113
A comparative density functional theory study of BMSF-BENZ chemisorption on Zn₁₂O₁₂, Al₁₂P₁₂ nanocages <i>Zaid Al-Sawaff, Serap Senturk Dalgic, Zaheda A. Najim, Shatha S. Othman, Fatma Kandemirli</i>	120
Physicochemical and Electrocatalytic Performance of Chromium doped Iron Pyrite Thin Films <i>P. Prabukanthan, M. Sreedhar, G. Harichandran, T. Tatarchuk, K. Dinakaran, S. Uthayakumar, A. Younis</i>	134

Influence of dislocation structure on electrical and spectroscopic properties of MoO_x/p-CdTe/MoO_x heterostructures	144
<i>I.M. Fodchuk, A.R. Kuzmin, O.L. Maslyanchuk, I.I. Hutsuliak, M.S. Solodkyi, Yu.T. Roman, M.M. Solovan, O.Yo. Gudymenko</i>	
Mass Transmission Regularities in CdTe under Nanosecond Laser Irradiation	150
<i>S.M. Levytskyi, D.V. Gnatyuk, O.V. Koba</i>	
Low-temperature deposition of Cd_{1-x}Zn_xTe layers by laser sputtering and their physical properties	154
<i>Yu.S. Gromovskyi, L.V. Rashkovetskyi, S.V. Plyatsko</i>	
Distribution of excess charge carriers in bilateral macroporous silicon with the same thickness of porous layers	159
<i>V.F. Onyshchenko</i>	
Intercalation of Li Atoms in TaSe₂ Film's Anode with LiClO₄/PEO Polymer Electrolyte: First Principles Calculation	165
<i>Yu. O. Prikhozha, R.M. Balabai</i>	
Porous structure of carbon materials obtained from the shell of walnuts	172
<i>N.Ya. Ivanichok, O.M. Ivanichok, P.I. Kolkovskiyi, B.I. Rachiy, S.-V.S. Sklepova, Yu.O. Kulyk, V.V. Bachuk</i>	
Prof. Muhammad Baba Babanly – 70	179
In Memory of Professor Volodymyr Prokopiv	181
In Memory of Acad. Vasyl Kladko	184
Information for authors	186