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Main research areas: low-temperature thermal expansion, sorption properties, carbon nanomaterials and composites based on them

Scientific degree: Candidate of Physical and Mathematical Sciences (2011 – Low Temperature Physics)

Scientific title: Senior Researcher (2023 – Physics and Astronomy)

Professional activities:
B. Verkin Institute of Low Temperature Physics and Engineering of the National Academy of Sciences of Ukraine, Department of Thermal Properties and Structure of Solids and Nanosystems
2005 – 2007 – Engineer
2007 – 2013 – Junior Research Fellow 2013 – 2017 – Research Fellow
2017 – to the present – Senior Research Fellow
Education:
2000 – 2005 – National Technical University “Kharkiv Polytechnic Institute” specialist in high voltage engineering and electrophysics

Selected publications in scientific journals:
1. N. A. Vinnikov, A. V. Dolbin, R. M. Basnukaeva, L. M. Buravtseva, E. M. Grytsyuk, Quantum effects in the kinetics of thermal expansion of C60 fullerite doped with 4He, Low Temperature Physics, **51**(3), 332–338 (2025) https://doi.org/10.1063/10.0035836
2. M.S. Barabashko, M. Drozd, A.V.Dolbin, R.M. Basnukaeva, N.A. Vinnikov, Kinetics of the thermal decomposition of thermally reduced graphene oxide treated with a pulsed high-frequency discharge in hydrogen atmosphere, Low Temperature Physics, **50**(5), 368–371 (2024) https://doi.org/10.1063/10.0025619
3. S.V. Cherednychenko, G.V. Andrievsky, N.A. Vinnikov, A.V. Dolbin, M.V. Kosevich, V.S. Shelkovsky, et al., Raman, UV-Vis, MS, and IR characterization of molecular-colloidal solution of hydrated fullerenes C60 obtained using vacuum-sublimation cryogenic deposition method. Is the C60 molecule truly highly hydrophobic?, Low Temperature Physics, 50, 248 (2024) https://doi.org/10.1063/10.0024965

4. D. E. Hurova; S. V. Cherednichenko; N. A. Aksenova; N. A. Vinnikov; A. V. Dolbin; N. N. Galtsov, Structural studies of epoxy resin with impurities of carbon nanostructures, Low Temp. Phys. **50**, 167 (2024) https://doi.org/10.1063/10.0024329
5. H. V. Rusakova, L. S. Fomenko, S. V. Lubenets, V. D. Natsik, A. V. Dolbin, N. A. Vinnikov, R. M. Basnukaeva, S. V. Cherednichenko, A. V. Blyznyuk; Low-temperature micromechanical properties of polyolephin/graphene oxide nanocomposites with low weight percent filler. Low Temp. Phys.; **49** 1213–1218 (2023) https://doi.org/10.1063/10.0021363
6. N. A. Vinnikov, A. V. Dolbin, R. M. Basnukaeva, V. G. Gavrilko, V. B. Eselson and L. M. Buravtseva, Quantum effects in the low-temperature thermal expansion of fullerite C60 doped with a 4He impurity, Low Temperature Physics 48, 791 (2022); https://doi.org/10.1063/10.0014
7. N. A. Vinnikov, S. V. Cherednichenko, A. V. Dolbin, V. B. Eselson, V. G. Gavrilko, R. M. Basnukaeva and A. M. Plokhotnichenko, The new approach for obtaining aqueous solutions of fullerene C60@{H2O}n by the cryogenic sublimation method, Low Temperature Physics 48, 336 (2022); https://doi.org/10.1063/10.0009739
8. A.V. Dolbin, V.I. Dubinko, N.A. Vinnikov, V.M. Boychuk, P.I. Kolkovsky, Low-temperature sorption of hydrogen by porous carbon material containing palladium nanoclusters, Low Temperature Physics, 46(10), p. 1030–1038 (2020) https://doi.org/10.1063/10.0001921 .
9. V.V. Sumarokov, A.V. Dolbin, A. Jezowski, D. Szewczyk, N.A. Vinnikov, M.I. Bagatskii, The low-temperature specific heat of thermal reduced graphene oxide. Low Temperature Physics, 46(3), 301-305 (2020) https://doi.org/10.1063/10.0000703.
10. A.V. Dolbin, N.A. Vinnikov, V.B. Esel'son, S.V. Cherednychenko, L. Kępiński, The impact of treating graphene oxide with a pulsed high-frequency discharge on the low-temperature sorption of hydrogen, Low Temperature Physics, 46(3), 293-300, (2020) https://doi.org/10.1063/10.0000701.
11. H.V. Rusakova, L.S. Fomenko, S.V. Lubenets, A.V. Dolbin, M.V. Khlistyuck, A.V. Blyznyuk, Synthesis and micromechanical properties of graphene oxide-based polymer nanocomposites, Fizika Nizkikh Temperatur, 46(3), p. 336–345 (2020), Low Temperature Physics 46 (3), 276-284 (2020), https://doi.org/10.1063/10.0000699.
12. A.V. Dolbin, N.A. Vinnikov, V.B. Esel'son, V.G. Gavrilko, R.M. Basnukaeva The effect of graphene oxide reduction temperature on the kinetics of low-temperature sorption of hydrogen, Low Temperature Physics 45 (4), 422-426 (2019), https://doi.org/10.1063/1.5093523.
13. A.V. Dolbin, M.V. Khlistuck, V.B. Eselson, V.G. Gavrilko, N.A. Vinnikov, Thermal expansion of organic superconductor α-(BEDT-TTF)2 NH4Hg(SCN)4, Low Temperature Physics 45 (1), 128-131 (2019), https://doi.org/10.1063/1.5082324.
14. A.V. Dolbin, M.V. Khlistuck, V.B. Eselson, V.G. Gavrilko, N.A. Vinnikov, R.M. Basnukaeva, V.A. Konstantinov, Y. Nakazawa, Thermal expansion of organic superconductor κ-(D4-BEDT-TTF)2Cu{N(CN)2}Br. Isotopic effect Fiz. Nizk. Temp.43, 1740 (2017) [Low Temp. Phys. 43 , 1387 (2017)] , https://doi.org/10.1063/1.5012790
15. A.V. Dolbin, N.A. Vinnikov, V.B. Esel'son, V.G. Gavrilko, R.M. Basnukaeva, M.V. Khlistyuck, A.I. Prokhvatilov, V.V. Meleshko, O.L. Rezinkin, and M.M. Rezinkina, Effect of cold plasma treatment on the hydrogen sorption by carbon nanostructures Low Temp. Phys. 44, 810 (2018); https://doi.org/10.1063/1.5049163.
16. A. V. Dolbin, M. V. Khlistyuck, V. B. Esel'son, V. G. Gavrilko, N. A. Vinnikov, R. M. Basnukaeva, V. E. Martsenuk, N. V. Veselova, I. A. Kaliuzhnyi, and A. V. Storozhko, Sorption of hydrogen by silica aerogel at low-temperatures Fiz. Nizk. Temp.44, 191 (2018) [Low Temp. Phys. 44 , 144 (2018)] https://doi.org/10.1063/1.5020910
17. A. I. Prokhvatilov, A. V. Dolbin, N. A. Vinnikov, R. M. Basnukaeva, V. B. Esel'son, V. G. Gavrilko, M. V. Khlistyuck, I. V. Legchenkova, Yu. E. Stetsenko, V. V. Meleshko, and V. Yu. Koda, Thermocatalytic pyrolysis of CO molecules. Structure and sorption characteristics of the carbon nanomaterial Fiz. Nizk. Temp.44, 439 (2018) [Low Temp. Phys. 44 , 334 (2018)] https://doi.org/10.1063/1.5030457
18. A.V. Dolbin, M.V. Khlistyuck, V.B. Esel'son, V.G. Gavrilko, N.A. Vinnikov, R.M. Basnukaeva, I. Maluenda, W.K. Maser and A.M. Benito. The effect of the thermal reduction

temperature on the structure and sorption capacity of reduced graphene oxide materials Applied Surface Science 361, 213 (2016) http://dx.doi.org/10.1063/1.4874880.
19. A.V. Dolbin, M.V. Khlistuck, V.B. Esel'son, V.G. Gavrilko, N.A. Vinnikov, R.M. Basnukaeva, A.I. Prokhvatilov, I.V. Legchenkova, and V.V. Meleshko, W.K. Maser and A.M. Benito. The effect of the thermal reduction on the kinetics of low-temperature 4He sorption and the structural characteristics of graphene oxide, Fiz. Nizk. Temp., 43, pp. 471– 478, 2017 [Low Temperature Physics 43, 383 (2017)] http://doi.org/10.1063/1.4979362
20. A.V. Dolbin, M.V. Khlistyuck, V.B. Esel'son, V.G. Gavrilko, N.A.Vinnikov, R.M. Basnukaeva, I. Maluenda, W.K. Maser, and A.M. Benito. The effect of the temperature of graphene oxide reduction on low-temperature sorption of 4He Fiz. Nizk. Temp.42, 75 (2016) [Low Temp. Phys. 42 , 57 (2016)] http://doi.org/10.1063/1.4979362
21. A.V. Dolbin, M.V. Khlistyuck, V.B. Esel'son, V.G. Gavrilko, N.A. Vinnikov, R.M. Basnukaeva, V.V. Danchuk, V.A. Konstantinov, Y. Nakazawa. Peculiarities of thermal expansion of quasi-two-dimensional organic conductor k-(BEDT-TTF)2Cu[N(CN)2]Cl Fiz. Nizk. Temp.42, 1007 (2016) [Low Temp. Phys. 42 ,788 (2016)] http://doi.org/10.1063/1.4962750.
22. B. A. Danilchenko, I. I. Yaskovets, I. Y. Uvarova, A. V. Dolbin, V. B. Esel'son, R. M. Basnukaeva and N. A. Vinnikov. Tunneling effects in the kinetics of helium and hydrogen isotopes desorption from single-walled carbon nanotube bundles Appl. Phys. Lett. 104 , 173109 (2014) http://doi.org/10.1063/1.4874880
23. A.V. Dolbin, V.B. Esel'son, V.G. Gavrilko, V.G. Manzhelii , N.A. Vinnikov, R.M. Basnukaeva, V.V. Danchuk, and N.S. Mysko, E.V. Bulakh, W.K. Maser and A.M. Benito. Sorption of 4He, H2, Ne, N2, CH4, and Kr impurities in graphene oxide at low temperatures. Quantum effects Fiz. Nizk. Temp.39, 1397 (2013) [Low Temp. Phys. 39 , 1090 (2013)] http://dx.doi.org/10.1063/1.4868528.
24. A.V. Dolbin, M.V. Khlistyuck, V.B. Esel'son, V.G. Gavrilko, N.A. Vinnikov, R.M. Basnukaeva, and V.V. Danchuk. The quantum effects in the kinetics of 4He sorption by mesoporous materials Fiz. Nizk. Temp.42, 109 (2016) [Low Temp. Phys. 42 , 80 (2016)] http://dx.doi.org/10.1063/1.4941598
25. V. Dolbin, M.V. Khlistyuck, V. B. Eselson, V. G. Gavrilko, N. A. Vinnikov, R. M. Basnukaeva, F. Conceição And M. Ochoa. Thermal expansion of silica aerogel at low temperatures, Journal of Applied Physical Science International, Vol 8 Issue 1, 2017.

Honors and awards:

Scholarship of the President of Ukraine for young scientists (2012–2014)

Participation in scientific projects:
2005–2007 – STCU Project UZ-116 "Complex Studies of Magnetoresonance, Magnetic, Magnetooptic and Thermal Properties of Fullerite Doped with Gases".
2008–2009 – STCU Project 4266 "Formation of one-, two-, three-dimensional carbon nanosystems and investigations of their low temperature dynamics".
2007–2009 – STCU Project 4359 "Development of a new material based on pressure-oriented carbon nanotubes and investigation of its properties".
2010–2012 – STCU Project 5212 "Development and investigation of new radiation modified carbon nanotube materials for molecular nanoelectronics".
2013–2014 – Grant of the NAS of Ukraine for young scientists 10-13/N.
2023 Project of the National Academy of Sciences of Ukraine "Creation of carbon nanocomposites with improved thermophysical characteristics"
2015 – 2016 Project of the National Academy of Sciences of Ukraine "Elementary excitations and phase states of simple molecular solids and nanostructures"
2017 – 2018 Project of the National Academy of Sciences of Ukraine "Thermodynamic properties of nano-structured systems, composites, molecular solids in extreme low temperature conditions"
2018 – 2019 Project of the National Academy of Sciences of Ukraine "Creation and research of new modified graphene nanosystems and nanocomposites with increased performance

characteristics”
2020 – 2021 Project of the National Academy of Sciences of Ukraine “Creation and research of structural and thermal properties of spatially oriented nanosystems, nanocomposites and complex crystals for new technologies”
2022 – 2026 Project of the National Academy of Sciences of Ukraine “Thermophysical properties, structure and low-temperature dynamics of nanostructures, crystalline and amorphous molecular systems in extreme temperature conditions”
2020 –2023 NRFU Project 2020.02/0094 “Quantum tunneling of vibrational excitations in the thermal conductivity of crystalline and amorphous materials and composites”
2024 – 2026 NRFU Project 2023.03/0012 “Low-temperature quantum nanoscale effects in the thermal properties of densified carbon materials and their composites”

Conferences:
1. Cherednychenko S., Vinnikov N., Boiko V., Dovbeshko G., Dolbin A., Spectroscopic and electrophysical studies of a solution of fullerene C_{60} molecules in water, "8th International Conference on NANOBIOPHYSICS (NBP-2023)" *Україна, Київ* с 2023-10-03 по 2023-10-06
2. R.M. Basnukaeva, A.V. Dolbin, N.A. Vinnikov, V.B. Esel’son, V.G. Gavrilko, S.V. Cherednychenko, V.O. Karachevtsev, A.M. Plokhotnichenko, Features of preparation colloidal aqueous solution of C_{60} fullerene by the sublimation method and its optical/electrophysical properties, XXVII International Summer School Nicolas Cabrera 2021, Madrid, Spain 5-10September 2021, p.39
3. H.V. Rusakova, L.S. Fomenko, S.V. Lubenets, A.V. Dolbin, N.A. Vinnikov, R.M. Basnukaeva, M.V. Khlistyuck, A.V. Blyznyuk The effect of temperature micromechanical properties of graphene oxide/polypropylene nanocomposite II International Advanced Study Conference Condensed Matter and Low Temperature Physics (CM&LTP2021), Kharkiv, Ukraine, 6-12 June, 2021, p.195.
4. R.M. Basnukaeva, A.V. Dolbin, N.A. Vinnikov, A.M. Plohotnichenko, V.B. Esel’son, V.G. Gavrilko, S.V. Cherednychenko, Electrophysical properties of aqueous colloidal solutions of C_{60} International Advanced Research Workshop “Thermal conductivity of solids states at low temperatures”, Kharkiv, Ukraine, 8 June, 2021, p 28.
5. S.V. Cherednychenko, A.V. Dolbin, N.A. Vinnikov, V.B. Esel’son, V.G. Gavrilko, R.M. Basnukaeva, N.V. Isaev, P.A. Zabrodin, Graphene-based nanocomposite adhesive compounds, II International Advanced Study Conference Condensed Matter and Low Temperature Physics (CM&LTP2021), Kharkiv, Ukraine, 6-12 June, 2021, p.130.
6. R.M. Basnukaeva, A.V. Dolbin, N.A. Vinnikov, A.M. Plohotnichenko, V.B. Esel’son, V.G. Gavrilko, S.V. Cherednychenko, Preparation of colloidal aqueous solution of C_{60} fullerene by the sublimation method, II International Advanced Study Conference Condensed Matter and Low Temperature Physics (CM&LTP-2021), Kharkiv, Ukraine, 6-12 June, 2021, p.128.
7. A.V. Dolbin, V.I. Dubinko, N.A. Vinnikov, V.B. Eselson, V.G. Gavrilko, R.M. Basnukaeva, M.V. Khlystyuk, S.V. Cherednichenko, Hydrogen sorption by porous carbon material, containing palladium nanoclusters, International Advanced Study Conference «Condenced matter and low temperature physics–2020» CM-LTP –2020 Kharkiv, Ukraine, June 8–14, 2020. – P .171