

ALEXANDR V. KNYAZEV

University	National Research Lobachevsky State University of Nizhny Novgorod
Level of English proficiency	C1
Educational program and field of the educational program for which the applicant will be accepted	1.4. Chemical Sciences 1.4.1 Inorganic chemistry
List of research projects of the potential supervisor (participation/leadership)	<p>1. Chemical basis for the creation of new generation functional materials for modern innovative technologies. No. 0729-2020-0039 (state task, 2020-2022, director).</p> <p>2. Development of the scientific foundations of the technology for producing chemoresistive materials for an electronic nose based on complex nanostructured oxide matrices. No. 22-13-00053. (RSF, 2022-2024, director)</p> <p>3. Reliable and logically transparent artificial intelligence: technology, verification and application in socially significant and infectious diseases. No. 075-15-2020-808. (project of the Ministry of Education and Science of the Russian Federation, 2020-2022, executor)</p> <p>4. Study of the role of phosphate-organic matrices in the abiogenic reproducible synthesis of peptides. No. 19-44-230040 r_a. (RFBR, 2019-2022, executor)</p> <p>5. No. FSWR-2023-0025. (state task, 2023-2025, executor).</p>
List of the topics offered for the prospective scientific research	<p>1. Synthesis and hydrolytic stability of binding phases radioactive waste</p> <p>2. Physico-chemical study of biologically active substances</p> <p>3. Study of isotope effects in crystals</p> <p>4. Inorganic materials for microelectronics</p>
	<p style="text-align: center;">Chemistry and Materials Sciences</p> <p>Supervisor's research interests Crystal chemistry Chemical thermodynamics of inorganic and organic compounds Radiochemistry</p> <p>Research highlights The postgraduate student's work will be carried out (depending on the topic chosen) using:</p> <ol style="list-style-type: none"> 1. Agilent DD2 NMR 400WB NMR spectrometer for experiments with liquid samples (Agilent Technologies USA) 2. ion liquid chromatograph LC-20ADsp Shimadzu 3. X-ray diffractometer XD-2 with vertical goniometer Θ-2Θ 4. X-ray powder diffractometer LabX XRD-6100 (Shimadzu, Japan) 5. Focus DSQ gas chromatography-mass spectrometer with electron impact ionization 6. energy dispersive X-ray fluorescence spectrometer EDX-900HS Shimadzu 7. liquid analyzer (spectrofluorimeter) 8. Voltammetric analyzer TA-Lab 9. Chromos gas chromatographic complex 10. Spectrophotometer UVmini-1240 Shimadzu 11. UV-VIS spectrophotometer UV-1650 Shimadzu.
Research supervisor: Alexandr V. Knyazev, Doctor of Chemical Sciences, Professor	

Supervisor's specific requirements

- knowledge of physical research methods,
- knowledge of methods for the synthesis of inorganic compounds and materials,
- good command of English/Russian language.

Supervisor's main publications

1. Bulanov E.N., Vasileva A.A., Kazakovtsev S.A., Golitsyna O.N., Syrov E.V., Knyazev A.V. Search for new apatite-like pigments: from synthesis to color measurements // Ceramics International. 2023. V. 49. P. 34097-34104.
2. Bulanov E.N., Stasenko K.S., Golitsyna O.N., Kyashkin V. M., Knyazev A.V. Unexpected morphotropic transition in apatites and its possible influence on application of apatite-based materials. // Ceramics International. 2022. V. 48. Iss. 7. P. 9858-9863.
3. Bulanov E.N., Stasenko K.S., Golitsyna O.N., Egorikhina M.N., Aleinik D.Ya., Skoblikow N.E., Knyazev A.V. Crystal-chemical and morphological interpretation of biocompatibility of compounds in Ca-Na-Bi-fluorapatite system. // Dalton Transactions. 2022. 51. P. 969-977.
4. Bissengaliyeva M.R., Knyazev A.V., Bespyatov M.A., Gogol D.B., Taimassova S.T., Zhakupov R.M., Sadyrbekov D.T. Low-temperature heat capacity and thermodynamic functions of thulium and lutetium titanates and Schottky anomaly in $Tm_2Ti_2O_7$. // The Journal of Chemical Thermodynamics. 2022. V.165. 106646.
5. Kuznetsov Yu., Mochalov L.A., Dorokhin M.V., Fukina D.G. Knyazev A.V., Kudryashov M.A., Kudryashova Yu.P., Logunov A.A., Mukhina O. V., Zdoroveyshchev A.V., Zdoroveyshchev D. A. Thermoelectrical properties of ternary lead chalcogenide plumbum-selenium-tellurium thin films with excess of tellurium prepared by plasma-chemical vapor deposition. // Thin Solid Films. 2022. V.752. 139244.
6. Krasheninnikova O.V., Syrov E.V., Knyazev A.V., Kyashkin V.M., Suleimanov E.V., Titaev D.N., Fukina D.G., Volkova N.S., Lomakina M.S. Synthesis and properties of layered perovskite-like compounds $PbBi_2Nb_2O_9$ and $PbBi_3Ti_2NbO_{12}$. // Solid State Sciences. 2021. V.121. 106730.
7. Syrov E.V., Krasheninnikova O.V. Knyazev A.V., Fukina D.G., Suleymanov E.V., Volkova N.S., Gorshkov A.P., Smirnov S.M. Synthesis, structure, and properties of new Dion-Jacobson compounds $A'LnNaNb_3O_{10}$ ($A' = Cs, Rb, H$; $Ln = Nd, Pr$). // Journal of Physics and Chemistry of Solids. 2021. V.156. 110184.
8. Bulanov E.N., Stasenko K.S., Aleynik D.Y., Egorikhina M.N., Charykova I.N., Knyazev A.V. Making bioceramics from CaBiPO-apatite. // Bulletin of Materials Science. 2021. V.44. 17.
9. Knyazev A.V., Syrov E.V., Krasheninnikova O.V., Kyashkin V.M., Titaev D.N., Fukina D.G. Structural and thermal properties of La-containing Dion - Jacobson homologous series. // Journal of Solid State Chemistry. 2021. V. 294. 121832.
10. Paraguassu W., Knyazev A.V., Corrêa Junior G., Blokhina A.G., Demidov D.N., Ghosh A. Lattice dynamics and high-pressure properties of K-ionic conducting system $KNbTeO_6$. // Journal of Raman Spectroscopy. 2020. V.51. P.2517–2524.

11. Bissengaliyeva M.R., Zhakupov R.M., Knyazev A.V., Gogol D.B., Taimassova Sh.T., Balbekova B.K., Bekturgenov N.S. Structure and calorimetric study of complex oxides based on lantha-num, tungsten, and alkaline earth elements MeLa_2WO_7 ($\text{Me} = \text{Mg, Ca, Sr, Ba}$). // Journal of Thermal Analysis and Calorimetry. 2020. V.142 P. 2287–2301.
12. Knyazev A.V., Demidov D.N., Zhakupova A.A. Experimental and computational study of crystal structure and thermal expansion of barium hollandites $\text{BaM}_2\text{Ti}_6\text{O}_{16}$ ($\text{M} = \text{Al, Cr, Ga}$). // Journal of Solid State Chemistry. 2020. 286. 121295.
13. Knyazev A.V., Alekseeva Yu.V., Smirnova N.N., Krasheninnikova O.V., Markin A.V., Syrov E.V., Elipasheva E.V., Smirnova L.V. Thermodynamic investigation of the Ruddlesden-Popper phase $\text{Sr}_3\text{Fe}_2\text{O}_7$. // Journal of Chemical Thermodynamics. 2020. V.143. 106061.

Results of intellectual activity

1. Shvareva A.G., Knyazev A.V. Drug based on an antimony compound with a biocompatible matrix // Russian Patent No. 2752169, 2021.
2. Bulanov E.N., Knyazev A.V. Method for producing biocompatible bismuth-apatites // Russian Patent No. 2776293, 2022.