MINISTRY OF SCIENCE AND HIGHER EDUCATION OF THE RUSSIAN FEDERATION
Federal State Autonomous Educational Institution of
Higher Education
"Ural Federal University named after the First President of Russia B.N. Yeltsin"

Institute of Natural Sciences and Mathematics

APPROVED BY
Vice-Rector for Research

_____ A.V. Germanenko
«_____»_____ 2023

PROGRAM OF RESEARCH AND ACADEMIC STAFF TRAINING
IN POSTGRADUATE (PhD) COURSE

Description

Solid State Chemistry

List of information about the postgraduate program	Credentials
Postgraduate program Solid State Chemistry	**Code PP** 1.4.15.
Group of scientific specialties Chemical Sciences	**Code** 1.4.
Federal State requirements (FSR)	Order of the Ministry of Science and Higher Education of the Russian Federation No. 951 dated 20.10.2021
Self-approved requirements (SAR)	The order "On the introduction of "Requirements for the development and implementation of training programs for scientific and scientific-pedagogical personnel in UrFU postgraduate school" № 315/03 dated 03.31.2022.

Yekaterinburg
2023

Description of the research and academic staff training program in postgraduate (PhD) course (hereinafter referred to as the postgraduate program) is compiled by:

№	Name	Degree, Academic Title	Position	Affiliation
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Recommended by:

Educational and methodological board of Institute of Natural Sciences and Mathematics

Head of the Educational and Methodological Council of
the Institute of Natural Sciences and Mathematics
Record № _1_   от 19.01.2023 г.

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Agreed by:

Head of academic staff training department

E.A. Butrina

1. GENERAL PROVISIONS

1.1. The characteristics of the postgraduate program were developed on the basis of Self-approved requirements (SAR) and the order of the rector "On the introduction of the "Requirements for the development and implementation of training programs for scientific and scientific-pedagogical personnel in UrFU postgraduate studies" No. 315/03 dated March 31, 2022, describes general requirements for the results of mastering the program, corresponding to the characteristics of the future professional activity of the graduate, as well as the structure and conditions for the implementation of the postgraduate program.

1.2. List of regulatory documents:

- Federal Law on December 29, 2012 No. 273-FZ "On Education in the Russian Federation" (with changes and additions);

- Federal Law No. 149-FZ on July 27, 2006 "On Information, Information Technologies and Information Protection" (with changes and additions);

- Federal Law on July 27, 2006 No. 152-FZ "On Personal Data" (with changes and additions);

- Federal Law on August 23, 1996 No. 127-FZ "On Science and State Science and Technology Policy" (with changes and additions);

- Decree of the Government of the Russian Federation on November 30, 2021 No. 2122 "On approval of the Regulations on the training of scientific and scientific-pedagogical personnel in postgraduate school (adjuncture)";

- order of the Ministry of Science and Higher Education of the Russian Federation dated February 24, 2021 No. 118 "On approval of the nomenclature of scientific specialties in which academic degrees are awarded, and on amendments to the Regulations on the Council for the Defense of Dissertations for the Candidate of Science degree, for the academic degree doctor of sciences, approved by order of the Ministry of Education and Science of the Russian Federation dated November 10, 2017 No. 1093 ";

- order of the Ministry of Science and Higher Education of the Russian Federation of October 20, 2021 No. 951 "On approval of federal state requirements for the structure of training programs for scientific and scientific-pedagogical personnel in graduate school (adjuncture), the conditions for their implementation, the timing of the development of these programs, taking into account various forms education, educational technologies and features of certain categories of postgraduate students (adjuncts)";

- Regulations on the award of academic degrees in the Federal Autonomous State Educational Institution of Higher Education "Ural Federal University named after the first President of Russia B.N. Yeltsin" (Order No. 590/03 dated July 19, 2021);

- Charter of UrFU and other legal, local regulations of the university.

1.3. Form of study and term of mastering the postgraduate program: full-time, 4 years.

1.4. The scope of the PhD program: 240 credits.

1.5. Main users of the PhD program:

- employers;

- PhD students;

- teaching staff;

- administration and collective governing bodies of the university.

1.6. Requirements for applicants:

Are determined by the Rules for Admission to UrFU.

1. CHARACTERISTICS OF PROFESSIONAL GRADUATE ACTIVITIES

Field of professional activity of a graduate, types and tasks of professional activity in a scientific specialty 1.4.15. "Solid State Chemistry", agreed with representatives of employers - social partners.

2.1. Field of professional activity of the graduate

Postgraduate graduate will be able to carry out professional activities in the fields:
- development of methods for the synthesis of solid-state compounds and materials;
- study of solid-state chemical reactions, their mechanisms, kinetics and thermodynamics;
- study of crystal structure and defect structure;
- study of the structure and properties of the surface and phase boundaries;
- study of mass-transfer and electro-transport processes.
- design of new materials with functional properties.

2.2. Objects of professional activity of the graduate

The objects of professional activity of graduates are:
 crystalline and amorphous inorganic compounds, hetero-phase materials, including nanostructured ones, prepared in terms of chemical synthesis (in a laboratory or industry) or isolated from natural objects;
chemical processes and general laws on preparation and solid-state matter;
scientific tasks of an interdisciplinary nature.

2.3. Types and tasks of the graduate's professional activity

   A postgraduate student prepares for the following types and tasks of professional activity (Table 1).

Table 1.

List of types of professional activity and their corresponding professional tasks

No	Type(s) of professional activity (TPA)	Professional tasks (PT)
1	Researches	- study of scientific and technical information, domestic and foreign experience on the research topic; - mathematical modeling of processes and objects based on standard computer-aided design packages and applied software packages for scientific research; - performing experiments according to a given methodology, compiling a description of ongoing research and analyzing of obtained results; - data preparation for reviews, reports and scientific publications; - preparation of a report on the completed research, participation in the implementation of research results; - protection of intellectual property and the results of research and development as a trade secret of the enterprise
2	Innovative activity	- mastering the methods of applying the results of scientific research in innovation; - mastering the methods of engineering and technological activities; - participation in the processing and analysis of the data obtained using modern information technologies.

3	Management	- familiarization with the basics of organization and planning of chemical research; - participation in information and technical organization of workshops, seminars and conferences; - participation in the writing and design of scientific papers and reports

3. STRUCTURE OF THE POSTGRADUATE PROGRAM

3.1. The structure of the postgraduate program includes three components: scientific and educational components, final certification (таблица 2).

Table 2.

Postgraduate program components

№	The name of the components of the postgraduate program and their components	Form of evaluation of the results of the development of the program
1	*Scientific Component*	
1.1	Scientific activity of a postgraduate student aimed at preparing a dissertation for the degree of Candidate of Sciences (hereinafter referred to as the Thesis) for defense	Intermediate certification by stages of scientific research
1.2	Preparation of publications that present the main scientific results of the Thesis in peer-reviewed scientific publications, equivalent scientific publications indexed in the international databases Web of Science and Scopus and international databases determined in accordance with the recommendation of the Higher Attestation Commission under the Ministry of Science and Higher Education of the Russian Federation, as well as in scientific publications indexed in the Russian Science Citation Index (RSCI) database and (or) applications for patents for inventions, utility models, industrial designs, breeding achievements, certificates of state registration of programs for electronic computing machines, databases, topologies of integrated circuits.	
2	*Educational Component*	
2.1	Disciplines aimed at preparing and passing candidate exams: - History and philosophy of science; - Foreign language; - Solid State Chemistry.	Intermediate certification based on the results of mastering disciplines and practice
2.2	Elective disciplines: - Science metrics, modern information and communication technologies in science.	
2.3	Research activities and practice: – Research practice; – Research activities and thesis preparation.	
3	*Final attestation*	Evaluation of the thesis for compliance with the requirements of the Federal Law on August 23, 1996 No. 127-FZ "On Science and State Scientific and Technical Policy"

4. CONDITIONS FOR THE IMPLEMENTATION OF THE POSTGRADUATE PROGRAM

The conditions for the implementation of the postgraduate program include system-wide requirements, material and technical and educational and methodological support, staffing and financial conditions for the implementation of the postgraduate program, as well as the applied mechanisms for assessing the quality of educational activities and preparing students for the postgraduate program.

4.1. General system conditions for the implementation of the postgraduate program

The University has on the right of ownership or other legal basis the material and technical support for carrying out both scientific activities (scientific potential in the scientific specialty in which the postgraduate program is being implemented, as well as a research infrastructure that allows performing fundamental, exploratory and applied scientific research) and educational activities (in terms of mastering disciplines by a postgraduate student, passing practice, intermediate and final certification in accordance with the curriculum).

Each postgraduate student during the entire period of study is provided with individual access to the electronic information and educational environment of the university from any point where there is access to the information and telecommunication network "Internet" (hereinafter referred to as the "Internet"), both on the territory of the university and outside it.

The electronic information and educational environment of the university provides:

- access to curricula, work programs of disciplines and practices, electronic educational publications and electronic educational resources specified in the work programs of disciplines and practices;
- formation of an electronic portfolio of a student;
- functioning of the electronic service "Personal account of a postgraduate student".

In the case of the implementation of a postgraduate program using distance learning technologies, the electronic information and educational environment additionally provides:

- control for the course of the educational process, the results of intermediate certification and the results of mastering the postgraduate program;
- conducting all types of training sessions, procedures for assessing learning outcomes, the implementation of which is provided for using e-learning, distance learning technologies;
- interaction between participants in the educational process, including synchronous and (or) asynchronous interaction via the Internet.

The functioning of the electronic information and educational environment is ensured by appropriate means of information and communication technologies and the qualifications of employees using and supporting it. The functioning of the electronic information and educational environment complies with the legislation of the Russian Federation.

When implementing a postgraduate program in a network form, the requirements for the implementation of a postgraduate program are provided by a set of resources for material, technical and educational support provided by organizations participating in the implementation of a postgraduate program in a network form.

When implementing a postgraduate program or part (parts) of a postgraduate program at other organizations, departments or other structural subdivisions created by the university in accordance with the established procedure, the conditions for implementing the postgraduate program are provided by a combination of resources of these organizations.

4.2. Material, technical, educational and methodological support of the educational process

Premises, which are classrooms and laboratories for scientific research, all types of classes provided for by the postgraduate program, are equipped with instruments and technical teaching aids, the composition of which is determined in the work programs of disciplines (modules) and requirements for scientific research.

Rooms for independent work of graduate students are equipped with computers with the ability to connect to the Internet and provide access to the electronic information and educational environment of the university.

The University is provided with the necessary set of licensed software, the composition of which is defined in the work programs of disciplines, scientific research and is subject to annual renewal if necessary.

The rate of provision of educational activities with educational publications is determined based on the calculation of at least one educational publication in printed and (or) electronic form, sufficient for

mastering the postgraduate program, for each postgraduate student in each discipline included in the individual work plan.

Postgraduate students are provided with access (remote access), including in the case of the use of e-learning, distance learning technologies, to modern educational and methodological materials, library collections and library and reference systems, professional databases and information reference systems, the composition of which is determined in the work programs disciplines and is subject to updating (if necessary).

Modes of access to the electronic library system:

Zonal Science Library http://lib.urfu.ru/

Digital catalogue http://lib.urfu.ru/course/view.php?id=76

Resources http://lib.urfu.ru/course/view.php?id=169

Electronic resources EBSCOhost: https://search.ebscohost.com/

Electronic resources ScienceDirect: https://www.sciencedirect.com/

Electronic resources Web of Science: http://apps.webofknowledge.com

Electronic resources Scopus: https://www.scopus.com/

Electronic resources Russian Science Citation Index (RSCI) database (elibrary.ru): https://elibrary.ru/

Electronic resources Elsevier: http://reaxys.org.

4.3. Staffing conditions for the implementation of the postgraduate program

The implementation of the postgraduate program is provided by the scientific and teaching staff of the university, as well as persons involved in the implementation of the postgraduate program on the terms of a civil law contract. The qualifications of teaching staff must meet the qualification requirements specified in the qualification handbooks and (or) professional standards (if any).

The qualitative and quantitative content of teaching staff involved in the implementation of the postgraduate program and persons involved in the implementation of the postgraduate program on the terms of a civil law contract (based on the number of positions to be replaced, reduced to integer values) must meet the following requirements: at least 60% of the number of full-time research and/or teaching staff participating in the implementation of the postgraduate program must have an academic degree (including a scientific degree obtained in a foreign country and recognized in the Russian Federation) and (or) an academic title (including an academic title obtained in a foreign state and recognized in the Russian Federation).

The supervisor of a postgraduate student must have a Dr. Sci. degree, or in some cases, by decision of the University, a PhD degree, or an academic degree obtained in a foreign state, recognized in the Russian Federation; carry out scientific activities or participate in the implementation of such activities in the relevant area of research within the scientific specialty 1.4.15. "Solid State Chemistry" for the last 3 years; have publications based on the results of the specified activities in peer-reviewed domestic or foreign journals; carry out approbation of the specified activity, including participation with reports on the subject of scientific activity at Russian and international conferences over the last 3 years.

Requirements for the qualification of the teaching staff involved in the implementation of the disciplines of the program implemented in English are established in the educational program, taking into account chapter 6.3 "Regulations on the assignment of the status of "English-speaking" and the implementation of training programs for scientific and pedagogical personnel in graduate school in English" (Order No. 811/03 dated October 15, 2018).

The scientific consultant must have a Ph.D. or a Dr.Sci. degree or a foreign academic degree recognized in the Russian Federation.

4.4. Financial support of the postgraduate program

Financial support for the implementation of the postgraduate program should be carried out in an amount not lower than the basic standard costs established by the Ministry of Science and Higher Education of the Russian Federation for the provision of public services in the field of education for a given level of education and direction of training, taking into account adjustment factors that take into account the specifics of educational programs in accordance with the Methodology for determining standard costs for the provision of public services for the implementation of educational programs of higher education in specialties (training areas) and enlarged groups of specialties (training areas), approved by order of the Ministry of Education and Science of the Russian Federation of October 30, 2015 No. 1272 (registered by the Ministry of Justice of the Russian Federation on November 30, 2015) .2015, registration number 39898).

4.5. Mechanisms applied for assessing the quality of educational activities and postgraduate training

The quality of educational activities and training of postgraduate students in the postgraduate program is determined within the framework of the internal evaluation system, as well as the external evaluation system on a voluntary basis.

In order to improve the postgraduate program, the university involves employers and their associations, other legal entities and (or) individuals, including university teaching staff when conducting regular internal assessment of the quality of educational activities and preparing students for the postgraduate program.

Within the framework of the internal system for assessing the quality of educational activities and training postgraduate students are given the opportunity to assess the conditions, content, organization and quality of the educational process in general and for each discipline, practice and research.

External assessment of the quality of educational activities and training in the postgraduate program can be carried out within the framework of professional and public accreditation conducted by employers, their associations, as well as organizations authorized by them, including foreign organizations, or authorized national professional and public organizations that are part of international structures , in order to recognize the quality and level of training of graduates who have mastered the postgraduate program that meet the requirements of professional standards (if any), the requirements of the labor market for specialists of the relevant profile.

5. EVALUATION OF THE RESULTS OF MASTERING THE POSTGRADUATE PROGRAM

The planned results of mastering the postgraduate educational program are formed step by step within the disciplines and practice in accordance with the curriculum. Evaluation of the results of mastering the program by a graduate student is carried out in the form of an intermediate and final certification.

Intermediate attestation of a postgraduate student is carried out in the form of passing candidate exams, credits in elective and optional disciplines, research practice, research activities and preparation of a thesis for the candidate of sciences degree. The form and procedure of intermediate certification for candidate exams are established by the Ministry of Science and Higher Education of the Russian Federation, and for other disciplines it is regulating by local regulations of the university.

The final attestation is carried out in the form of an assessment of the thesis for its compliance with the criteria established in accordance with the Federal Law of August 23, 1996 No. 127-FZ "On Science and State Scientific and Technical Policy", and the requirements for a thesis for the Candidate of Sciences degree established by the Regulations on the award of academic degrees in UrFU.

6. REGISTRATION SHEET OF CHANGES IN THE POSTGRADUATE PROGRAM

Sheet number	Record number of the meeting of the educational and methodological council of the institute	Date of the meeting of the educational and methodological council of the institute	Total amount of pages in the record	Signature