

Powder Metallurgy and Composite Materials

National Research Nuclear University MEPhI (Moscow Engineering Physics Institute)

Degree or qualification is awarded: **Researcher. Lecturer-researcher**

Language of study: **Russian, English**

Mode of study: **full-time**

Duration: **4 years**

Availability of free education: **yes**

Price: **325 000 rubles per year**

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Objectives of the program: Training of post-graduate students who can work successfully in the field of activity related to the synthesis of new materials, design and operation of manufacturing equipment for pilot and series production of materials and products that have universal and subject-specialized competencies, contributing their social mobility and stability in the labor market.

Basic Department: Department of Physical Problems of Materials (№ 9).

Area of professional activity: the sphere of science, technology and pedagogy, include a set of problems areas "Materials Technologies", including the synthesis of new materials, design and operation of manufacturing equipment for pilot and series production of materials and products, development of methods and means of quality control of materials and technical diagnostics manufacturing processes, to define a set of structural and physical properties of materials (mechanical, thermal, optical, electro and others), corresponding the objectives of their practical use.

Objects of professional activity: Methods of designing advanced materials using multiscale mathematical modeling and software. Methods and means of nano- and microstructural analysis using microscopes with different resolution (optical, electronic, atomic force and others), and the charged particle generator. Technological equipment for shaping products, bulk and surface processing of materials based on different physical principles. Methods and means for identifying a set of physical properties of materials (mechanical, thermal, optical, electro and others) consistent with the objectives of their practical use. Methods and means of technological impact of electromagnetic fields on the processes of consolidation of nanostructured and ultrafine powder materials.

Features of the curriculum: The main feature of the educational process is the fundamental physical and mathematical and engineering training, which is allows to master the basic and special disciplines. The program promotes the development of skills of independent research work on high professional level, with self-assessment of performed works. The emphasis in the educational process is made on the practical application of acquired knowledge. Scientific researches and education is carried out in close connection with works carried out at the department and scientific organizations of the State Corporation "Rosatom" and the Institutes of Russian Academy of Sciences (RAS) (MEPhI, Scientific Research Center "Kurchatov Institute", A.A. Baikov Institute of Metallurgy and Materials Science of RAS, Scientific and Production Association "Luch", A.A. Bochvar Highly Technological Scientific Research Institute of Inorganic Materials and others).

Graduates of the department are trained for a wide range of tasks, in the first place, such as:

- Modification of structural materials using ion beam and plasma technologies in order to improve their corrosion, erosion and tribological properties;
- Modeling of processes and phenomena occurring in the solid when exposed to radiation;
- Experimental studies in the field of interaction of radiation with solids;
- Development of techniques to improve the service performance of materials and structural components of nuclear fusion reactors using electropulse technologies

The list of enterprises for practice and employment of graduates: Russian Research Centres; Enterprises of Rosatom; RAS Institutes.

Specializations within this programme