REPORT

on the work of the Dissertation Council at KazNITU named after K.I. Satpayev in the field of Physical and Chemical Sciences (EP D090 – Physics) for the educational programs "6D072300 – Technical Physics" and "8B05301 – Applied and Engineering Physics"

1. **Data on the number of meetings held.** 2 defenses were conducted.
2. **Names of the members of the Dissertation Council who attended less than half of the meetings.** All members of the Dissertation Council participated in full.
3. **List of PhD candidates with the indication of the institution of study**

№	Full Name of Candidate	Date of Birth	Period of Doctoral Studies	University	Dissertation Topic
1	Eleuov Mukhtar Auezovich	01.11.1986	2017–2020	KazNITU named after K.I. Satpayev	Synthesis and Study of Porous Carbon Materials and Transition Metal Oxides for Electrochemical Energy Storage
2	Kasymbayev Aleksey Valeryevich	27.07.1988	2020–2023	East Kazakhstan State Technical University named after Daulet Serikbayev	Study of the Microstructure and Tribo-Mechanical Properties of Multicomponent Nitride Coatings

4. **Brief analysis of dissertations reviewed by the council during the reporting year, highlighting the following sections**

1) Analysis of the topics of the reviewed dissertations. The dissertations reviewed by the Dissertation Council in the reporting year are dedicated to relevant scientific and scientific-technical problems in the fields of technical physics, condensed matter physics, surface physics, electrochemical energy, and materials science. The topics are highly interdisciplinary and focused on solving both fundamental and applied problems that are significant for modern high-tech industries.

The first group of studies focuses on the development and investigation of electrode materials for electrochemical energy storage systems. Particular attention was paid to the creation of graphene-like porous carbons derived from biomass, as well as nanostructured transition metal oxides integrated into hybrid architectures of supercapacitor electrodes. The studies explored the patterns of material structure and morphology formation, the influence of synthesis and modification parameters on electrochemical characteristics, as well as scalability and reproducibility issues.

The second group of studies is devoted to the investigation of the microstructure and tribo-mechanical properties of multicomponent nitride coatings synthesized using ion-plasma deposition methods. These dissertations address fundamental questions of non-equilibrium thin film growth, phase formation, internal stress development, evolution of crystallographic texture, and wear mechanisms. Special attention was paid to multilayer and gradient nitride coatings (WN/MeN, TiAl(Si)N) intended for operation under extreme conditions.

The reviewed dissertations share a focus on establishing cause-and-effect relationships in the system "synthesis parameters – structure – properties," the use of modern experimental research methods, and the aim of creating materials with improved functional characteristics.

2) Relevance of the dissertation topics to the directions of science development The dissertation topics correspond to the priority areas of scientific development defined by the Supreme Scientific and Technical Commission under the Government of the Republic of Kazakhstan, in accordance with paragraph 3 of Article 18 of the Law "On Science." In particular, the works relate to such priorities as the development of new materials and technologies, energy security, environmentally oriented and resource-saving technologies, as well as increasing technological independence and import substitution.

Research in the field of electrochemical energy storage is aimed at addressing tasks related to the development of "green" energy, integration of renewable energy sources, and creation of high-efficiency energy storage systems. The use of biomass waste as a raw material for carbon materials aligns with strategic directions of sustainable development, rational use of natural resources, and reduction of environmental impact.

Studies on multicomponent nitride coatings are directly related to the development of the physical-technical foundations of plasma technologies, the creation of protective and functional coatings for mechanical engineering, energy, aviation, and medical industries. The results contribute to the formation of a scientific basis for developing new materials capable of replacing imported analogues, consistent with state objectives for the development of high-tech production and strengthening the scientific-technical potential of the Republic of Kazakhstan.

3) Analysis of the level of practical implementation of dissertation results. The results of the dissertations reviewed by the Council demonstrate a high level of practical significance and applied focus. Experimental setups, technological processes, and synthesis methodologies were developed and tested to obtain materials with defined structural and functional properties.

In electrochemical energy, the results can be used to develop and produce prototype supercapacitors and hybrid energy storage devices, as well as to establish technological regulations for electrode materials based on porous carbons and transition metal oxides. These approaches have scalability potential and can be implemented in scientific-production and innovation projects. In ion-plasma technologies, the results can be applied to create wear- and heat-resistant protective coatings for cutting tools, machine and equipment components, energy equipment parts, and medical devices. The findings allow targeted control over deposition parameters to optimize coating microstructure and operational characteristics.

Additionally, the dissertation results are implemented in the educational process of higher and postgraduate education institutions in the training of specialists in "Technical Physics," "Materials Science," and related fields, contributing to the development of human resources in priority scientific and technological areas.

5. **Analysis of the work of official reviewers (with examples of the least satisfactory reviews)** In the reporting year, official reviewers performed their duties in full compliance with the normative legal acts of the MHES of the Republic of Kazakhstan, the regulations of the Dissertation Council, and the existing procedures for examining dissertation research. Reviewers provided comprehensive and objective assessments of the scientific level of the submitted works, the justification and novelty of conclusions, compliance of set goals and objectives with methodological approaches, and the practical significance of results.

Special attention was given to analyzing dissertation structure, completeness of literature review, correctness of applied research methods, and quality of presented experimental data. Reviewer comments and recommendations were constructive, facilitating clarification of formulations, strengthening arguments, and enhancing the overall level of dissertations, ensuring compliance with international standards and PhD defense requirements. The reviewers' work significantly contributed to maintaining a high scientific standard of the Dissertation Council and reinforcing trust in scientific evaluation procedures.

6. **Proposals for further improvement of the scientific personnel training system.** To improve the quality of scientific personnel training, it is advisable to strengthen the practical and interdisciplinary focus of dissertations, ensure closer alignment with priority scientific directions and state programs, expand involvement of co-supervisors and consultants from leading domestic and international research and production organizations, increase requirements for publication activity of doctoral students in peer-reviewed international journals, promote academic mobility and international cooperation, and continue to enhance the material-technical base and the monitoring system of dissertation quality.

7. **Number of dissertations for the degree of Doctor of Philosophy (PhD) and Doctor by profile by training areas: 2 dissertations**

1. Dissertations accepted for defense (including candidates from other universities) – 2 dissertations.
2. Dissertations withdrawn from consideration (including candidates from other universities) – none.
3. Dissertations for which negative reviews were received (including candidates from other universities) – none.
4. Dissertations with a negative decision based on defense results (including candidates from other universities) – none.
5. Dissertations sent for revision (including candidates from other universities) – none.
6. Dissertations sent for repeated defense (including candidates from other universities) – none.

Dissertation Council Chairman **A.S. Serikkanov**

Scientific Secretary of the dissertation Council **A.R. Assembayeva**

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