Appendix 12c

REVIEW

to occupy the academic position:

"professor"	
"associate professor"	**X**
	The sign "X" indicates one of the specified academic positions.

Candidates for the position :

1	**Senior Assistant**	**PhD**	**Vladislava**	**Hristova**	**Ivanova**	**HTMU**
No.	academic position	scientific degree	name	middle name	last name	workplace

Scientific field :

4	**Natural sciences, mathematics and computer science**
code	name

Professional field :

4.1	**Physical Sciences**
code	name

Scientific specialty :

Condensed Matter Physics with French

The competition is announced:

102	**0 3.12.2024**	**Physics**	**FHT**
in SG issue	date	for the needs of the Department	Faculty

Prepared the review by :

Prof.	**PhD**	**Lian**	**Lyubenov**	**Nedelchev**	**IOMT-BAS / HTMU**
academic position	scientific degree	name	middle name	last name	workplace

1. Review for the candidate:

Senior Assistant	**PhD**	**Vladislava**	**Hristova**	**Ivanova**
academic position	scientific degree	name	middle name	last name

1.1. Completion of the provided documents:

A) The competition documents fully comply with the Regulations	3 points	**X**
B) The documents are complete, but do not fully comply with the requirements of the Regulations	2 points	
C) The documents are not completed in accordance with the requirements of the Regulations	0 points	

		with the sign “X” one of the indicated answers is marked

It is mandatory to describe the missing documents and violated requirements if answer C is marked.
I did not find any lack of documents or any inconsistencies with regulatory requirements.

1.2. Meeting the minimum requirements according to the Regulations:

A) The candidate meets the minimum requirements	20 points	**X**
B) The candidate does not meet the minimum requirements	0 points	
		with the sign “X” one of the indicated answers is marked

Required if answer B is marked. The candidate's publication activity is analyzed. The impact of the achieved results (citations) is analyzed.
The only candidate in the competition for Associate Professor, Senior Assistant Professor Dr. Eng. Vladislava Hristova Ivanova, participates in the competition with 19 scientific articles, 10 of which in journals with an impact factor (the total impact factor is 17.4). 25 citations were noted for 11 of the publications. The candidate has 437.67 points according to the PPNSZAD, which not only satisfies the minimum requirements for occupying the academic position of "associate professor" in the scientific field of the announced competition, but also exceeds them.

1.3. Relevance of scientific and/or applied research:

A) The research is up-to-date. Some of the research is pioneering (no results on the topic from other authors are known)	7 points	
B) The research is up-to-date. For each of the researched topics and/or applications, results from other authors are known.	5 points	**X**
C) Most of the research is up-to-date, but results are also presented that have no scientific and/or applied value.	3 points	
D) The smaller part of the research is up-to-date	2 points	
E) The research is not up to date	0 points	
		with the sign “X” one of the indicated answers is marked

The assessment of the relevance of the research must be substantiated.
The research articles presented by Senior Assistant Professor Dr. Vladislava Ivanova are up-to-date and have a fundamental-applied nature. They can be grouped into three areas: 1) Preparation of bulk and thin-film chalcogenide materials and characterization of their physicochemical (thermal, optical and mechanical) properties; 2) Biosensor and peptide studies mimetics ; 3) Development of interactive methods for teaching students in the engineering majors of Physics and Materials Science.

1.4. Knowledge of the problems subject of research:

A) The candidate knows in detail the achievements of other authors on the researched topics and/or applications	6 points	**X**
B) The candidate is partially familiar with the results achieved on the researched topics and/or applications	4 points	
C) The candidate has no prior knowledge of the state of the researched problems	0 points	
		with the sign “X” one of the indicated answers is marked

It is mandatory to justify the assessment if the answer is C.
In my opinion, Dr. Vladislava Ivanova has a thorough knowledge of the current state of research on the topics she is developing, she is able to analyze it and, on this basis, set adequate research goals. This is clearly evident from the detailed review of the author's publications submitted for the competition.

1.5. Type of research:

A) Theoretical	4 points	
B) Applied	4 points	
C) Theoretical with elements of applications	4 points	**X**
D) They do not meet the level specified in the ZRASRB and the Regulations	0 points	
		with the sign “X” one of the indicated answers is marked

It is mandatory to justify the level of research if answer D is marked.
I believe that the publications submitted for the competition achieve an excellent balance between theoretical research and its applications, which is worthy of praise. Similar to point 1.3, the research can be divided into the following three areas: 1) Synthesis of new materials based on chalcogenide glasses and azopolymers with potential for application in optics and optoelectronics and characterization of their composition, structure, physicochemical and physical (mechanical, thermal and optical) properties; 2) Studies on lactate biosensors with a view to practical application in the food industry and research into the biochemical properties of peptide mimetics ; 3) Automation of the laboratory experiment in the process of practical training in Physics and Materials Science in technological higher education institutions.

1.6. Research objectives:

A) Realistic and of scientific and/or applied interest	8 points	**X**
B) Realistic, but not of scientific and/or applied interest	4 points	
C) Unattainable (unrealistic)	0 points	
		with the sign “X” one of the indicated answers is marked

It is mandatory to note the goals. The type of goals set is argued.
The objectives of the presented research are of a scientific and applied nature, as follows:

1. To obtain chalcogenide materials with different compositions, to deposit thin layers of them and to characterize their structure, morphology, topology and composition, or more generally, their physicochemical properties; 2. To research, analyze and summarize data on enzymatic methods and the latest advances in the development of lactate biosensors ; 3. To develop and implement methods to increase the engagement and interest of engineering students in Physics and Materials Science education.

1.7. Research methods:

A) Adequate to the research and the scientific objectives and/or applications set	8 points	**X**
B) Partially suitable, enabling the achievement of part of the scientific objectives and/or applications	4 points	
C) Inappropriate methods	0 points	
		with the sign "X" one of the indicated answers is marked

It is mandatory to note the methods. The type of methods used is justified.
The research methods used by the candidate fully meet the scientific goals set. They include both established techniques (methods for the synthesis of chalcogenide and azopolymer bulk and thin-film materials; methods for characterizing the phase composition, structure and optical properties, electrospray deposition, X-ray diffraction, IR spectroscopy, scanning electron microscopy), as well as new and interdisciplinary scientific methods and techniques, for example, X-ray absorption techniques for studying the elemental composition and structure.

1.8. Candidate research contributions:

A) With lasting scientific and/or applied impact, they constitute the basis for new directions of research and applications	20 points	
B) Represent significant scientific and/or applied interest, complete and/or summarize previous research	16 points	**X**
C) Are of scientific and/or applied interest	12 points	
D) Lack of significant contributions	8 points	
E) Lack of contributions	0 points	
		with the sign "X" one of the indicated answers is marked

Contributions must be noted. The type of results achieved is argued.
The scientific contributions of Dr. Vladislava Ivanova are of a fundamental-applied nature and can be summarized in the following main areas: 1. **Obtaining new compositions for the synthesis of:** • bulk and thin-film chalcogenide materials in the Ge-Te, Ge-Te-In/Cu, Ge-Se-In/Ga and Ga-Se-In-Cu systems; • thin-film composite materials based on azo dyes, with chalcogenide particles incorporated into the polymer matrix. 2. **Getting new data:** • The evaporation and condensation energies were determined depending on the chalcogenide concentration and the procedure for obtaining thin layers was optimized.

- The thermal, mechanical and electronic properties of the obtained thin films in the Ge - Te-In and As_2Se_3-Ag_2Te-GeTe systems have been studied and the influence of changes in the composition on the characteristic temperatures - glass transition and melting - has been established, and an assumption has also been made about the change in the nature of the chemical bonds based on the obtained data on the properties.
- The optical parameters (refractive index, absorption coefficient, band gap) of the new chalcogenide thin-film materials and of the composite layers based on azopolymers doped with chalcogenide particles have been measured.
- The diffraction efficiency of diffraction gratings recorded in thin amorphous chalcogenide layers of the Ge-Se, Ge-Se-Ga/In systems has been determined and it has been found that the addition of Ga / In leads to an increase in the diffraction efficiency, and the addition of indium leads to the highest diffraction efficiency.

3. Proposing hypotheses about the structure of the synthesized new materials

- Hypotheses have been raised about the structure of the obtained chalcogenide glasses, which are confirmed by the results of other authors who cited Dr. Ivanova's research.
- The kinetics of evaporation and condensation during the deposition by vacuum-thermal evaporation of thin amorphous layers of the Ge - Se - In system have been studied and the evaporation and condensation energies have been determined as a function of the content of the chalcogenide elements.
- Using density functional theory (DFT) and molecular dynamics, the electronic properties of ternary chalcogenide systems $(GeTe_4)_{100-x}In_x$ and $(GeTe_5)_{100-x}In_x$, x=0-20 mol % have been studied for the first time, and it has been found that the introduction of indium atoms causes a significant change in the electronic structure and a significant decrease in the band gap of the Ge-Te binary system .

4. Review and evaluation of the advantages and disadvantages of the main methods for lactate determination and development of biosensors based on it

- A comprehensive review and evaluation of existing enzymatic methods for lactate determination is made and recent advances in the development of lactate biosensors are summarized. A comparative assessment of the economic feasibility of the proposed candidate method compared to other methods is made and the benefit of the possibility of miniaturization of the proposed lactate sensor is indicated.
- Specially designed peptide mimetics that offer higher selectivity and have less toxicity to mammalian cells have been investigated, and the effect of the model peptide KLAKLAK-NH_2 on important physicochemical parameters of lipid membrane models has also been studied.

5. Development and advancement of methods to increase the engagement and interest of engineering students in Physics and Materials Science education

- The theoretical justifications and experimental setups of laboratory exercises for measuring the position and intensity of light using a webcam and a personal computer without additional hardware have been developed: diffusion of ink in water; damped oscillations of a pendulum and diffraction of light, as the constructed setups are distinguished by simplicity, efficiency in assessing the relevant physical parameters and low cost of the materials and equipment used.

In conclusion, I can say that the contributions in the scientific papers presented in the competition are of a fundamental-applied nature and are a prerequisite for continuing the candidate's research activities.

1.9. Participation of the candidate in achieving the presented results:

A) The candidate has at least equal participation in the submitted works	8 points	**X**
B) The candidate has at least equal participation in the majority of the submitted works	7 points	
C) The candidate has a secondary involvement in the majority of the submitted works	4 points	

D) The candidate's participation is imperceptible	0 points	
		with the sign “X” one of the indicated answers is marked

Critical notes are required if one of the answers C or D is marked.
The personal contributions of the candidate are clearly formulated. They are an indisputable testimony to the competence and quality of the work performed by Senior Asst. Prof. Dr. Vladislava Ivanova. I would also like to note her significant contribution to the results achieved by the group I lead under project BG-RRP-2.004-0002-C01, BiOrgaMCT , in which she participates.

1.10. Pedagogical activity:

A) The candidate has impeccable and sufficient pedagogical activity in the university. The issued teaching aids are modern and useful (meet the requirements of the Regulations). The work with students and doctoral students is at a high professional level	8 points	**X**
B) The candidate has sufficient pedagogical activity at the university. The issued teaching aids meet the requirements of the Regulations	6 points	
C) The pedagogical activity and/or the published teaching aids are insufficient (do not meet the requirements of the Regulations)	0 points	
		with the sign “X” one of the indicated answers is marked

Critical notes are required if one of the answers B or C is marked.
The pedagogical activity of the Chief Assistant Professor, Dr. Eng. Vladislava Ivanova at UCTM, is not only in accordance with the requirements of the Regulations, but even exceeds them. She has led lecture courses and exercises related to them on "Classical Physics Part I", "Classical Physics Part II", "Quantum Physics", "Materials Science", "Methods for the Study of Nano and Microstructures" in French for master's students in the specialty "Chemical and Biochemical Engineering" (with teaching in French), a full-time form of education. She has led exercises in Physics in Bulgarian. She is also a co-author of a textbook in French for students in the specialty "Chemical and Biochemical Engineering" (with teaching in French).

1.11. Critical notes:

A) Lack of critical remarks	8 points	**X**
B) Critical remarks of a technical nature	7 points	
C) Critical remarks that would partially improve the results achieved in a small part of the studies	5 points	
D) Critical remarks that would partially improve the results achieved in the majority of studies	3 points	
E) Significant critical remarks	0 points	
		with the sign “X” one of the indicated answers is marked

Critical notes are required if one of the answers C, D or E is marked.

I have no critical remarks.

1.12. Conclusion

A) The assessment of the candidate's performance is **POSITIVE**	The assessment is given with a total point asset of at least 65 points.	**X**
B) The assessment of the candidate's performance is **NEGATIVE**	The assessment is given for a total point asset below 65 points.	
		with the sign "X" one of the indicated answers is marked

To be completed at the request of the reviewer
The materials presented in the competition and the scientific and applied contributions highlighted in them, as well as the pedagogical activity of the Chief Assistant Professor, Dr. Eng. Vladislava Hristova Ivanova, not only meet, but also exceed the requirements of the Law on Academic Affairs of the Republic of Bulgaria and the recommended requirements for occupying the academic position **of "associate professor"** according to the Regulations on the conditions and procedure for acquiring scientific degrees and for occupying academic positions at the University of Chemical Technology and Metallurgy (UCTM). Based on the assessments (points and comments) given by me in the previous sections of this review, **I strongly suggest** that the Scientific Jury of the competition recommends to the Faculty Council of the Faculty of Chemical Technology at the UCTM to vote **"YES"** for awarding the academic position "Associate Professor" in the Professional area 4.1 Physical Science (specialty "Condensed Matter Physics with French language") at the UCTM to the candidate – Senior Assist. - Prof. Dr. eng Vladislava Hristova Ivanova.

31.03.2025	Prepared the review:	
Date	**Prof. Lian Lyubenov Nedelchev, PhD**	signature