Appendix 12d

REPORT

to occupy the academic position:

''Professor''	
''Associate Professor''	X
	one of the academic positions indicated shall be marked with the sign "X"

Candidates to occupy the position:

1	Assistant	PhD	Vladislava	Hristova	Ivanova	UCTM
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

4	Natural sciences, mathematics and computer science
code	name

Professional area:

4.1	Physical Sciences
code	name

Scientific specialty:

Condensed Matter Physics with French

The competition has been announced:

102	03.12.2024 г.	Physics	Faculty of Chemical Technology
in SG issue	date	for the needs of the Department	Faculty

The report was written by:

''Associate Professor''	PhD	Georgi	Vyacheslavovich	Avdeev	IPC-BAS
academic position	scientific degree	name	middle name	last name	workplace

1. Report for the candidate:

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

1.1. Meeting the minimum requirements under the Regulations:

A) The candidate meets the minimum requirements	20 points	X
B) The candidate doesn't meet the minimum requirements	0 points	
		one of the answers given is marked with the sign "X"

It must be filled in if answer B is marked. The publication activity of the candidate is analyzed. The response of the results achieved (quoted) is analyzed.

1.2. Relevance of scientific and / or applied research:

A) The research is relevant. Part of the research is pioneering (no results are known on the topic by other authors)	8 points	
B) Research is relevant. Results from other authors are known for each of the topics and / or applications studied.	6 points	X
C) Most of the research is relevant, but also some results are presented that have no scientific and / or applied value	4 points	
D) The smaller part of the research is relevant	2 points	
E) Research is not relevant	0 points	
		one of the answers given is marked with the sign "X"

The evaluation of the relevance of the research must be substantiated.
Semiconductor materials with a wide band gap are widely used in electronics and energy systems due to their high optical transparency and relatively easy-to-control concentration of charge carriers, which allows changing their electrical conductivity. The most intensively studied wide-band gap semiconductors are transparent oxides, which are used in displays and solar panels. In contrast, semiconductors based on chalcogenides

(Ch = S, Se, Te) have been less studied. One of the most important characteristics of chalcogenide semiconductors is their ease of p-type doping and high mobility of charge carriers. These properties make them promising for widespread application in various electronic devices, including solar panels. In the specialized scientific database Scopus, a search by keywords "chalcogenide semiconductors" shows that in the last three years 2022 - 2024, an average of 450 publications were published. The analysis and reference show that research on the topic is relevant and makes an important contribution to science.

1.3. Objectives of the research:

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	
		one of the answers given is marked with the sign "X"

Objectives must be specified. The type of the set objectives must be justified
The candidate's research objectives are related to the synthesis and characterization of new chalcogenide materials and can be indicated in the following order: Synthesis and characterization of bulk samples of chalcogenide materials new tellurium-based chalcogenide materials from the systems (GeTey)100-xInx, where y=3, 4, 5; x = 0-20 mol% and (GeTe4)100-xCux, where x = 5-20 mol%; GexSe100-x, x = 14, 17, 20 25 mol. %, and (GeSe5)100-xMex, x = 0-20 mol. %, where Me = Ga, In; As2Se3-Ag2Te-GeTe in the range of 0-90 mol% GeTe, and in the binary system As2Se3-Ag2Te from 0-50 mol% Ag2Te and Bi2(Se1-xTex)3 x= 10%, 50% and 100%. Thin film preparation and characterization on glass substrates with different compositions of the chalcogenide systems (GeTey)100-xInx, where y=3, 4, 5, x = 0-20 mol. %, GexSe100-x, x = 14, 17, 20 25 mol. %, and (GeSe5)100-xMex, x = 5-20 mol. %, where Me = Ga, In and Bi2(Se1-xTex)3 x= 10%, 50% and 100%; on silicon substrates and silicon substrates with a special design – cantilevers, from the chalcogenide systems (GeTey)100-xInx, where y=3, 4; x = 0-20 mol%; using the "doctor blade" technique with the composition Cu0.9(In0.7Ga0.3)Se2 (CIGS) for the absorber of photovoltaic solar cells, with different layer thicknesses. by the electrospray method of composite materials based on the azo polymer poly[1-[4-(3-carboxy-4-hydroxyphenylazo)benzenesulfonamido]-1,2-ethanediyl, sodium salt], doped with chalcogenide particles of the system (GeTe4)100-xCux, where x = 5-20 mol %. Structural studies have been carried out on the materials thus obtained by means of X-ray diffraction and by means of simulations with molecular dynamics (AIMD) and density functional theory (DFT). The regions of glass formation have been determined. Mechanical properties of some of the systems have been studied. The morphology, topology and composition of thin films have been studied, and it has been established that the obtained

samples can be used in the form of chemical sensor devices in optics and optoelectronics. The research goals are realistic and of scientific and applied interest.

1.4. Candidate research contributions:

A) With lasting scientific and / or applied response, they form the basis for new research and applications	20 points	
B) They are of significant scientific and / or applied interest, complete and / or summarize previous research	16 points	X
C) They are of scientific and / or applied interest	12 points	
D) Lack of significant contributions	8 points	
E) Lack of contributions	0 points	
		one of the answers given is marked with the sign "X"

Contributions must be specified. The type of results achieved must be justified.
The publications submitted for participation in the competition are in the field of synthesis, characterization and study of the properties of chalcogenide semiconductor materials. In 3 of them the candidate is the first author, in 9 - second, in 7 - corresponding author. 25 citations have been noted for the publications in the competition. The submitted reference shows that the candidate participates both in the experimental work on synthesis and characterization and in the writing and correspondence with the editors during publication. The results are of significant scientific and applied interest and complete previous research.

1.5. Participation of the candidate in the achievement of the presented results:

A) The candidate has at least an equal participation in the submitted papers	8 points	
B) The candidate has at least an equal participation in most of the submitted papers	7 points	X
C) The candidate has a secondary participation in most of the submitted papers	4 points	
D) The candidate participation is unnoticeable	0 points	
		one of the answers given is marked with the sign "X"

In the published works, the candidate is the first author in 3 of them, in 9 - second, in 7 - corresponding author. The candidate has at least equal participation in the majority of the submitted works.

1.6 Pedagogical activity:

A) The candidate has effective and sufficient pedagogical activity at the university. The textbooks issued are modern and useful (they meet the requirements of the Regulations). The work with undergraduate and doctoral students is at a high professional level.	8 points	X
B) The candidate has sufficient pedagogical activity at the university. The textbooks issued satisfy the requirements of the Regulations.	6 points	
C) The pedagogical activity and / or textbooks issued are insufficient (do not meet the requirements of the Regulations)	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the items B or C is marked.
9 modern and useful teaching aids have been published. She is the supervisor of 4 excellently defended diplomas. A lot of high-quality data on working with students has been presented. In conclusion, it can be said that this is a well-established teacher with excellent pedagogical activity.

1.7. Critical notes:

A) Lack of critical notes	8 points	X
B) Critical notes of a technical nature	7 points	
C) Critical notes that would partially improve the results achieved in a small part of the research	5 points	
D) Critical notes that would partially improve the results achieved in most of the research	3 points	
E) Significant critical notes	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the answers C, D or E is marked.

1.8. Conclusion

A) The evaluation of the candidate's activity is **POSITIVE**	This evaluation is assigned to a total number of at least 50 points	X
B) The evaluation of the candidate's activity is **NEGATIVE**	This evaluation is assigned to a total number below 50 points	
		one of the answers given is marked with the sign "X"

To be filled in if requested by the member of the scientific jury
The candidate is an established teacher with excellent pedagogical activity. The submitted reference shows that the candidate participates both in the experimental work on synthesis and characterization and in the writing and correspondence with the editors during publication. The scientific results represent a significant scientific and applied interest and complete previous research. The topic on which he works is relevant. The points collected in the competition significantly exceed the minimum. In connection with the analysis made, I can confidently recommend Assistant Professor Dr. Vladislava Hristova Ivanova for the position of "Associate Professor" in the Department of Physics, Faculty of Chemical Technology.

24.03.2025	The report was written by:	**Georgi Vyacheslavovich Avdeev**
date		signature