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 Professor	Dr.	Vanya	Dimitrova	Lilova	UCTM
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

4	Natural Sciences, Mathematics and Informatics
code	name

Professional area:

4.1	Physical sciences
code	name

Scientific specialty:

4.1 Physical sciences (Structure, mechanical and thermal properties of condensed matter)

The competition has been announced:

108	22.12.2020г.	Physics	Fac. Chem. Sci.
in SG issue	date	for the needs of the Department	Faculty

The report was written by:

Associate Professor	Dr	Ivailo	Boyanov	Gugov	UCTM
academic position	scientific degree	name	middle name	last name	workplace

1. Report for the candidate:

Assistant Professor	Dr.	Vanya	Dimitrova	Lilova
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.

The candidate Dr. Vanya Lilova satisfies the minimum requirements of ZRASRB and the Regulations for its application, as well as the Regulations of UCTM in professional field 4.1 Physical Sciences. In some areas she exceeds them, as can be seen from the Table:

Indicators	Min. number of points required	Assistant Professor Dr Vanya Lilova
1 (PhD degree)	50	**50**
4 (habil. work – 10 articles)	100	**146**
7 – 11 (other publications)	200	**205**
10 – 12 (citations)	50	**54**

Assistant Professor Dr. Vanya Lilova is a co-author of textbook in "Physics - Introductory Course" and of two other textbooks. She has led four lecture courses at UCTM.

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.
The research of Dr. Lilova is relevant: Research on Topic 1: *Synthesis and characterization of composite materials based on borate and tellurite matrix.* Composite materials based on a glass matrix with included nano- or microcrystals with important for the practice optical, dielectric, etc. properties allows the production of materials combining the positive physical and technological properties of glass with the valuable physical properties of crystals. In the present case, composite materials have been studied in which crystals such as lead molybdate and maghemite with interesting dielectric or magnetic properties are included in a tellurite and borate glass matrix. Research on Topic 2: *Study of the anodic behavior of zinc and antimony.* The Sb2O3 layers are used in electrocatalysis and in the creation of electrochromic displays. The structured layers of ZnC2O4.2H2O are used as a step to obtain structured thin layers of ZnO. The thin layers of ZnO are widely used in the creation of displays, solar cells and oxygen gas sensors. Research on Topic 3: *Preparation and research of bulk and thin-film chalcogenide materials.* Chalcogenide bulk and thin film materials are suitable for optical recording of information, for example on a holographic principle. Research on Topic 4: *Study of optical properties of thin layers.* The appearance of the surface relief of azopolymer layers irradiated with low-energy picosecond laser pulses was first reported in 1995 and has been of increasing interest since then, both from an applied and a fundamental point of view. The main attention is paid to the optical properties of these layers. The relevance of Dr. Vanya Lilova's research is also confirmed by the observed citations of her scientific publications (34 in number, including 15 in 2019 and 2020).

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
Objectives of research on Topic 1: Synthesis and characterization of composite materials based on borate and tellurite matrix. phase. The glasses are obtained either by melting or by the sol-gel method, and the composite materials by crystallization or by the incorporation method. The aim is to trace the dependence of the structure and properties of composites on the production methods. Objectives of research on Topic 2: Study of the anodic behavior of zinc and antimony. The aim of this part of the work is to synthesize and study thin layers of antimony oxide and zinc oxalate by electrochemical reactions and trace the dependence of the structure and properties of the layers on the parameters of synthesis. Objectives of research on Topic 3: Obtaining and research of bulk and thin-layer chalcogenide materials. The purpose of this part of the research is to obtain new bulk and thin-film materials on a chalcogenide basis for applications in the optical recording of information. The aim is to trace the relationship composition - method of production - structure - properties of these materials. Objectives of research on Topic 4: Investigation of optical properties of thin layers. The aim of this part of the work is to obtain new thin-film materials based on azopolymer and to study their optical properties as a function of the composition. Generalized scientific- and applied purposes of the research: Synthesis and study of new bulk and thin - layer materials by using of different preparation techniques and research of the dependences on the type of composition - method of production - structure - properties of these materials. Development of methods for synthesis of new materials with useful for practice and tailored properties.

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.

Scientific and applied contributions of research on Topic 1: *Synthesis and characterization of composite materials based on borate and tellurite matrix:*

- New compositions of borate, tellurite and tellurite-borate glasses have been formulated
- New composite materials based on glass matrix and ferroelectric or ferromagnetic crystalline phase are obtained
- Relationships of the type composition - method of preparation - structure - properties have been established
- Methods for obtaining composite materials with controllable structure and properties have been developed

Scientific and applied contributions of research on Topic 2: *Study of the anodic behavior of zinc and antimony.*

- New methods have been developed for the synthesis of thin layers of antimony oxide and zinc oxalate by electrochemical means
- The influence of the synthesis parameters on the structure and properties of the layers has been studied

Scientific and applied contributions of research on Topic 3: *Preparation and research of bulk and thin-layer chalcogenide materials*

- new compositions of bulk and thin-layer chalcogenide materials are formulated
- dependences have been established on the type of composition - structure – properties

Scientific and applied contributions of research on Topic 4: *Investigation of optical properties of thin layers.*

- New composite layers of azopolymer and metal complexes are formulated
- The dependence of the optical properties of the layers on the amount of additive has been established

<u>Summarized scientific and applied research contributions of Dr. Vanya Lilova's research :</u>

- New compositions of materials with interesting properties for practice have been formulated.
- Various methods for material synthesis have been successfully used: glass melting, low-temperature sol-gel synthesis, crystallization, incorporation of the crystalline phase, anodizing of metal layers and surfaces, thermal and laser pulsed vacuum evaporation, spray pyrolysis, etc.
- Results were obtained for the structure of the obtained materials.
- Properties of the obtained materials were measured.
- For all materials, connections of the type composition - method of production - structure - properties have been established.
- Compositions and methods for obtaining new materials with controllable structure and properties have been developed.

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"

Critical notes must be provided if one of the items C or D is marked. According to the analysis of the publications and according to my personal observations, Dr. Vanya Lilova has at least equal participation in the planning, implementation and publication of the research results. An indication of this is the unified scientific approach applied to the various materials - the study of relationships of the type composition of the material - conditions for synthesis - structure and properties of the material, characteristic of the scientific school of materials science at UCTM, which Dr. Lilova is a successor

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.

1.7. Critical notes:

A) Lack of critical notes	8 points	
B) Critical notes of a technical nature	7 points	X
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 (72 points)
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
Both the academic and the scientific work of Assistant Professor Dr. Vanya Dimitrova Lilova is at a very high professional level. Her fundamental and applied scientific interests are in the field of materials science - synthesis and study of the structure and properties of new materials with useful for practice and tailored properties. Impressive is the large number of scientists with whom she is in fruitful scientific cooperation. After getting acquainted with the materials that Assistant Professor Dr. Vanya Dimitrova Lilova has presented for the competition and after analyzing the scientific and applied contributions that are presented in them, as well as her overall pedagogical and scientific

work, I confidently give my positive assessment and recommend to colleagues from the Scientific jury to vote for the award of the academic position of Associate Professor at UCTM in the scientific specialty 4.1 Physical Sciences. on Ch. Assistant Professor Dr. Vanya Dimitrova Lilova.

date	The report was written by:	signature
04.04.2021	**Assoc. Prof. Dr Ivailo B. Gugov**	