

**REPORT**

of dissertation for the acquisition of:

educational and scientific degree " doctor "	X
scientific degree " <b>Doctor of Science</b> "	
	the true is indicated by the sign "X"

**Author of the dissertation:**

Assist.- Prof.		Ina	Stoyanova	Karardashka- Radeva	UCTM
academic position	scientific degree	name	middle name	last name	workplace

**Topic of the dissertation:**

<b>Synthesis and characterization of As<sub>2</sub>Se<sub>3</sub>-based chalcogenide systems</b>
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**Scientific area:**

<b>4</b>	<b>Natural sciences, mathematics and informatics</b>
code	name

**Professional area:**

<b>4.2</b>	<b>Chemical sciences</b>
code	name

**Scientific specialty:**

Inorganic chemistry
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**The report was written by:**

Assoc. Prof.	Dr.	Ruzha	Georgieva	Harizanova	UCTM
academic position	scientific degree	name	middle name	last name	workplace

**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 is mandatory to fill 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 applies with 3 publications in referred and indexed journals which reflect the main results of the dissertation work – 2 are in journals with a quartile Q2 and 1 is in a journal with a Q3 quartile. The results from the dissertation of assist.-prof. eng. Ina Stoyanova Karadashka-Radeva have been presented at 2 international, 1 national conference with international participation and at 1 university conference. The candidate fully satisfies the requirements and even exceeds the minimum number of points, according to the Regulation – she has 55 points, according to Appendix 5a.

## 2. The relevance of the topic of the dissertation:

A) The topic is relevant and new (there are no known results on the topic by other authors)	8 points	X
B) The topic is relevant and results from other authors are known	6 points	
C) The topic is not relevant, but results from other authors are known	2 points	
D) The topic is not relevant and no results from other authors are known	1 point	
E) The topic does not correspond to the level of dissertation	0 points	
		one of the answers given is marked with the sign "X"

The evaluation of the relevance of the dissertation must be substantiated

The dissertation of eng. Karadashka-Radeva is dedicated to the preparation of amorphous materials in the systems  $\text{Ag}_2\text{Te}-\text{As}_2\text{Se}_3-\text{CdTe}$ ,  $\text{As}_2\text{Se}_3-\text{Ag}_2\text{Te}-\text{GeTe}$  and  $\text{As}_2\text{Se}_3-\text{GeTe}-\text{CdTe}$  and the investigation of the glass-forming abilities, characterization of the structure and the physico-chemical properties as well as the degradation of the obtained materials in aggressive media. The presented results are new and contribute to the enlargement of the number of chalcogenide glasses and glass-like materials with potential for application as media for wave guides, diffraction gratings,  $\text{CO}_2$  laser lens, materials for the elaboration of resistive sensors and sensors for potentiometric and amperometric measurements.

## 3. Type of research:

A) Theoretical	4 points	
B) Applied	4 points	
C) Theoretical with application elements	4 points	X
D) It does not correspond to the level of dissertation	0 points	
		one of the answers given is marked with the sign "X"

The level of research must be substantiated if answer D is marked.

The submitted dissertation and the outlined contributions allow to classify the investigations presented as theoretical with application elements because the obtained chalcogenide glasses and glass-like materials can find application in electronics, opto-electronics and laser technology.

## 4. 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	3 points	
C) Unattainable (unrealistic)	0 points	

		one of the answers given is marked with the sign "X"
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Objectives must be specified. The type of the set objectives must be justified.

The objectives of the dissertation of eng. Ina Karadashka-Radeva are realistic, of both fundamental and applied interest and are clearly and specifically formulated. They concern the design and synthesis of new compositions in the systems  $\text{Ag}_2\text{Te}-\text{As}_2\text{Se}_3-\text{CdTe}$ ,  $\text{As}_2\text{Se}_3-\text{Ag}_2\text{Te}-\text{GeTe}$  and  $\text{As}_2\text{Se}_3-\text{GeTe}-\text{CdTe}$ , as well as determining of the glass-forming ranges, characterization of the structure and physico-chemical properties and the reaction of the obtained materials when in contact with strong acids as a function of the acid type and the temperature.

### 5. Contributions of the dissertation:

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.

In the dissertation of assist-prof. eng. Ina Karadashka-Radeva the following contributions can be outlined:

1. Synthesis of new glasses and estimation of the glass-forming ranges in the pseudo ternary chalcogenide systems  $\text{Ag}_2\text{Te}-\text{As}_2\text{Se}_3-\text{CdTe}$ ,  $\text{As}_2\text{Se}_3-\text{Ag}_2\text{Te}-\text{GeTe}$  and  $\text{As}_2\text{Se}_3-\text{GeTe}-\text{CdTe}$ .
2. Investigation of the structure, main physico-chemical and mechanical properties of the glasses from the studied systems and the establishing of an increased transparency range in the middle infrared part of the spectrum for the obtained materials.
3. Studying the dissolution kinetics of the prepared chalcogenide materials in aggressive acids as a dependence on the type of the acid used and the temperature.

The contributions of the dissertation are of significant theoretical and applied interest because they determine the glass-forming ranges in the studied systems, supply and summarize information concerning the main thermo-physical and mechanical properties of the obtained materials as well outline the potential fields of application – in electronics, opto-electronics and sensor technology.

### 6. Conclusion

A) The evaluation of the dissertation is <b>POSITIVE</b>	This evaluation is assigned to a total number of at least 40 points	X
B) The evaluation of the dissertation is <b>NEGATIVE</b>	This evaluation is assigned to a total number below 40 points	
		one of the answers given is marked with the sign "X"

To be filled in at the request of the member of the scientific jury

Eng. Ina Karadashka-Radeva has submitted a dissertation which fully corresponds and even exceeds the minimum criteria determined by the Regulation. The results from the investigations included in her thesis are

published in 3 articles in specialized scientific journals and have been presented at specialized scientific forums. As a result from the investigations carried out, significant results with both fundamental and applied character have been obtained.

I evaluate positively the submitted dissertation thesis.

With conviction, I propose to the Scientific jury to vote positively for awarding the **scientific and educational degree “Doctor” to assist-prof. eng. Ina Stoyanova Karadashka-Radeva.**

<b>10.07.2024</b>	The report was written by:	
date	<b>Assoc. Prof. Dr. Ruzha Georgieva Harizanova</b>	signature