

## 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	Chief Assistant Professor	PhD	Petrunka	Atanasova	Malinova	UCTM-Sofia
№	academic position	scientific degree	name	middle name	last name	workplace

## Scientific area:

5	Technical Sciences
code	name

## Professional area:

5.10	Chemical Technologies
code	name

## Scientific specialty:

Rubber Technology
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## The competition has been announced:

56	19.07.2022	Polymer Engineering	Faculty of Chemical Technologies
in SG issue	date	for the needs of the Department	Faculty

## The report was written by:

Prof.	PhD	Ivaylo	Vladimirov	Dimitrov	Institute of Polymers, Bulgarian Academy of Sciences
academic position	scientific degree	name	middle name	last name	workplace

## 1. Report for the candidate:

Chief Assistant Professor	PhD	Petrunka	Atanasova	Malinova
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 requirements for **indicator A** are fulfilled, as the candidate holds the educational and scientific degree "Doctor" since 2007 (**50 points**).

Regarding **indicator C**, the candidate has presented *ten scientific publications*, referred and indexed in world-renowned databases with scientific information (Scopus and/or Web of Science), thus collecting **125.57 points** (with a minimum of 100 points required).

Regarding the **group of indicators D**, the candidate has presented *20 scientific publications*, referred and indexed in world-renowned databases with scientific information and *8 non-referred publications*, thus collecting a total of **203.78 points** (with a minimum of 200 points required).

According to **group of indicators E**, the candidate has presented *105 citations* (100 of which in scientific journals, referred and indexed in world-renowned databases with scientific information), collecting **1012 points** (with a minimum of 50 points required).

According to **group of indicators F** a list of *6 participations in national* and *8 participations in international projects* together with a university textbook published by the candidate and recognized *10 patents* and *one utility model* co-authored by the candidate are presented with a score of **680 points**.

Chief Assistant Professor Petrunka Malinova has collected a total score of **2071.35 points**, which significantly exceeds the minimum of 400 points required by the Regulations for acquiring scientific degrees and holding academic positions at UCTM for the academic position of "Associate Professor".

### 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	
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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.
<p>The research in the scientific papers presented by the candidate in the competition for the academic position of "Associate Professor" is relevant and could be classified as follows:</p> <ul style="list-style-type: none"> <li>• Research related to the preparation and characterization of various fillers for elastomers, as well as studying the properties of composites filled with them.</li> <li>• Study of the electrical, microwave and dynamic properties of filled (nano)composites.</li> <li>• Research related to the utilization of waste products from the rubber and military industries.</li> <li>• Research related to the preparation and characterization of elastomeric composites with application in wireless communications.</li> </ul>

### 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
<p>The objectives set in the presented research are realistic and are of scientific applied and applied interest.</p> <p>In the research related to the preparation and characterization of various fillers for elastomers, the goal is to achieve high efficiency and to obtain composites for specific applications through:</p> <ul style="list-style-type: none"> <li>- the development of two-phase hybrid fillers;</li> </ul>

- the use of fillers obtained from the combustion of natural products;
- the preparation of composites containing glass-ceramic fillers with application in "flexible electronics".

Another objective of the candidate's research is the preparation and characterization of electrically conductive elastomeric composites for applications in strain, pressure or acetone vapor sensors through filling the elastomers with various combinations of conductive fillers.

Within the research of environmental aspects related to the accumulation of waste products from the rubber industry, the objectives are related to the recovery of used car tires, applying different methods for their processing and the reuse of the corresponding products.

In the research related to the development of flexible antenna elements for wireless communication, the goal is to obtain and characterize elastomeric composites that meet a set of stringent requirements for medical and industrial applications.

#### 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 main contributions of the candidate's research presented for participation in the competition that are of scientific and applied interest can be summarized as follows:

- Two-phase hybrid fillers have been developed applying an impregnation method. Various properties of elastomers filled with the two-phase fillers were evaluated. The impregnation method and the composition of the hybrid fillers were optimized depending on the specific application of the composites.
- Electrically conductive composites were successfully obtained using conductive fillers in elastomers of different chemical nature. Their properties were evaluated and the potential application in pressure, deformation or organic (acetone) vapor sensors has been established.
- The possibilities for the utilization of waste elastomeric products have been demonstrated. Appropriate methods for the treatment of pyrolysis carbon black obtained from worn car tires are proposed. As a result, an increased reinforcing

efficiency was achieved when they were incorporated into elastomer composites. The conditions for the reprocessing of rubber regenerate, as well as the use of ground waste rubber vulcanizates for the production of insulation materials and floor coverings, have been also established.

- Elastomeric composites with specific properties suitable for application in flexible antennas for wireless communications have been developed.
- The possibility of using fillers obtained from natural products (rice husks), sol-gel bioglasses and glass ceramics for the preparation of elastomeric composites with specific applications has been established.

### 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.

### 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	
B) The candidate has sufficient pedagogical activity at the university. The textbooks issued satisfy the requirements of the Regulations.	6 points	X
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"
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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.
Minor technical errors and, in some cases, inappropriate use of foreign words such as "external" and "internal" surface, which could have been avoided in the candidate's text describing the main results and scientific contributions, are noted.

**1.8. Conclusion**

A) The evaluation of the candidate's activity is <b>POSITIVE</b>	This evaluation is assigned to a total number of at least 50 points	X
B) The evaluation of the candidate's activity is <b>NEGATIVE</b>	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 research results presented by Chief Assistant Professor Dr. Petrunka Atanasova Malinova and her teaching activities fully comply with the National minimum requirements for filling the academic position "Associate Professor" according to the *Development of Academic Staff in the Republic of Bulgaria Act* (DASRBA), the *Regulations on the Implementation of the DASRBA* and the *Regulations for acquiring scientific degrees and holding academic positions at UCTM*. Therefore, I give my positive assessment and recommend Chief Assistant Professor Dr. Petrunka Atanasova Malinova to be elected as an "Associate Professor" in the professional field 5.10. Chemical Technologies (Rubber Technology), according to a competition announced by UCTM in SG, issue 56 from 19.07.2022.

<b>09.11.2022</b>	The report was written by:	
date	<b>Prof. Ivaylo Dimitrov, PhD</b>	signature