Appendix 12d

REPORT
to occupy the academic position:

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

Candidates to occupy the position:

1	Associate Professor	PhD	Rayna	Georgieva	Bryaskova	UCTM-Sofia
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

4	Natural Sciences, Mathematics and Informatics
code	name

Professional area:

4.2	Chemical Sciences
code	name

Scientific specialty:

Chemistry of High-molar-mass Compounds

The competition has been announced:

23	19.03.2024	“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:

Associate Professor	PhD	Rayna	Georgieva	Bryaskova
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 1** are fulfilled, as the candidate holds the educational and scientific degree "Doctor" since 2004 (**50 points**). Regarding **indicator 4**, the candidate has presented eight scientific publications in referred and indexed in world-renowned databases with scientific information (Scopus and Web of Science) journals, falling into Q2 (three), Q3 (three) and Q4 (two) quartiles, thus collecting **115 points** (with a minimum of 100 points required). Regarding **indicators 5-10**, the candidate has presented 11 scientific publications in referred and indexed in Scopus and/or Web of Science journals (indicator 7). Five of them are in Q1 journals, three in Q2 and three of the publications are in SJR journals with no impact factor, thus collecting a total of **215 points** (with a minimum of 200 points required) According to **indicator 11**, the candidate has presented 107 citations of the publications from indicators 4 and 7 in scientific journals, referred and indexed in world-renowned databases with scientific information, collecting **214 points** (with a minimum of 100 points required). According to **indicators 12-20**, proofs are presented for the supervision of one successfully defended her thesis PhD student, coordination and attracted funds from one national scientific project, participation in 5 national projects, as well as a university textbook published by the candidate, collecting **184 points** (with a minimum of 100 points required). Associate Professor Raina Bryaskova has collected a total score of **778 points**, thus exceeding the minimum of 550 points required by the Regulations for acquiring scientific degrees and holding academic positions at UCTM for the academic position of "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	
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 in the scientific papers presented by Assoc. Prof. Bryaskova in the competition for filling the academic position of "Professor" is in the relevant field of obtaining and evaluating novel polymer-hybrid materials with specific properties, that are gaining an increased interest due to the opportunities they provide for a variety of applications. Prof. Bryaskova's research includes the synthesis of polymeric materials containing silver nanoparticles with pronounced antimicrobial activity and potential application in biotechnology and veterinary medicine. Further on, various amphiphilic block copolymers were synthesized and characterized, and the possibility of forming micelles with incorporated gold nanoparticles or fluorescent functionalities with potential application in diagnostic imaging and antitumor therapy was investigated. Research also covers the preparation of new functional polymer coatings, characterized by a good adhesion and exhibiting a photodynamic antibacterial activity.

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 objectives set in Assoc. Prof. Bryaskova's research are realistic and represent both scientific and scientific-applied interest. In the research related to hybrid materials exhibiting antimicrobial activity, the goal is to incorporate silver nanoparticles into thin polymer films or to stabilize them using polymers in solution. In the research related to functional polymeric micelles, the aim is to obtain polymeric carriers of gold nanoparticles, biologically active substances and fluorescent functionalities for potential application in nanomedicine.

In the studies related to the preparation and characterization of new polymer coatings with photodynamic antibacterial activity, the goal is to synthesize suitable copolymers and functional photosensitizers, allowing their layer-by-layer deposition on a steel substrate. Appropriate and modern methods for the synthesis, characterization and evaluation of the polymers and polymeric materials' properties have been selected for the implementation of the set objectives.

1.4. Candidate research contributions:

A) With lasting scientific and / or applied response, they form the basis for new research and applications	20 points	X
B) They are of significant scientific and / or applied interest, complete and / or summarize previous research	16 points	
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 which are of scientific and applied interest can be summarized as follows: • **Polymeric materials containing silver nanoparticles with potential medical applications have been obtained and evaluated.** Novel hybrid materials with enhanced mechanical properties and thermal stability based on a polymeric film of poly(vinyl alcohol) (PVA) and organosilanes with incorporated silver nanoparticles were synthesized. The materials were found to exhibit strong antimicrobial activity. PVA-stabilized silver nanoparticles have been evaluated for potential applications in veterinary medicine - initially as an additive to formulations for the treatment of otitis externa in dogs, and have also been successfully applied to inactivate various bacterial strains for the preparation of a polyvalent "ghost"-vaccine. • **Functional fluorescent micelles based on various amphiphilic block copolymers with potential application in diagnostic imaging and antitumor therapy have been obtained and characterized.** Amphiphilic di- and triblock copolymers based on poly(ethylene glycol) and poly(4-vinylpyridine) were obtained applying controlled polymerization techniques. The self-association of the copolymers and the incorporation of gold nanoparticles into their hydrophobic cores were evaluated. Further on, a series of amphiphilic block copolymers forming functional pH-sensitive micelles containing chemically or physically linked fluorescent compounds were synthesized. The incorporation of the hydrophobic biologically active substance 1H-benzimidazol-2-yl hydrazone into the core of amphiphilic diblock copolymer micelles leads to the preparation of fluorescent

nanocarriers with a pronounced cytotoxic effect, selectively manifested on tumor cells.

- **Contributions to the preparation and characterization of polymer coatings exhibiting photodynamic antibacterial activity.** A specific polycationic copolymer containing 3,4-dihydroxy-L-phenylalanine (DOPA) segments with excellent adhesion properties was synthesized and characterized. Next, a nanogel was obtained by the interaction between DOPA-methacrylamide homopolymer and polyallylamine. Finally, the 9-aminoacridine photosensitizer was modified with a hydrazine group. A layer-by-layer deposition of the three components was performed on a stainless-steel substrate. Following the same procedure, coatings containing silver nanoparticles incorporated into the polymer nanogel were obtained and another type of photosensitizer (diamino-modified protoporphyrin IX) was deposited as the third layer. The resulting photoactive polymer coatings are characterized by good adhesion to the substrate and good mechanical properties. The coatings were found to exhibit strong antibacterial activity.

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	X
B) The candidate has at least an equal participation in most of the submitted papers	7 points	
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	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.
Some minor technical errors are noted throughout the text describing the main results and scientific contributions of the candidate.

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 (77 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
The research results presented by Associate Professor Dr. Rayna Georgieva Bryaskova and her teaching activities fully meet all the requirements for filling the academic position of "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 I recommend Associate Professor Dr. Rayna Georgieva Bryaskova to be elected as a "Professor" in the professional field 4.2. Chemical Sciences (Chemistry of High-molar-mass Compounds), according to a competition announced by UCTM in SG, issue 23 from 19.03.2024.

03.07.2024	The report was written by:	
date	**Prof. Ivaylo Dimitrov, PhD**	signature