

REVIEW

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'	Ph.D.	Desislava	Staneva	Grabcheva	UCTM
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

	Technical sciences
code	name

Professional area:

5.10	Chemical technologies
code	name

Scientific specialty:

Chemical technology of fibrous materials
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The competition has been announced:

23	19.03.2024	Textiles, leather and fuels	Faculty of Chemical Technologies
in SG issue	date	for the needs of the Department	Faculty

The review was written by:

Professor	D.Sc.	Todor	Minkov	Dudev	Sofia University "St. Kliment Ohridski"
academic position	scientific degree	name	middle name	last name	workplace

1. Review for the candidate:

Associate Professor	Ph.D.	Desislava	Staneva	Grabcheva
academic position	scientific degree	name	middle name	last name

1.1. Completion of the provided documents:

A) The competition documents are in full compliance with the Regulations	3 points	X
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B) The documents are complete but do not fully comply with the requirements of the Regulations	2 points	
C) The documents are not completed in accordance with the requirements of the Regulations	0 points	
		one of the answers given is marked with the sign "X"

Missing documents and violated requirements must be described if response C is marked.

A complete set of documents is presented, organized very precisely, which fully comply with the Regulations.

1.2. 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 fully meets (and in a number of cases significantly exceeds) the minimum requirements for holding the position of "Professor". Assoc. Prof. Grabcheva participates in the competition with 45 publications, of which 41 are in refereed and indexed editions, 3 publications in non-refereed peer-reviewed journals, 1 publication in a Bulgarian specialized scientific journal and 2 chapters of collective monographs. In 23 of them, the candidate is the first author, and in 15 - the second author. A significant number of articles have been published in high impact factor journals such as Journal of Photochemistry and Photobiology A: Chemistry, Dyes and Pigments, Journal of Functional Biomaterials and Molecules. Thirteen of the articles were published in co-authorship with foreign researchers. The total number of citations without self-citations, according to SCOPUS, is 749.

1.3. 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)	7 points	X
B) Research is relevant. Results from other authors are known for each of the topics and / or applications studied.	5 points	
C) Most of the research is relevant, but also some results are presented that have no scientific and / or applied value	3 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 studies have been conducted at a high scientific research level and are of an innovative nature. A set of state-of-the-art techniques/approaches was used for the overall characterization of the properties/behavior of the studied systems. The creation of textile materials with applications in medicine (textile products with bactericidal, antifungal and antiviral properties) and ecology (adsorbents for petroleum products, photocatalysts), as well as those with sensory properties, is timely, as evidenced by the high rating of citation of relevant publications.

1.4. Knowledge of the problems subject of research:

A) The candidate knows in detail the achievements of other authors on the researched topics and/or applications	6 points	X
B) The candidate is partially familiar with the achieved results on the researched topics and / or applications	4 points	
C) The candidate has no prior knowledge of the status of the researched problems	0 points	
		one of the answers given is marked with the sign "X"

The evaluation must be substantiated if answer C is marked.

1.5. Type of research:

A) Theoretical	4 points	
B) Applied	4 points	X
C) Theoretical with application elements	4 points	
D) It does not correspond to the level specified in the Act for the Development of the Academic Staff in the Republic of Bulgaria and the Regulations	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 research is mainly applied. A large range of textile materials with different coatings/inclusions have been investigated, which exhibit very valuable, from the point of view of biomedicine, ecology and sensors, properties.

1.6. 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"
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Objectives must be specified. The type of the set objectives must be justified.

The candidate's scientific activity is focused on research related to the modification of textile materials with various chemical compounds and subsequent characterization of the new systems with a view to their application in practice: textile materials with the biomedical application; materials for environmental applications; materials with sensory properties. Special attention is given to the determination/investigation of the factors ensuring the stability of the obtained coatings after their deposition on the fibrous material. The tasks set are realistic and feasible, which is convincingly confirmed by the impressive results achieved by the candidate.

1.7. Methods of research:

A) Adequate to research and set scientific objectives and /or applications	8 points	X
B) Partially appropriate, enabling part of the scientific objectives and / or applications to be achieved	4 points	
C) Inappropriate methods	0 points	
		one of the answers given is marked with the sign "X"

Methods must be specified. The type of methods used is justified.

The candidate used a set of state-of-the-art methods that allow the complete characterization of the studied systems and shed light on the mechanism of the physico-chemical and biochemical processes occurring in the modified textile materials. The methods of chemical synthesis, biochemical studies, spectral measurements (IR, UV/VIS, EPR, Fluorescence Spectroscopy), thermal analysis, X-ray diffraction analysis and studies using a scanning electron microscope were used.

1.8. 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 candidate's scientific contributions are in the field of chemical modification of textile materials in order to obtain those with applications in biomedicine (textile products with bactericidal, antifungal

and antiviral properties) and ecology (adsorbents for petroleum products, photocatalysts), as well as textile materials with sensory properties.

A significant part of Assoc. Prof. Grabcheva's publications are dedicated to the creation of textile materials with antibacterial and antifungal properties based on polyamidoamine dendrimers of the first, second and third generation, which are modified with 1,8-naphthalimide, acridine and dansyl fluorophores and their metal complexes. It has been convincingly shown that the deposition of the dendrimers and their metal complexes on cotton fabric prevents the retention of bacteria on the surface of the fibers and the formation of a bacterial biofilm. Extensive research has also been conducted on textile materials treated with modified antimicrobial peptides that exhibit virucidal activity. The target bacterial strains and human viruses whose growth/activity has been inhibited by the new coatings are identified. A hypothesis has been formulated regarding the mechanism of their antiviral action. The obtained results show that the approach used in the preparation of the new composite materials has the potential to achieve good microbiological and disinfection activity of the newly obtained materials. Research on textile materials releasing biologically active substances is of particular interest. The resulting new composite materials have the potential to be used as antimicrobial wound dressings, releasing an anti-inflammatory biologically active substance.

Modified textile materials with potential application in ecology as adsorbents for oil, oil products and dyes dissolved in water were also investigated. New composite materials were obtained from biodegradable polymers, including cotton fabric that was modified with chitosan, cross-linked with glutaraldehyde and containing ZnO particles. The physico-chemical factors influencing the efficiency of the obtained sorbents for the removal of spills of crude oil and petroleum products have been established. The presence of zinc oxide particles suggests the use of the composite materials not only as sorbents, but also as photocatalysts that generate reactive oxygen species upon light irradiation.

To find reliable, efficient and sensitive sensors for the detection of amines, a second-generation polypropylene imine dendrimer whose primary amino groups had been modified with fluorescent benzanthrone groups has been synthesized for the first time. Changes in the fluorescence spectrum of a polypropylene imine-dyed viscose silk fabric indicated that the modified textile material had the ability to detect ammonia, methylamine, dimethylamine, and triethylamine in aqueous media. It has been also found that in the presence of copper and zinc ions, the dyed viscose fabric quenches its fluorescence, making it suitable as a heterogeneous sensor for the detection of these cations in aqueous media.

1.9. 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.

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1.10. 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.

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1.11. 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.

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1.12. Conclusion

A) The evaluation of the candidate's activity is POSITIVE	This evaluation is assigned to a total number of at least 65 points	X
B) The evaluation of the candidate's activity is NEGATIVE	This evaluation is assigned to a total number below 65 points	

		one of the answers given is marked with the sign "X"
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To be filled in if requested by the reviewer

The publications and habilitation thesis presented by the candidate are on the topic of the competition and represent original scientific developments with a significant contribution in the field of chemical technology of fibrous materials. The obtained results are of an innovative nature and can be attributed to the category of novelties in scientific research. They provide a solid foundation for further wide-ranging and promising research in this scientific direction. The candidate is a distinguished scientist/educator in his field with deep knowledge and practical skills in the field of textile technology. Demonstrates maturity, creative thinking and the ability to successfully select and solve current tasks with a long-lasting effect on science and practice. In conclusion, as a result of the above, I am convinced that with her research and teaching activity Assoc. Prof. Desislava Grabcheva fully meets all the requirements of the Law on holding the academic position of "professor" and I propose that she be elected as a "professor" in a scientific specialty 5.10 Chemical technologies (Chemical technology of fibrous materials).

	The review was written by:	
date	26.06.2024	signature