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	***Assist. Prof.***	***PhD***	***Dimka***	***Ivanova***	***Ivanova***	***University of chemical technology and metallurgy***
№	academic position	scientific degree	name	middle name	last name	workplace
2	***Not be***					
№	academic position	scientific degree	name	middle name	last name	workplace
3	***Not be***					
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

5	***Technical Science***
code	name

Professional area:

5.10	***Chemical Technology***
code	name

Scientific specialty:

Chemical resistance of materials and corrosion protection

The competition has been announced:

No. 61	***2/08/2019***	***Inorganic and electrochemical productions***	***Faculty of chemical technologies***
in SG issue	date	for the needs of the Department	Faculty

The report was written by:

Professor	***DSc***	***Ivan***	***NEDKOV***	***Ivanov***	***Institute of Electronics BAS***
academic position	scientific degree	name	middle name	last name	workplace

1. Report for the candidate:

Assistent Prof.	***PhD***	***Dimka***	***Ivanova***	***Ivanova***
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 for the post of academic post “Associate Professor” meets the requirements of the University of chemical technology and metallurgy for scientific and teaching activity, set out in the Regulations for the acquisition of academic degrees and occupation of academic positions (Annexes 2a and 2b).

- Dissertation work for the award of educational and scientific degree "Doctor". Total number of points according to Indicator 1:50.

- Scientific publications 10 in publications that are referenced and indexed in world-renowned scientific information databases (n is the number of co-authors of the respective publication). Total number of points according to Indicator 4: 102.85.

- Scientific publications (articles and reports) - 9, published in publications that are referenced and indexed in world-renowned scientific information databases. Total number of points according to Indicator 7: 176.65.

- Scientific publications (articles and reports) published in non-refereed peer-reviewed journals or in peer-reviewed collective volumes.Total score for Indicator 8: 32.52.

- Textbook - CORROSION OF MATERIALS by authors: L. Fachikov, D. Ivanova, 2019 (accepted for publication) - Indicator 22, total points: 20.

- 42 citations of the candidate's works were opened, which replay to a indicator 12 - 290 points; 9 points on indicator 13 - 9 points and 20 points on indicator 14.

The most cited works of the applicant are:
L. Fachikov, D. Ivanova, “Surface treatment of zinc coatings by molybdate solutions”, Applied Surface Science, vol. 258, p. 10160-10167, 2012. - 17 tims.
D. Ivanova, L. Fachikov, Phosphating of zinc surfaces in zinc-calcium solutions, *Bulgarian Chemical Communications*, 43 (1), 2011, p. 54-59. - 4 times.

Over the last 4 years, the candidate has been expanding her research and her recent publications are related to nanotechnology research. It is noteworthy that these works have already been recognized in the scientific community and are cited. Appreciate the work:
Zahariev, M. Piskin, E. Karaduman, D. Ivanova, I. Markova, L. Fachikov, FTIR spectroscopy method for investigation of Co-Ni nanoparticle nanosurface phenomena, Journal of Chemical Technology and Metallurgy, 52 (5), 2017, p. 916-928. - 4 citations.
N. Markova, I. Z. Zahariev, M. T. Georgieva, D. Tzankov, D. I. Ivanova, M. B. Piskin, L. B. Fachikov, Influence of the Co:Ni ratio on the properties of Co-Ni nanoparticles and their carbon-containing nanocomposites, Reviews on Advanced Materials Science, 50, 2017, p. 95- 103. - 2 citations.
N. Markova, I. Z. Zahariev, V. L. Milanova, D. I. Ivanova, M. B. Piskin, L. B. Fachikov, E. Hristoforou, Nanomaterials based on intermetallic (Co-Sn, Ni-Sn, Co-Ni) nanoparticles studied by FTIR spectroscopy, *Reviews on Advanced Materials Science,* 52, December 2017, p. 70-81. - 1 citation.

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 development of modern chemical technologies for conversion coatings has a long history and its great practical importance determines the lasting interest and permanent development. The proposed studies and thematic focus are relevant as they explore modern methods for amorphous and crystalline phosphating of zinc surfaces and optimization of the main parameters of the phosphating processes - concentration, temperature, duration and others. Significant is the elucidation of fundamental problems of formation and phase composition under different conditions for corrosion coatings in various types of structural steels, medical implants, and the effect of intermetallic nanoparticles on the surface properties of functional metal surfaces. New data have been obtained on the composition, structure, durability and protective ability of such coatings. Industrial phosphating technologies for zinc and its alloys have been proposed and have been put into practice. Research is up-to-date and solves fundamental and practical tasks.

1.3. Objectives of the research:

A) Realistic and of scientific and / or applied interest	8 points	
B) Realistic, but not of scientific and / or applied interest	4 points	**X**
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 candidate's research work has well-defined goals for: clarifying the fundamental problems of the formation of conversion coatings; phase composition and properties under different functional conditions of corrosion coatings for different types of structural steels. The other purpose of study is the surface properties of medical metal implants and the effect of intermetallic nanoparticles on the functional properties of the listed materials. Innovative goals are also well formulated to address the practical application of these materials.

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 applicant's contributions are related to the specialties in the professional fields of materials and materials science, chemical technologies and chemical resistance of metals and corrosion protection and can be summarized in a sequence that the reviewer sorts by relevance after analyzing the applied works, as follows: - **Corrosion of various materials** (Works: Indicator 4 - No 1, 3; Indicator 7 - No 4, 6, 8; Indicator 8 - No 12). a large part of the applicant's visible contributions are related to the results obtained from a study of the corrosion behavior of steels intended as structural materials for the mining industry.New data have been obtained on the phase composition of the surface layer and it has been shown that the presence of spinel structure products of oxidation, and in particular Fe_3O_4 and γ-Fe_2O_3, increase the resistance of the steel to stress corrosion cracking. New data on corrosion of medical implants also have been obtained and a link is made to its effect on biocompatibility for two types of austenitic steels.

- **Synthesis of intermetallic nanoparticles** (Works: Indicator 4 - No 4, 5, 6, 9, 10; Indicator 8 - No 13, 14, 15). Technology has been developed - a the so-called "template technique" using a carbon carrier (substrate) to produce *"in situ"* at room temperature by reducing chloride salts in aqueous solutions of nanocomposite materials containing particles of Co, Ni and Sn. New results have been obtained with intermetallic nanoparticles for use as catalysts, electrode materials in lithium-ion batteries and as magnetic materials for biomedical applications. Corrosion resistance and partial corrosion reactions of hybrid nanostructured sol-gel coatings and their effect on anodic dissolution were obtained.
- **Phosphating of low carboned steels in zinc and modified phosphating preparations** (Works: Indicator 7 - No 1, 2, 7, 9; Indicator 8 - No 10). New data are obtained on the effect of P_2O_5 and NO_3 on the thickness / mass of corrosion coatings, including changes in the phase composition and structure of low carbon steels.
- **Amorphous phosphating of steel, zinc and aluminum surfaces** (Works: Indicator 7 - No 3, 5; Indicator 8 - No 11). New results have been obtained for the influence of cathode current density on electrochemical phosphating in aqueous solutions of zinc, aluminum and low carbon steel surfaces in coating formation, including changes in their composition and morphology.
- **Others** (Works: Indicator 4 - No 2, 7, 8). Practically useful data were obtained for cathode materials based on MnO_2 spinel. New data have been ilustrared on the electrochemical preparation of Zr, Ce and Y oxides from alcoholic solutions.

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.

In item 1.1. I have provided details of the candidate's participation in the achievement of the presented results. The continued active work with her supervisor after defending her dissertation made a good impression on me. Her involvement stands out and she is already an initiator and a major factor in the implementation of new research projects and applied projects. A typical example in this respect is the jointly prepared textbook - CORROSION OF MATERIALS with authors: L. Fachikov, D. Ivanova, 2019 (under seal).

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"

Critical notes must be provided if one of the items B or C is marked.
The candidate is actively teaching in the field of "Electrochemistry and corrosion protection of metals" at the Department of Inorganic and Electrochemical Productions-Sofia. It has made an indisputable contribution to the training of highly qualified specialists in the field of corrosion and metal protection, chemical and electrochemical treatment of metal surfaces, electroplating, production of autonomous sources of electricity (batteries, batteries) and electrochemical synthesis.

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.
I have introduced the candidate to some technical inaccuracies that do not change my overall impression.

1.8. Conclusion

A) The evaluation of the candidate's activity is **POSITIVE**	This evaluation is assigned to a total number of at least 70 points	***X***
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
I recommend that engineer Dimka Ivanova Ivanova **be selected as an "Associate Professor"** in the scientific specialty 5.10. Chemical technologies (Chemical resistance of materials and corrosion protection), according to competition announced by **the University of chemical technology and metallurgy** in SG issu No. 61 of 02.08.2019.

2. Report for the candidate: *not be*

academic position	scientific degree	name	middle name	last name

The structure of the report under the previous point 1 shall be respected.

3. Report for the candidate: *not be*

academic position	scientific degree	name	middle name	last name

The structure of the report under the previous point 1 shall be respected.

Candidate ranking (in case of more than one candidate who has received a positive evaluation to occupy the academic position):

Based on the assigned points, the candidates who have received a **positive** evaluation are ranked as follows:

1	***Assestent Prof.***	***PhD***	***Dimka***	***Ivanova***	***Ivanova***	***70***
place	academic position	scientific degree	name	middle name	last name	points
2	***Not be***					
place	academic position	scientific degree	name	middle name	last name	points
3	***Not be***					
place	academic position	scientific degree	name	middle name	last name	points

05.11.2019	The report was written by: ***Prof. I.Nedkov***	
date		signature