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	**Chief Assistant**	**Dr**	**Chavdar**	**Petrov**	**Chilev**	**UCTM**
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

5	**Technical Sciences**
code	name

Professional area:

5.10	**Chemical Technologies (Unit Operations in Chemical and Biochemical Technology)**
code	name

Scientific specialty:

Chemical Engineering

The competition has been announced:

74	**21.08.2020**	**Chemical Engineering**	**FCSE** **Faculty of Chemical and System Engineering**
in SG issue	date	for the needs of the Department	Faculty

The report was written by:

Assoc.Prof.	**Dr**	**Kiril**	**Georgiev**	**Stanulov**	**UCTM University of Chemical Technology and Metallurgy**
academic position	scientific degree	name	middle name	last name	workplace

1. Report for the candidate:

Chief Assistant	**Dr**	**Chavdar**	**Petrov**	**Chilev**
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 chief assistant Chavdar Chilev participates in the competition for associate professor with 25 scientific publications, including one his own monograph, 15 publications in referenced journals in world data bases, from which 7 publications in journals having impact factor, and 9 publications in non-referenced journals with scientific reviewing or in edited collective

volumes. In 10 of the publications in the referenced journals Dr. Chilev is the first author, which is an indication for his active participation in the studies. It has been observed that his papers had been cited 95 times, from which 78 citations are in referenced journals with H-index (Scopus) = 5. This can be considered as recognition for a high citation of his works. The candidate is an author of one textbook, and has 22 participations in international scientific forums, including with three oral presentations and 19 posters.

According to the law for the academic staff development, and the regulations of its application in Republic of Bulgaria, and in the University of Chemical Technology and Metallurgy, the minimum required points by groups of indicators to hold an academic position “associate professor” is 400. The results of the candidate according to the main sections are as follows: indicator 1 – 50 points (minimum 50); indicator 3 – 100 points (100); indicators from 5 to 11 – 240 points (200); indicators from 12 to 15 -814 points (50) or total 1204 points. These data show that the chief assistant Dr. Chilev has achieved results significantly exceeding the minimum requirements for the academic position “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	**X**
B) Research is relevant. Results from other authors are known for each of the topics and / or applications studied.	6 points	
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 scientific works of the candidate are in the field of the hydrogen technologies, modelling of gas adsorption on micro-porous adsorbents, kinetics and modelling of solid-liquid extraction of active substances from plant materials, and modelling and simulation of chemical-technological processes. They are in the topic of the competition and in unison with the modern trends in the development of the hydrogen energy, pharmacy, ecology, food industry, and in other fields of industry. The investigations of the candidate are topical, with elements of originality and significance for the scientific knowledge.

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 scientific production of the chief assistant Chilev is characterized by realistic aims of the studies, presenting scientific and scientific-practical interest. The achievement of these goals is a result of implementation of definite tasks, related to comprehensive investigation of sorption processes of hydrogen and other gases on adsorbents and their modifications with potential application in the ecology, and thermal engines, optimization of solid-liquid extraction of high value products of pharmacy from plant biomass, and modelling of important for the industry processes.

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	16	

interest, complete and / or summarize previous research	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 scientific and scientifically-applicable contributions of the candidate are expressed by acquiring of new knowledge in the field of the chemical engineering, which can be summarized as follows: ➢ New methods for storage of hydrogen are developed and tested with a potential application in automotive industry. The parameters of hydrogen storage are studied at conditions of pure compression and through physical adsorption on adsorbents, while the advantages of adsorptive storage at different operating conditions are established. ➢ An innovative technology for implanting of metal particles of Ni, Ni-La, and Ni+MM (mixed metals) in the structure of active carbon AC35 has been developed. Modified adsorbents for hydrogen storage by original matching of physical adsorption and chemical sorption with formation of metal hydrides are obtained. A higher efficiency of the implanted sorbents during hydrogen storage at normal conditions in comparison with the unmodified ones is determined. ➢ The adsorption equilibrium of super critical gases on micro-porous adsorbents at high pressure has been investigated. A new adsorption isotherm has been proposed. It describes the adsorption equilibrium in a wide range of pressures varying between 0 and 650 MPa. The application of the isotherm has been experimentally proved by modelling the adsorption of H_2, and CH_4 and C_2H_4 on different types of active carbon and zeolites. A new triparametric model for

sufficiently accurate describing the isotherms of adsorption equilibrium is proposed.

- A new procedure for quantitative determination of the main morphological characteristics of porous materials, based on the software processing of results from SEM analyses, is created. It reveals possibilities to define the surface area, size, and volume of pores and other indicators of the adsorbents without requiring results from other instrumental methods for morphological investigations, which is a substantial contribution in the analytical practice.

- A mathematical model for simulation, description, and control of the technological parameters of extraction processes for deriving biological active substances from plant resources is developed. The applicability of the model has been verified by kinetic studies during extraction of total phenols, flavonoids, rutin and tannins from plant materials.

- Mathematical models and software for simulation of technological objects with capabilities for selection of hardware configuration, optimal parameters of the processes, and their efficiency have been developed. A hybrid scheme of dehydration of acetic acid (liquid-liquid extraction, and rectification) and combining of the esterification with reactive distillation during obtaining of ethyl acetate has been proposed, which is an innovation in these technologies with a scientific, and applied contribution

- The monograph “Contemporary trends in distillation processes” is a scientific work in which Dr. Chilev presents the principles, design, and application of these processes in industry. In the book, the author summarizes the results of his investigations in modelling of distillation units and in this way he adds and enriches the knowledge in the field of chemical engineering.

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	**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.

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	**78**
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
In the competition the candidate presents himself with production characterizing him as a researcher with a high scientific qualification in the field of mathematical modelling of mass transfer processes in the chemical engineering. The pedagogical activity of the chief assistant Chilev is characterised with competency, and motivation to work with undergraduate and graduate students. He is an author of a textbook in his specialty. He has been an invited lector abroad and an active participant in the European educational programmes. The scientific volume, and qualitative indicators, scientific and teaching activity of the candidate completely meet the requirements of the law for the academic staff development, and the regulations of its application in Republic of Bulgaria, and in the University of Chemical Technology and Metallurgy for the academic position “associate professor”. The findings made above give me the reason to convincingly recommend the Faculty Council at Faculty of Chemical and System Engineering to elect the chief assistant Chavdar Petrov Chilev for the academic position “associate professor” at the professional direction 5.10 Chemical Technologies for the needs of the Department of Chemical Engineering at the University of Chemical Technology and Metallurgy.

	The report was written by:	
27.11.2020	**Assoc.Prof. Dr Kiril Stanulov**	