

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	Assistant professor	PhD 5.13. General engineering	Ekaterina	Stoyanova	Serafimova	University of Chemical Technology and Metallurgy, Sofia
№	academic position	scientific degree	name	middle name	last name	workplace

Scientific area:

5	Technical sciences
code	name

Professional area:

5.13	General engineering
code	name

Scientific specialty:

„Systems and devices for environmental protection“(02.22.05)
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The competition has been announced:

27	02.04.2021	„Engineering ecology“	„Chemical and systems engineering“
in SG issue	date	for the needs of the Department	Faculty

The report was written by:

Associate Professor	PhD	Nadia	Lubomirova	Petrova	Institute of Mineralogy and Crystallography, BAS
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academic position	scientific degree	name	middle name	last name	workplace
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1. Report for the candidate:

Assistant Professor	PhD	Ekaterina	Stoyanova	Serafimova
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"

<p>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.</p> <p>Dr. Ekaterina Serafimova presents a total of 42 publications in response to the requirements of the occupancy of the academic position "Associate Professor". 10 publications of them are referenced and indexed in world-famous databases (SCOPUS, Web of Science) and 8 of them have IF. With these publication activities the candidate exceeds twice the required points in the group of indicators "B", <i>indicator 4</i>. The remaining 32 publications cover the requirements in the group of indicators "Г", as 1 work is referenced and indexed in world-famous databases (<i>indicator 7</i>) while the remaining 31 are not (<i>indicator 8</i>). The total number of points from all publications presented in the competition is 451.54. The overall publication citation of the candidate was evaluated with H-index 4 (SCOPUS), evidence of significance and good response to the achieved results. For the purposes of the competition (<i>Indicators 12 - 14</i>) the candidate has presented the citations of 2 publications (31 citations, 286 points) and 1 review (10 points), which exceeds several times the required 50 points. The textbook on "Ecology and Sustainable Development", intended to train students studying ecology and environmental protection (<i>Indicator 22</i>, 40 points) with a single author E. Serafimova is impressive with the content and manner of design. In summary, I would like to note that the total number of points for participation in the competition is twice the required number of points.</p> <p>In addition, the candidate applies her participations in conferences and scientific forums (over 50), the majority of which are international or with international participation, as well as her participation in 2 European projects and research projects funded by Bulgarian sources - 1 with NSF and 9 with NIS / UCTM (6 as a leader and 3 as a participant). Her extensive expertise in environmental, health, risk assessment, laboratory management, calibration techniques, etc. is also impressive (supported by BGS standards and qualification courses).</p>
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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"

<p>The evaluation of the relevance of the research must be substantiated.</p> <p>The sustainable agriculture is based on organic and ecological farming - this is a production system that limits the use of fertilizers, pesticides and growth regulators. The chicken litter is used as organic fertilizer, but its excessive use can lead to serious environmental problems. These prerequisites have substantiated the research of Dr. Serafimova in a scientific team for processing manure from poultry farms in several areas using an innovative approach:</p> <ul style="list-style-type: none">- Mixing chicken litter with industrial waste - such as wood ash and nitric acid treatment facilitates (i) the soil's retention of moisture; (ii) the rapid elimination of pathogens; (iii) the course of phase transformations in which the insoluble forms of P and Ca are transformed into digestible forms for plants, and (iv) the course of mineralization processes.- The conversion of poultry manure into biological charcoal - leads to a reduction in weight, volume and its odor. When such biological charcoal is applied to the soil, it enters into many biophysical interactions and processes, leading to changes in its characteristics. Biological coal is obtained by pyrolysis, as the energy from the process is also utilized. This process is associated with the release of relatively low emission levels.
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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 set research goals are realistic and have been realized in the works of the candidate with both scientific and applied orientation. The most important from my point of view are:</p> <ul style="list-style-type: none"> -Creation of new soil improvers - mixtures of waste from poultry farms, the paper industry through an innovative approach to treatment with nitric or sulfuric acid. To achieve this goal, studies of the chemical composition, phase transformations, morphological features and thermal characteristics were performed using ICP analysis, PXRD, IR spectroscopy and DTA (DSC) -TG analysis. The experimental results show that the used set of methods is very suitable for monitoring the ongoing processes of mineralization, phase transformations and elimination of pathogenic elements; -Creation of soil improvers by mixing sewage sludge with biomass ash for recovery of soils from the mining industry. The performed analyzes identify these mixtures as suitable soil improvers for restoration of disturbed terrains from the copper production; - Utilization of waste materials (lime sludge and ceramic materials) in construction - creation of new composite materials with study of their mechanics, strength characteristics and heat resistance; - Assessment of the health risk for the people at exposure to different types of pollution in residential buildings - still poorly considered problem in Bulgaria.

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.
<p><u>Scientific contributions:</u></p> <ol style="list-style-type: none"> 1. A new approach has been developed for the production of biochar by mixing different types of waste and acid treatment, as this product is on the one hand a soil improver and on the other an energy resource arising from the pyrolysis process and associated with relatively low emissions; 2. An elimination of pathogens, a transition of the organic component to organic (mineralization) as well as a reduction of the time for maturation of manure from poultry farms has been achieved through the innovative approach of acid treatment of mixtures chicken litter with biomass ashes;

3. The properties of different wastes from poultry farms, paper industry, sewage sludge, lime sludge and vegetable waste have been investigated. Based on the assessment of the chemical composition, phase transformations, structure and thermal characteristics of waste mixtures, new soil improvers are proposed.

Applied contributions:

1. Some results have been obtained to limit the use of conventional mineral fertilizers and to replace them with bio-enhancers, composts and bio char, which: (i) improve the soil's moisture retention characteristics; (ii) restore and increase soil carbon content; (iii) improve the nutrient balance in soils and soil structure;

2. Creating efficient technologies for carbonization of biomass for decentralized energy production for overcoming the effects of climate change in the context of European practices.

3. Some of the methods for processing manure from poultry farms have found practical application in a poultry farm in Kyustendil.

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.

D-r. Serafimova is the first author in over 60% of the works, an evidence for her leading role in these publications. A number of characteristic methods have been used to characterize the source and obtained biomaterials, which suggests the participation of research teams, as a significant part of the DTA-TG experiments and the applicability of thermal methods in research are the work of the candidate. It would be good for the candidate to emphasize her specific contributions in the collective works

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
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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.
The candidate in the competition offers a list of 12 lecture courses trained during the last three academic years; the total number of school programs developed by her is 14; the number of defending graduates under her leadership in the period 2010-2021 is 22, and the diploma theses she reviewed by her are 26. These data are evidence of perfect pedagogical activity, professional experience and approach in working with students

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	X 78 ps.
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
<p>It is indisputable for me, that Dr. Ekaterina Serafimova is a productive researcher with established qualities and a promising career. Analyzing the scientific achievements of the candidate, the relevance and prospects of the topics in her research, her active participation in research projects, expert and teaching activities, her personal qualities and skills, I consider that they fully meet the requirements of the Academic Staff Development Act. in the Republic of Bulgaria (DASRB), the Regulations for the implementation of the DASRB, and I strongly recommend for the needs of the Department of Engineering Ecology at the Faculty of Chemical and Systems Engineering to be awarded to</p> <p>Dr. Ekaterina Stoyanova -Serafimova the academic position "Associate Professor" in professional field 5.13 "General Engineering" in technical sciences, scientific specialty "Systems and devices for environmental protection"</p>

30.07.2021	The report was written by:	
date		signature