

REPORT

by Assoc. Prof., Natalia Toncheva-Moncheva, PhD – Institute of Polymers of the Bulgarian Academy of Sciences (IP-BAS)

member of the Academic Jury set to render a decision on the competition for filling the academic position of an Associate Professor in the Professional Field 4.2. Chemical Sciences, according to the Classifier of the Areas of Higher Education and the Professional Fields (Scientific Specialty “Polymers and Polymer Materials”) for the needs of direction “Polymers for alternative energy and environment protection”, announced in State Gazette issue 102/23.12.2022

This Report is prepared in response to Order № RD-09-28/21.02.2023, issued by the Director of the Institute of Polymers, Bulgarian Academy of Sciences, following the decision made by the Academic Jury that was held on 02.03.2023.

This Report is in compliance with *Act on Development of Academic Staff in the Republic of Bulgaria (ADASRB), the Rules for applying ADASRB, and the Rules for development of academic staff set at the Bulgarian Academy of Sciences (BAS) and the Institute of Polymers - BAS.*

1. Assessment of the scientific and research accomplishments of the candidate

In the announced competition Assist. Prof. Dr. Ivelina Tsankova Tsacheva, participate with **20 scientific papers** in co-authorship (19 publications and 1 book chapter). They were published outside the dissertation for the acquisition of the PhD degree, therefore they are accepted for review and are taken into account in the final evaluation. Six of them are in publications falling in the Q1 quartile, two in the Q2 quartile, six in the Q3 quartile, five in the Q4 quartile, and one book chapter published by Elsevier. Distributed by categories of indicators as follows 5 publications participating in the competition as an equivalent number of articles for habilitation work (group of indicators C.4) and 15 works participating in the competition under group of indicators D.

Group of indicators C: The included 5 scientific publications for indicator C.4., presented as an equivalent number of publications as habilitation thesis are referenced and indexed in world-famous databases with scientific information (Web of Science and Scopus), three of them are in quartile Q1, one in quartile Q2, one in quartile Q4. They bring the candidate of 107 points, which exceeds the required minimum 100 points of ADASRB and the regulations of IP-BAS.

Group of indicators D: In this group of indicators, 15 scientific works are presented (14 publications and 1 book chapter). Three of them are in quartile Q1, one in quartile Q2, six in quartile Q3, four in quartile Q4, and one published book chapter. Publication №11 should be classified as quartile Q3, instead of Q4 as was indicated by the candidate, as a result the points for this publication increase from 12 to 15. Thus, the scientific publications presented in the indicator D give a total of 248 points instead of those of 245 declared by the candidate, which exceeds the required minimum of 220 points of ADASRB and the regulations of IP-BAS.

Group of indicators E: In the competition, Dr. Tsacheva applied with 192 citations, which correspond to 384 points, thus she exceeds more than 6 times the required minimum of 60 points of ADASRB and the regulations of IP-BAS.

Group of indicators A: Assist. Prof. Dr. Tsacheva presented a diploma for acquisition of PhD degree with doctoral thesis entitled "Polymer radiation protection complexes: design, characterization and

effectiveness", which earned her 50 points for this indicator.

The summary analysis of the materials presented for participation in the competition shows that the total number of points from all group indicators give 789 points (Table 1), with which the candidate Dr. Ivelina Tsacheva fully cover and moreover significantly exceeds both the national minimum requirements (400 points) and those of the Institute of Polymers - BAS (430 points) for acquiring the academic position of an Associate professor.

Table 1. The summarized group of indicators of the candidate Assist. Prof. Dr. Tsacheva for acquiring the academic position of an Associate professor.

Group of indicators	Points by indicators	
	Minimal requirements by groups of indicators	Points declared by the candidate
A	50	50
B	-	-
C	100	107
D	220	248
E	60	384
F	-	
Total:	430	789

The scientific research of Dr. Ivelina Tsacheva are focused in the following main areas: 1) Development and improvement of the synthetic methods for obtaining of novel low molecular weight aminophosphonates and poly(aminophosphonates); 2) Preparation of new biodegradable phosphoester polymer-drug conjugates with enhanced biological activity; 3) Obtaining of nano carriers for controlled release of biologically active substances on the base surface modification of mesoporous particles with polymer complexes;

The main scientific contributions of Dr. Ivelina Tsacheva can be summarized as follows:

- Different experimental synthetic approaches, including microwave synthesis, have been developed for the preparation of new biologically active low molecular weight aminophosphonates. The diversity of low molecular weight aminophosphonates with potential antitumor activity have been synthesized and fully characterized.

- Different experimental synthetic procedure approaches, including microwave synthesis, have been developed to obtain a new type of polymer carriers based on poly(oxyethylene aminophosphonate). The latter has improved physicochemical properties, with potential application as DNA carriers, as well as for the development of active antineoplastic agents for chemotherapy of malignant diseases of the breast and liver.

- A synthetic methodology has been developed for obtaining new anthracene and furan-containing aminophosphonates as potential cytotoxic agents.

- Poly(oxyethylene aminophosphonates) based on biodegradable polyphosphoester and synthesized Schiff basec N,N-dimethyl-N'-furfurylidene-1,3-diaminopropane and N-(4-dimethylaminobenzylidene)-p-toluidine were obtained. Both polyphosphoesters were found to act as

prodrugs under physiological conditions.

- Surface modification of pre-loaded mesoporous particles with quercetin or curcumin with polyelectrolyte complexes (by successive deposition (layer-by-layer technique) of κ -carrageenan/chitosan/ κ -carrageenan) was successfully achieved.

The research activity and scientific contributions of Dr. Ivelina Tsacheva are in a modern and up-to-date scientific field related to the development of new synthetic methods for obtaining biologically active drug carriers. They have potential application in the therapy of various human pathologies and solving basic problems in medicine, such as toxic effects of drugs and time-interval of drug action.

The scientific activity of Dr. Ivelina Tsacheva is supported and realized within the framework of a total of 10 scientific projects. Three of them are financed by the "The Bulgarian National Science Fund" and one on the bilateral inter-academic cooperation of the BAS as well as Inframat project and UNION-National Center for New Materials. The candidate participates in a project to build a Center of Competence "Sustainable utilization of bio-resources and waste from medicinal and aromatic plants for innovative bioactive products", financed under OP SESG, as well as a project "Student practices" - financed under the Operational Program "Science and education for smart growth, through the European Social Fund of the European Union. Dr. Tsacheva received a DAAD scholarship for university teachers and scientists, she was also a mentor for students under the "Student Practices" project.

2. Opinions, notes and recommendations

I have no remarks and comments on the publications and documents submitted for the current competition. Since I know Dr. Ivelina Tsacheva beforehand I would like expressing my positive opinion about her scientific research. Also, her qualities as a scientist. I am convinced of her significant contribution to the presented scientific publications as well as the potential and future development of Dr. Tsacheva in the presented scientific fields of interest. However, I would recommend Dr. Tsacheva to be more active in her future contributions, for example to takes the lead in the manuscripts as corresponding author or to take a role of the first author.

3. Conclusion

Based on familiarization with the documents and materials presented by Dr. Ivelina Tsacheva and evaluation of her scientific production and the scientific and applied contributions contained therein, **I express a positive opinion** and According to Art. 26(3) of the ADASRB, I recommend the Academic jury to render **a positive decision** on Dr. Ivelina Tsacheva for the position of an Associate Professor at the Institute of Polymers, Bulgarian Academy of Sciences in professional direction 4.2. Chemical Sciences (Polymers and Polymeric Materials).

Date: 20.04.2023

Report prepared by:

/Assoc. Prof., PhD Natalia Toncheva-Moncheva/