

# REPORT

by

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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")

This Report is prepared in response to Order № № ПД-09-28 от 21.02.2023 г. 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.

The Report is in compliance with *Development of Academic Staff in the Republic of Bulgaria Act (DASRB)*, *the Rules for the Application of the Development of Academic Staff in the Republic of Bulgaria Act*, *the Rules of BAS* and with the *Rules set at the Institute of Polymers, Bulgarian Academy of Sciences, for applying the Act aforementioned*.

The competition for filling the academic position of an Associate Professor in the Professional Field 4.2. Chemical Sciences (Scientific Specialty "Polymers and Polymer Materials") has been declared in State Gazette no. 102 on 23.12. 2022. It is for the needs of the department "Polymers for alternative energy and environmental protection" - Institute of Polymers - BAS.

Only one candidate participated in the competition – eng. Ivelina Tsankova Tsacheva, assistant professor, Ph.D., currently chief assistant in the same scientific direction.

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

The documents presented by Dr. Ivelina Tsankova Tsacheva, meet the requirements of Art. 24 (1) and (2) of the DASRB, Art. 53 (1) of the Rules for the Application of the Act and Art. 2 item 4.3. of the Rules of BAS and Art. 70 of the Rules of IP-BAS

Dr. Ivelina Tsacheva has a total of 29 publications (28 articles and 1 book chapter), 2 of which submitted in fulfillment of the criteria for the higher education and academic degree "Doctor of Philosophy". In the current competition for filling the academic position of an Associate Professor, she participated with 19 publications in journals with an impact factor that are referenced and indexed in world-renowned databases of scientific information (Web of Science & Scopus) and one book chapter, published by Elsevier. There are also 2 publications in journals with no impact factor and 5 full-text publications, in edited volumes, from national scientific conferences with international participation. Publications that are referenced and indexed in world-renowned databases of scientific information, falling into Quartiles from Q1 to Q4 according to the grouping of scientific journals. Six of them are in Q1, two in Q2, five in Q3, six in Q4. The requirement that 6 of the articles have been published in the last 5 years has been met.

The presented publications are fully sufficient to meet the criteria for holding the academic position "Associate Professor" at the Institute of Polymers - BAS.

In *indicator B4* of the Terms and Conditions for holding the academic position of Associate Professor: Habilitation work or equivalent of scientific publications in journals that are referenced and indexed in Web of Science and Scopus, 5 publications are included, of which in Q1 - 3, in Q2 - 1 and in Q4 - 1 publications, giving a total of 107 points.

In *indicator G7 and G8*: Additional publications - includes 14 publications as following: in Q1 - 3, in Q2 - 1, in Q3 - 5, in Q4 -5 publications and a chapter of a book published by Elsevier, with a total of 245 points. All works are in the field of the current competition and have been published in specialized international journals.

Most of the scientific results are published in very high impact factor journals: *Eur. J. Med. Chem., Eur. J. Pharm. Sci., Microporous Mesoporous Mater.* (quartile Q1); *J. Drug. Deliv. Sci. Technol.* (quartile Q2). This is a direct proof of the relevance of the scientific subject and the significance of the results obtained by the research of Assist. Prof. Ivelina Tsacheva, Ph.D. Eng.

In *indicator D.11*, the points are 384 (more than the required 60 points) obtained from the total number of 192 citations noticed at the moment.

Ch. Assist. Prof. Ivelina Tsacheva participated in the development of 10 scientific projects and was a mentor in two "Student practice" projects financed under the Operational Program.

She has participated in 36 international and national scientific forums, with 49 oral presentations and posters with her participation, 18 of which were presented personally by the candidate at 8 international and 10 national scientific forums.

Dr. Ivelina Tsacheva's scientific research included in *indicator B.4* is mainly in the field of synthesis and characterization of new anthracene and furan-containing aminophosphonates and poly(aminophosphonates), with the aim of creating new biodegradable phosphoester polymer-drug conjugates with their own biological activity.

➤ The candidate's scientific and applied contributions are the following:

- Effective synthetic approaches for the synthesis of new biologically active aminophosphonates have been developed, and new low-molecular aminophosphonates with potential applications, such as antitumor agents, have been obtained and characterized.

- An efficient synthetic method for obtaining a new biologically active Schiff base and three new  $\alpha$ -aminophosphonic acid diesters bearing an anthracene moiety was developed.

- For the first time, microwave synthesis was applied to obtain the Schiff base 9-anthrylidene-furfurylamine and the derivative aminophosphonate N-methyl(dimethoxyphosphonyl)-1-(9-anthryl)furfurylamine.

- The advantages of microwave synthesis as an alternative to the classical method have been established.

- Sustainable synthetic procedures have been developed to obtain a new type of polymer carriers with improved properties and poly(oxyethylene aminophosphonate)s have been synthesized and characterized as new biologically active drug carriers.

- The in vitro antitumor activity of the newly synthesized low- and high-molecular aminophosphonates on various cancer cell lines was investigated and their potential as anticancer agents was shown. Their selectivity and lower toxicity for healthy cells has been established.

- The obtained results have shown that the simultaneous presence of an anthracene part, a furan ring and an aminophosphonate group, which are three pharmacophoric fragments in the same molecule, is essential for the higher antitumor activity.

Part of the publications in group G.7. are thematically related to the publications in group B.4.

➤ Scientific contributions of works in indicator G.7 in brief are:

- Development of synthetic methods for obtaining new anthracene and furan-containing aminophosphonates, as well as new anthracene-containing bisaminophosphonates and phosphorus-containing polymeric carriers of biologically active substances. All obtained compounds were characterized by modern spectral methods.

- Mesoporous particles preloaded with quercetin or curcumin suitable for their controlled delivery have been successfully modified.

- All accumulated knowledge and scientific experience from the development of new phosphorus-containing polymeric materials is summarized in a chapter of a book, of which the candidate is a member of the author's collective.

## 2. Opinions, notes and recommendations (optional)

I have known Dr. Ivelina Tsacheva since she was a PhD student and I would like to express my conviction in her qualities and my positive opinion of her scientific research. I have no notes or recommendations on the applicant's documents.

## Conclusion

According to Art. 26(3) of the DASRB, on the grounds of the documentation presented by the candidate, on his publications reviewed and the above assessment, I recommend the Academic Jury to render a **positive decision** on Ch. Assis. Prof. Ivelina Tsankova Tsacheva, Ph.D. filling the position of an Associate Professor in 4.2. Chemical Sciences (Polymers and Polymer Materials), at the Institute of Polymers, Bulgarian Academy of Sciences.

**Date: 19. 04. 2023**

**Report prepared by: prof. Dr. E. Naydenova  
Member of the Academic Jury**