

# REPORT

by

Prof. Ivaylo Vladimirov Dimitrov, PhD  
Institute of Polymers, Bulgarian Academy of Sciences

member of the Scientific 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 (Organic Photochemistry) for the needs of the  
Faculty of Chemistry and Pharmacy (FCP) of the Sofia University (SU) „St. Kliment Ohridski”,  
announced in the State Gazette, issue. 103 from 12.12.2023

This Report is prepared in response to Order № ПД 38--14/10.01.2024, issued by the Rector of SU „St. Kliment Ohridski”, following the decision made by the Scientific Jury on a meeting held on 21.02.2024. The Report is in compliance with the Act for the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations on the Implementation of the Development of Academic Staff in the Republic of Bulgaria Act (RIDASRBA) and the Rules on the Conditions and Procedure for Acquiring Science Degrees and Holding Academic Positions (RCPASDHAP) in Sofia University “St. Kliment Ohridski”.

## **1. Biographical information about the candidate.**

The only candidate in the competition is Chief Assistant Prof. Dr. Stanislava Borisova Yordanova-Tomova. Dr. Yordanova completed her higher education at the Faculty of Chemistry of Sofia University „St. Kliment Ohridski“ and graduated in 2011 with a master's degree in chemistry. In the period 2011-2014, she was a full-time PhD student at the Department of Organic Chemistry of the same university, defending a thesis in 2014 on the topic "A light driven molecular devices for rapid environmental monitoring" under the scientific supervision of Prof. Ivan Petkov, DSc and Prof. Ivo Grabchev, DSc. Since 2014, Dr. Yordanova has been employed at the Department of "Organic Chemistry and Pharmacognosy" at the Faculty of Chemistry and Pharmacy of Sofia University “St. Kliment Ohridski”, successively occupying the academic positions “Assistant Professor” and “Chief Assistant Professor”. Dr. Yordanova is the winner of the award named after Academician Ivan Yuhnovski in the National competition "Outstanding Young Scientist in the Field of Organic Chemistry" for 2017.

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

Dr. Stanislava Yordanova-Tomova participates in the competition with 19 scientific publications, which are different from those presented for obtaining the educational and scientific degree "Doctor". All of them are assigned to a corresponding quartile (Q1-Q4) according to the metrics of Web of Science or Scopus.

The requirements for *indicator A* of the Minimum points required by a group of indicators for holding the academic position of an "Associate Professor" for the field 4.2. Chemical Sciences are fulfilled, as the candidate holds the educational and scientific degree "Doctor" since 2014.

Concerning the *group of indicators C* Dr. Yordanova has presented 6 publications. Thus, the total score of 117 points exceeds the minimum required 100 points. Two of the publications are in journals falling within quartile Q1 (*Journal of Photochemistry and Photobiology A: Chemistry* and *Dyes and Pigments*). Two other publications are in journals falling in Q2 (*International Journal of Polymer Analysis and Characterization* and *Inorganica Chimica Acta*). Two of publications in the *Journal of Molecular Structure* (Q3) and *Bulgarian Chemical Communications* (Q4) are also presented.

Dr. Yordanova has presented 13 scientific publications for participation in the competition that are relevant to *the group of indicators D*. They are sorted according to the quartile of journals in the corresponding year of publication as follows: 2 publications in Q1, 3 publications in Q2 and 8 – in journals falling in Q3. Thus, the total score for the *group of indicators D* is 230 with a minimum required 220 points.

The *indicator E* of the minimum requirements for the candidate's research activities reflects the citations of her publications in scientific journals, referred and indexed in the world-renowned databases with scientific information Web of Science and/or Scopus. The citations list presented by Dr. Yordanova for the period after the acquisition of "Doctor's" degree to the time of submission of the documents reveals a total number of 109 citations (without self-citations by all co-authors) in scientific journals, referred and indexed in Scopus. Thus, the score for *indicator E* is 218 – significantly exceeding the minimum required 70 points.

Concerning the *group of indicators G* which includes additional requirements of the Faculty of Chemistry and Pharmacy for acquiring scientific degrees and holding academic positions at Sofia University "St. Kl. Ohridski" for the professional field 4.2 "Chemical Sciences" Dr. Yordanova has presented one research project in which she was the leader, thus scoring 10 points, although her CV contains a list of 5 more projects (ongoing and completed), in which she is a participant. The candidate's *h*-index is 7 (after excluding all self-citations), which corresponds to 70 points. Dr. Yordanova has been the supervisor of 6 graduate theses, but has presented points for the supervision of just two defended graduate theses. The total score for *group of indicators G* is 100 (with the minimum required 70 points).

From the data provided, it is clear that the candidate meets and even exceeds the minimum national requirements, as well as the additional recommended criteria for holding the academic position of an "Associate Professor" at Sofia University "St. Kl. Ohridski" for professional field 4.2 "Chemical Sciences" as her total score by groups of indicators is 715 with a minimum required 510 points.

The candidate's scientific contributions cover the preparation and characterization by spectroscopic and biological methods of novel fluorescent organic compounds and surface-modified dendrimers, as well as their metal complexes. Dr. Yordanova's interest in these compounds is also triggered by their potential applications in biomedicine and as sensors for rapid detection of metal ions and changes in the environmental pH.

- ***Contributions to the evaluation of the photophysical properties of functional organic compounds and surface-modified dendrimers in solvents of different polarity.*** Various, novel 1,8-naphthalimide derivatives were obtained and characterized. It was found that their photophysical characteristics strongly depend on the polarity of the solvent used. Additionally, novel, functional compound exhibiting a highly pronounced positive solvatochromism in solvents of different polarity was obtained by direct arylation of the amino groups of cyclam with 4-chloro-7-nitrobenzofurazan. The fluorescence quantum yield was also found to be strongly dependent on the solvent polarity. In another series of studies, the primary amine groups located on the surface of poly(propylene imine) (PPI) dendrimers of various generations were used for the surface-modification with 1,8-naphthalimide derivatives or 4-nitrobenzofurazan functionalities. The photophysical properties of the obtained multifunctional dendrimers were investigated depending on the polarity of the solvents used.
- ***Contributions to the spectral characterization of the obtained multifunctional organic compounds and dendrimers towards their potential application as sensors for metal ions and for environmental pH changes.*** Various spectroscopic methods (NMR, infrared, fluorescence, UV and EPR spectroscopy) were used to study the complex formation of the obtained multifunctional low-molecular-weight compounds and dendrimers with different metal ions. It was established which of them could be used as sensors for the selective detection of certain metal ions. It was also shown that the fluorescence intensity of some of the compounds strongly depends on the pH of the medium.
- ***Contributions to the microbiological evaluations of the multifunctional compounds and their metal complexes.*** Dr. Yordanova's research in this area was performed in collaboration with colleagues who are experts in the field. Some of the evaluated systems show good antibacterial and antifungal activity and have a potential for future biomedical applications.

Unfortunately, in the presented by Dr. Yordanova reference for the contributions of the scientific works, not even an attempt was made to arrange the research results according to the contributions. Instead, articles' abstracts are presented in the order of their appearance in the other references.

Dr. Yordanova's habilitation thesis is written on 25 pages and is dedicated to the synthesis and characterization of functional organic compounds and surface-modified poly(propylene imine) dendrimers containing chromophore segments. The influence of pH and complexation with various metal ions on the photophysical characteristics of the systems was evaluated in

order to establish their potential application as sensors. Results from the dendrimer systems' antimicrobial activity are also discussed. It would have been better if the thesis had a title and a bibliography in order to clearly distinguish the author's research from that of other researchers.

Despite the remarks made concerning the layout of the presented documents, I do believe that the results obtained so far from Dr. Yordanova's research activity are promising and provide good opportunities for further and in-depth research.

### **3. Teaching activity**

Dr. Yordanova supervises seminars and laboratory exercises for the specialties "Chemistry", "Ecochemistry" and "Pharmacy" at the Faculty of Chemistry and Pharmacy of Sofia University as well as for all specialties studying organic chemistry at the Faculty of Biology of Sofia University. She also supervises laboratory exercises in "Organic Chemistry, Part I and II" and in "Organic Photochemistry". The reference on Dr. Yordanova's academic workload shows an average of 390 hours of annual auditorium workload (461 hours of total workload).

### **4. Conclusion**

The materials presented in the competition and the evaluation of Chief Assistant Professor Dr. Stanislava Borisova Yordanova-Tomova's contributions to the scientific publications show that her scientific indicators meet and exceed the requirements for filling the academic position of an "Associate Professor" as defined in the Act for the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its implementation, as well as those, specified in the Rules on the Conditions and Procedure for Acquiring Science Degrees and Holding Academic Positions in Sofia University "St. Kliment Ohridski" and the specific criteria of the Faculty of Chemistry and Pharmacy. Therefore, I give my *positive assessment* and recommend the respected members of the Scientific Jury and the Faculty Council at the Faculty of Chemistry and Pharmacy at Sofia University to support the election of Chief Assistant Professor Dr. Stanislava Borisova Yordanova-Tomova for the academic position of an "Associate Professor" in the professional field 4.2. Chemical Sciences, scientific specialty Organic Photochemistry at the Department of Organic Chemistry and Pharmacognosy at Faculty of Chemistry and Pharmacy of Sofia University "St. Kl. Ohridski".

**Report prepared by:**

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/Prof. Ivaylo Dimitrov, PhD/