REVIEW

by Prof. Lyubomir Todorov Vlavev, PhD, currently retired

Re: Competition for the academic position of "ASSOCIATE PROFESSOR" in the field of higher education 4. "Natural Sciences, Mathematics, and Informatics," professional field 4.2 "Chemical Sciences," scientific specialty "Inorganic Chemistry," announced by BDU "Prof. Dr. Asen Zlatarov" in the State Gazette, issue 89 of 24.10.2025.

The only candidate for participation in the competition is Senior Assistant Professor Dencho Ivanov Mikhov from the Department of Chemistry at Prof. Dr. Asen Zlatarov University. The documents submitted by Senior Assistant Professor Dencho Ivanov Mikhov for participation in the competition show that the procedure for its disclosure and announcement was carried out in accordance with the requirements of the competition rules.

The documents submitted by Senior Assistant Professor Dencho Ivanov Mikhov for participation in the competition show that the procedure for its disclosure and announcement has been complied with and that they are in accordance with the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria and the Regulations for its implementation, as well as the Regulations on the conditions and procedure for acquiring scientific degrees and occupying academic positions at BDU "Prof. Dr. As. Zlatarov".

As no violations have been found, the procedure is ongoing and the competition is legitimate. All preliminary procedures and regulatory rules provided for in this procedure have been complied with.

Position of the reviewer: member of the scientific jury in the competition for the academic position of "ASSOCIATE PROFESSOR".

Basis for the review: Order No. RD 4 of 05.01.2026 of the Rector of BDU "Prof. Dr. Asen Zlatarov".

I have known the candidate personally since the 1990s, when he was appointed as an assistant in the Department of Inorganic Chemistry, and I am familiar with his scientific development up to the point when he left the University. I have no joint publications with him and am not in a conflict of interest.

I. Information and data on the Candidate's professional development.

Senior Assistant Professor Dencho Ivanov Mikhov graduated from the University of Chemical Technology and Metallurgy "Prof. Dr. As. Zlatarov" in Burgas, where in 1988 he obtained a degree in Chemical Engineering, specializing in Inorganic Chemical Technologies. From 1988 to 1998, he was an assistant, senior assistant, and chief assistant at the University of Chemical Technology and Metallurgy, respectively. University "Prof. Dr. As. Zlatarov" - Burgas. Since 2002, he has been the manager of Libra Scorp Publishing House in Burgas. Since 2023, he has been a senior assistant in the Chemistry Department at Prof. Dr. Asen Zlatarov Burgas State University. Since January 6, 2023, he has been a DOCTOR of

Inorganic Chemistry after defending his dissertation on "Experimental and Theoretical Study of Selenate Systems".

II. Assessment of the candidate's research activity

In my capacity as Reviewer, I have been provided with all documents on the list submitted by the Candidate in hard copy and electronic format.

A. List of publications by indicator B:

A.1. Habilitation thesis – monograph by sole author D. Mikhov, "Synthesis, Characteristics, and Application of Double Selenates," published by Libra Scorp, 2025 (200 pages). The monograph is very useful as it classifies and describes the production, structure, and properties of this exotic class of inorganic compounds, whose practical application is in the production of high-quality materials for the construction industry. The monograph is very useful as it classifies and describes the production, structure, and properties of this exotic class of inorganic compounds, whose practical application is yet to be expanded and evaluated. A significant amount of scientific literature on the subject is cited, and a number of diagrams, structures, and graphical dependencies are presented. It is the result of the Candidate's work in the field of selenium-containing compounds chemistry. However, the fact that the monograph is in Bulgarian limits its use by foreign authors.

B. List of publications by indicator G:

B.1. A monograph has been published, which is not presented as a main habilitation thesis, with D. Mikhov as the sole author and entitled "Quantum Chemical Modeling of Selenium-Containing Compounds," published by Libra Scorp, 2025 (172 pages). The results of quantum chemical modeling of selenium-containing compounds using appropriate computer programs owned by the candidate are presented here. The fact that the monograph is in Bulgarian also limits its use by foreign authors.

B.2. A book has been published in English, based on the defended dissertation for the award of the educational and scientific degree "Doctor" with sole author Mihov, D., "Experimental and Theoretical Studies of Selenate Systems," Libra Scorp Publishing House, 2024 (200 pp.). It includes all the results of his own research, published in specialized scientific journals abroad and in Bulgaria after anonymous review. Of course, the English language significantly expands the perimeter of users, which should be the goal of every scientific worker.

B.3. Scientific publications in editions that are referenced and indexed in world-renowned scientific information databases (Web of Science and Scopus).

C. Scientific publications declared in the competition.

A total of 9 works are presented here, of which ONLY TWO were published after the defense of the doctoral dissertation. They were published in J. Mol. Struct., quartile Q2 with an impact factor IF=4.7, which is a good value for chemical journals. The remaining 7 publications, co-authored with Assoc. Prof. T. Oikova from the same department, were published during the Candidate's first period of work at the University and are in journals from quartile Q1 – Q4, with an impact factor lower than 4. This raises the question of why the doctoral thesis was not defended, for which there are sufficient grounds. Only the candidate knows the answer to this question, but I regret that his scientific career has developed in this way.

Three other scientific publications included in the dissertation for the acquisition of the academic degree of Doctor have been published in journals with an impact factor, in which the candidate is listed as the first, second, or third co-author.

To date, the aforementioned publications have received a total of 53 citations from foreign authors. The highest number of citations were received by TWO works from 1991 and 1992, with 14 and 9 citations, respectively, while the latest scientific publications from 2025 and 2023, printed in J. Mol. Struct., have 5 and 4 citations, respectively.

For other scientific publications (in non-refereed peer-reviewed journals), the candidate provides bibliographic data for SIX works that have been published in the Yearbooks of the Higher Institute of Chemical Technology, respectively BDU "Prof. Dr. Asen Zlatarov," All scientific publications are in the field of inorganic chemistry, which is the subject of this competition.

D. List of publications under indicator E concerning the publication of teaching aids for students and pupils.

Here is a textbook by a team of authors: R. Yankova, Zheleva, S., Mikhov, D., entitled "Guide to Laboratory Classes in Chemistry for Students Majoring in Medicine," published by Libra Scorp, 2025 (112 pages). It is assumed that the textbook will be used by medical students studying at the BDU "Prof. Dr. Asen Zlatarov". It is assumed that the teaching aid will be used by medical students studying at the BSU "Prof. Dr. As. Zlatarov".

Three other textbooks are also presented as follows:

* Mikhov, D., Guide to Laboratory Classes in General Chemistry, published by Libra Scorp, 2025 (128 pages), ISBN 978-619-273-180-9

** Mikhov, D., Guide to Laboratory Classes in Inorganic Chemistry, published by Libra Scorp, 2025 (128 pages), ISBN 978-619-273-181-6

*** Mikhov, D., Stoichiometric Calculations, Libra Scorpio Publishing House, 2025 (136 pages), ISBN 978-619-273-182-3

In these THREE textbooks (all from 2025!), the candidate is the sole author. The publications have been reviewed by two reviewers each, but it is not clear WHO IS THE COMMISSIONER! For this reason, I classify them as "SAMIZDAT" and do not consider them as a contribution to the Competition. The reason for this is the fact that the Department of Chemistry did not commission the publication of such textbooks, their content was not discussed, and it is not clear who is financing their publication. When it comes to textbooks for a state higher education institution, THIS IS NOT HOW IT IS DONE!

III. Scientific and applied scientific contributions of the Candidate.

According to the Candidate's report on his scientific and applied scientific contributions, they relate to the following FIVE claims:

1. Experimental study of the solubility isotherms of triple water-salt systems of the M_2SeO_4-$MeSeO_4$-H_2O type.

2. Experimental determination of water activity at different concentrations of components in binary selenate solutions and calculation of osmotic coefficients and activity coefficients.

3. Thermodynamic modeling of equilibrium in ternary water-salt selenate systems.

* In relation to the first claim, at 25°C, the solubility isotherms of the three-component water-salt selenate systems were studied using the Hlopin method. Using the Schreinemakers method and thermogravimetric analysis, the composition of the double salts formed was determined. A list of TWO scientific publications in the renowned journal Crystal Research and Technology concerning these results is presented.

** In relation to the second claim, the activity of water for binary water-salt systems of some alkali and alkaline earth selenates was determined by the isopyestic method. This claim is supported by THREE scientific publications in refereed journals.

*** The third claim is supported by three scientific publications related to thermodynamic models that predict solution behavior and solid-liquid-gas equilibrium and can successfully replace costly experimental activities. The development of accurate and reliable models for natural systems is related to the use of Kenneth Pitzer's approach. The authors have developed and validated thermodynamic models for the behavior of solutions and solid-liquid equilibrium in SIX type 1-2 binary systems such as Li_2SeO_4-H_2O and others, with the determined crystallization fields showing very good agreement with the experimental ones.

**** Fourth, for the first time, double selenate systems were obtained as a combination of sodium selenate and another divalent metal selenate through co-crystallization from the corresponding three-component water-salt systems. Their main physicochemical parameters were determined using infrared spectrophotometry and thermal analysis methods. The results obtained are described in five scientific publications in renowned international journals.

***** Fifth, a predictive assessment was made of the possibility of using the synthesized double salts of selenic acid as ingredients in insecticides for plant protection and in medicine and pharmacotherapy as tumor growth inhibitors. TWO scientific publications report that the newly synthesized selenate salts based on iron and cobalt show very pronounced cytotoxicity on liver cancer cells.

In general, it can be said that the scientific results obtained enrich human knowledge in the field of chemistry of certain selenium compounds and the search for opportunities for their possible practical application.

IV. Documents for participation in scientific research projects and scientific forums.

A document has been submitted according to which the candidate in the competition was the leader of Project NIH No. 500/2024 on the topic: "Experimental and theoretical research on selenium-containing compounds," funded by the University's Scientific Research and Artistic Activity Fund. In addition, in the period 2021-2023, the Candidate participated as a member in the work on three other projects funded by the same Fund. He has also participated in TEN scientific forums in the country, some of which were international, but has NOT participated in any international forums abroad.

In addition to all of the above, the Candidate presents data in several tables showing that, for all indicators, the values of the criteria exceed the minimum required values for area 4. "Natural Sciences, Mathematics, and Informatics," professional field 4.2 "Chemical Sciences," scientific specialty "Inorganic Chemistry," at BDU "Prof. Dr. Asen Zlatarov," according to PPZRASRB.

V. Critical remarks, recommendations, and questions.

I have some recommendations and comments regarding the documents submitted by the Candidate for participation in the Habilitation Competition.

1. Some of the documents submitted by the Candidate lack his signature (Creative Autobiography, List of Scientific Publications, List of Curricula. List of Participation in Various Forums), which, far from making them unreliable, speaks of a certain haste in their preparation.

2. In order to assess the quality of the scientific output, it would be good if the Candidate had indicated the impact factor of the journals in which his scientific papers are published, so that the objective level of the journals can be seen. For the chemical sciences, an IF higher than 4.0 is considered good.

3. There is another scientometric parameter called the HIRSCH INDEX (H-index), which allows for a quick and excellent assessment of the significance of scientific publications and the level of a given author within the global scientific community.

4. There is also another criterion – the T-index or "τ1-index", which shows the number of scientific publications that received citations in the first year after their publication, the so-called "speed of international response". It shows how quickly a given work has been noticed, positively evaluated, and cited by the scientific community.

5. My question is, will the Candidate continue their scientific research work in the same direction in the coming years?

VI. CONCLUSION

Based on the materials submitted for the competition and their careful analysis, I believe that the candidate, Senior Assistant Professor Dr. Dencho Ivanov Mikhov, meets all the criteria for the academic position of "Associate Professor," as defined by the Law on the Development of Academic Staff in the Republic of Bulgaria and the Regulations for its implementation, as well as the Regulations on the conditions and procedures for acquiring scientific degrees and occupying academic positions at BDU "Prof. Dr. As. Zlatarov."

I propose that the esteemed members of the Scientific Jury vote in favor and propose to the Faculty Council of the Faculty of Natural Sciences at BDU "Prof. Dr. As. Zlatarov" to elect Chief Assistant Professor Dr. Dencho Ivanov Mikhov to the academic position of "Associate Professor" in the field of higher education 4. "Natural Sciences, Mathematics and Informatics", professional field 4.2 "Chemical Sciences", scientific specialty "Inorganic Chemistry", announced by BDU "Prof. Dr. Asen Zlatarov" in the State Gazette, issue 89 of 24.10.2025.

24.02.2026

Burgas

Member of the scientific jury

Prof. Lyubomir Todorov Vlaev, DSc