REVIEW STATEMENT

by Dr. Lenia-Nezaet de Brito Gonsalvesh

Associate Professor at Burgas State University "Prof. Dr. Asen Zlatarov",
Field of Higher Education: 4. Natural Sciences, Mathematics and Informatics
Professional Field 4.2 Chemical Sciences, Scientific Specialty Inorganic Chemistry

Regarding: a competition for the academic position of Associate Professor in the scientific specialty Inorganic Chemistry, Field of Higher Education 4. Natural Sciences, Mathematics and Informatics, Professional Field 4.2 Chemical Sciences, for the needs of the Faculty of Natural Sciences, Burgas State University "Prof. Dr. Asen Zlatarov", announced in the State Gazette, Issue No. 89 of 24.10.2025.

One candidate has applied for the competition – Senior Assist. Prof. Dr. Ing. Dencho Ivanov Mihov, lecturer at the Department of Chemistry, Faculty of Natural Sciences, Burgas State University "Prof. Dr. Asen Zlatarov".

1. General presentation of the procedure

The present review statement has been prepared on the basis of Order No. RD-4 of 05.01.2026 issued by the Rector of Burgas State University "Prof. Dr. Asen Zlatarov" (BSU), appointing the Scientific Jury for the present competition. According to the submitted documentation and the accompanying materials, the procedure for announcing and conducting the competition has been carried out in compliance with the provisions of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, as well as the Regulations for the Conditions and Procedures for the Acquisition of Scientific Degrees and the Occupation of Academic Positions at Burgas State University "Prof. Dr. Asen Zlatarov." Within the legally established deadline, a complete set of documents for participation in the competition was submitted by one candidate – Senior Assist. Prof. Dr. Ing. Dencho Ivanov Mihov, from the Department of Chemistry at Burgas State University "Prof. Dr. Asen Zlatarov". The documentations submitted by the candidate complies with Article 67(2) of the above-mentioned University Regulations and includes all required materials. No procedural violations or inconsistencies with the applicable regulatory framework were identified. The competition is therefore considered legitimate, and the procedure for its conduct has been carried out in full compliance with the relevant legal and institutional regulations.

2. Information on the professional and academic development of the candidate

Senior Assist. Prof. Dr. Ing. Dencho Mihov graduated from the Higher Institute of Chemical Technology "Prof. Dr. Asen Zlatarov" – Burgas in 1988, where he obtained the qualification Chemical Engineer. At the beginning of his professional career, he oriented himself toward academic and research activities in the field of inorganic chemistry. During the period 1988–1998, he successively held the academic positions of Assist. Prof. and Senior Assist. Prof. at University "Prof. Dr. Asen Zlatarov" – Burgas. During this time, he conducted seminars and laboratory classes in Inorganic Chemistry and Stoichiometric Calculations, actively participating in the educational process and developing substantial teaching experience. Between 1999 and 2001, he served as Manager of the Employment and Structural Development Company in Aytos, where he

gained significant organizational and managerial experience. Since 2002, he has been the Manager of the Libra Scorp Publishing House in Burgas. In this capacity, he organizes and manages the overall publishing activity, including the publication of scientific literature, textbooks, teaching materials, and monographs. He has extensive experience as both an artistic and technical editor, as well as in organizing public presentations of scientific and literary publications. During the period 2021–2023, he was a PhD student in Professional Field 4.2 Chemical Sciences, scientific specialty Inorganic Chemistry, and successfully defended a doctoral dissertation entitled "Experimental and Theoretical Studies of Selenate Systems," thereby obtaining the educational and scientific degree Doctor (PhD). Since 2023, he has held the academic position of Chief Assistant Professor at the Department of Chemistry at Burgas State University "Prof. Dr. Asen Zlatarov."

3. General characteristics of the candidate's research activity

The research activity of Senior Assist. Prof. Dr. Ing. Dencho Mihov is focused in the field of inorganic chemistry, and more specifically on the experimental and theoretical investigation of selenate systems. The thematic scope of his research is clearly defined and encompasses studies on phase equilibria, solubility, and thermodynamic characteristics of aqueous salt systems.

For the purposes of the present competition, Senior Assist. Prof. Dr. Dencho Mihov has submitted a total of 18 scientific publications, of which 12 are indexed in the international databases Scopus and Web of Science (SCOPUS ID: 6508010883 (h-index 8), ORCID https://orcid.org/0000-0003-4610-2072). Of the total number of publications, nine are presented for participation in the current competition for the academic position of Associate Professor, three publications were used for the doctoral dissertation, and the remaining publications are not included in the present competition. The nine publications declared in the competition are published in journals with an impact factor and are distributed by quartiles as follows: two publications in Q_1 journals, five publications in Q_2 journals, and one publication each in Q_3 and Q_4 journals. The candidate has participated both in collaborative scientific research and in independent publications, which allows the assessment of his contribution both within research teams and as an author with individual scientific contributions. Out of the total 18 scientific publications, 13 are co-authored, while five are single-author works. An analysis of the authorship positions in the co-authored publications shows that the candidate appears as first author in 15% of the cases, second author in 31%, third author in 39%, and fourth author in 15%. The publications submitted by the candidate have received a total of 53 citations by other authors. The largest number of citations has been obtained by two publications from 1991 and 1992, respectively: *Oykova, T., D. Mihov, P. Pavlova, Phase Interaction in the Systems Sodium Selenate – Copper Selenate – Water and Sodium Selenate – Zinc Selenate – Water at 25 °C, Crystal Research and Technology, 1991, 26(8), 1071–1075*; and *Oykova, T., D. Mihov, Study on the Phase Equilibrium in the Systems Sodium Selenate – Cadmium Selenate – Water and Sodium Selenate – Manganese Selenate – Water at 25 °C, Crystal Research and Technology, 1992, 27(5), 697–701*, which have received 14 and 9 citations, respectively. The candidate's publications during the last five years have received 13 citations.

In addition to the above-mentioned scientific publications, the candidate also presents several monographic works. The habilitation thesis is the monograph authored solely by D. Mihov, entitled "*Synthesis, Characteristics and Application of Double Selenates*," Libra Scorp Publishing House, 2025, ISBN 978-619-273-177-9. The monograph systematizes and analyzes both literature data and the author's own research results related to the preparation, structure, and properties of

double selenates, a specific class of inorganic compounds whose potential practical applications are still being actively investigated. The work is based on an extensive body of scientific literature. Another monograph is also presented, although it is not declared as the main habilitation work: "*Quantum-Chemical Modeling of Selenium-Containing Compounds*," D. Mihov, Libra Scorp Publishing House, 2025, ISBN 978-619-273-178-6. This work presents the results of quantum-chemical studies of selenium-containing compounds, carried out using specialized computational software and theoretical methods applied in the candidate's research. The candidate also presents a book in English based on his defended doctoral dissertation: Mihov, D., *Experimental and Theoretical Studies of Selenate Systems*, Libra Scorp Publishing House, 2024, ISBN 978-619-273-063-5.

The project activity of Senior Assist. Prof. Dr. Dencho Ivanov Mihov includes participation both as a project leader and as a member of research teams in four research projects funded by internal university research funds. The thematic focus of these projects is directly related to the main direction of his scientific work, namely the synthesis, structure, properties and thermodynamic modeling of selenium-containing compounds, as well as the study of related inorganic systems. The leadership of a research project demonstrates the candidate's ability to assume organizational and scientific responsibility, while participation in collaborative projects reflects his integration within a research environment and his capacity for teamwork. The candidate has presented his scientific results at national scientific forums as well as at conferences with international participation held in Bulgaria.

The scientific contributions of Senior Assist. Prof. Dr. Eng. Dencho Mihov are of both fundamental and applied character and are fully consistent with the professional field and the scientific specialty of the announced competition. They stem from systematic research in inorganic and physical chemistry, focusing on phase equilibria and thermodynamic behavior of aqueous selenate systems, the synthesis and characterization of double selenate compounds, and the development of thermodynamic and quantum-chemical models for describing their properties. The obtained results contribute both to the development of fundamental knowledge in the chemistry of selenates and to clarifying the possibilities for their practical application. I accept the scientific contributions presented in the author's report as original and correctly formulated. They can be summarized in the following main directions:

- New experimental data have been obtained on phase equilibria and solubility isotherms in ternary aqueous salt systems of the type M_2SeO_4 – $MeSeO_4$ – H_2O, involving alkali and divalent metal selenates, and the equilibrium crystallization fields have been determined over a wide concentration range.
- The water activity, osmotic coefficients, and activity coefficients in binary aqueous selenate systems have been experimentally determined, allowing a quantitative description of the thermodynamic behavior of multicomponent electrolyte solutions.
- The formation of new double selenate salts obtained through co-crystallization in the investigated ternary systems has been established, and their composition and main physicochemical characteristics have been determined.
- Thermodynamic models based on the Pitzer approach have been developed and applied to describe equilibrium in binary and ternary aqueous selenate systems, achieving good agreement between experimental results and theoretical calculations.

- A comprehensive structural and thermodynamic characterization of the synthesized double selenate salts has been carried out, including the determination of thermodynamic parameters (heat capacities, entropy, enthalpy, Gibbs energy) and molecular structures using quantum-chemical calculations within the framework of density functional theory (DFT).
- The potential of the synthesized compounds for practical applications has been demonstrated, including their possible optical properties and biological activity, with the conducted studies revealing a pronounced cytotoxic effect on tumor cells.

4. Teaching and educational activity

Senior Assist. Prof. Dr. Eng. Dencho Mihov carries out teaching activities at the Department of Chemistry, Faculty of Natural Sciences, Burgas State University "Prof. Dr. Asen Zlatarov." His teaching work is related to the training of students from various Bachelor's and Master's degree programmes, including Chemistry, Ecology and Environmental Protection, Chemical Engineering, Engineering Materials, Medical and Cosmetic Chemistry, and Medicine. The candidate participates in the educational process by delivering lectures (up to 30%) and laboratory exercises in fundamental chemical disciplines, including Inorganic Chemistry, General Chemistry, Stoichiometric Calculations, and others. The teaching activities are conducted in both full-time and part-time forms of study, and the annual teaching workload of Dr. Eng. Dencho Mihov meets the university's established annual teaching requirement of 400 academic hours, which demonstrates his active involvement in the educational process. Within the framework of his teaching activities, the candidate has also supervised graduate theses. Under his supervision, four diploma theses in the field of inorganic chemistry have been successfully defended. The candidate has also contributed to the development and updating of study programmes, in particular for the course "Stoichiometric Calculations" in the study programmes Chemistry and Medical and Cosmetic Chemistry, as well as to the methodological support of the teaching process. Senior Assist. Prof. Dr. Eng. Dencho Mihov is the author and co-author of several teaching manuals and laboratory exercise guides in General Chemistry and Inorganic Chemistry, as well as a teaching manual on Stoichiometric Calculations intended for students from various study programmes. It should be noted, however, that some of the laboratory exercises included in these materials represent established methodologies that have been used for many years in the teaching practice of the Department of Chemistry. These methodologies have been developed and implemented by lecturers within the department as part of the respective courses. In this context, their presentation in separate teaching manuals under the sole authorship of the candidate raises certain questions regarding the accuracy and the extent of the candidate's individual contribution to their development. It should also be noted that the presented teaching manuals were not previously discussed or reviewed at the department level, which generally represents an established academic practice when preparing and introducing teaching and methodological materials of this type.

5. Fulfilment of the requirements for the academic position of Associate Professor

The candidate's report on the fulfilment of the minimum national requirements, as well as the requirements set out in the Regulations for the Conditions and Procedures for the Acquisition of Scientific Degrees and the Occupation of Academic Positions at Burgas State University "Prof. Dr. Asen Zlatarov", for the academic position of Associate Professor in the professional field 4.2 Chemical Sciences, indicates that the achievements of Senior Assist. Prof. Dr. Eng. Dencho Mihov

meet the necessary criteria for occupying the academic position of Associate Professor in the respective professional field.

Group of indicators	Minimum national requirements	Minimum requirements of BSU	Candidate's score
A – Indicator 1	50	50	50
B – Indicator 2	-	-	-
C – Indicator 3 or 4	100	100	100
D – Sum of indicators 5–10	200	200	227
E – Sum of points for indicator 11	50	100	106
F – Sum of indicators 12–20	-	100	116

6. Conclusion

Based on the considerations presented above, I give my positive evaluation of the candidacy of Senior Assist. Prof. Dr. Eng. Dencho Mihov. I propose that the esteemed members of the Scientific Jury recommend to the Faculty Council of the Faculty of Natural Sciences at Burgas State University "Prof. Dr. Asen Zlatarov" that Senior Assist. Prof. Dr. Eng. Dencho Ivanov Mihov be awarded the academic position of Associate Professor in the Field of Higher Education 4. Natural Sciences, Mathematics and Informatics, Professional Field 4.2 Chemical Sciences (Inorganic Chemistry).

09.03.2026 г.

Member of the Scientific Jury:

(Assoc. Prof. Dr. Lenia Gonsalvesh)