OPINION

by Dr. Antoaneta Borissova Trendafilova, Professor at the Institute of Organic Chemistry with a Centre for Phytochemistry, Bulgarian Academy of Sciences,
member of the scientific jury in a competition for the academic position of "Associate Professor" in the professional field 4.2. "Chemical Sciences", scientific specialty "Organic Chemistry

This opinion has been prepared on the basis of Order No. RD-09-53/12.03.2026 issued by the Director of IOCCP–BAS, a resolution of the Scientific Council (Minutes No. 5/12.02.2026), and a decision of the Scientific Jury from a meeting held on 17.04.2026. It is in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for the Implementation of the LDASRB, the Regulations for the Implementation of the LDASRB of the Bulgarian Academy of Sciences, and the Regulations of IOCCP–BAS

1. General presentation of the procedure

In the competition for 'associate professor' at the Institute of Organic Chemistry with a Centre for Phytochemistry (IOCCP) - BAS, Dr. Ivalina Ognyanova Trendafilova, a chemist at the IOCCP - BAS, participated as the only admitted candidate. The set of materials presented by Dr. Ivalina Trendafilova on paper and electronic media is in accordance with the Regulations for the Development of the Academic Staff of the IOCCP and meets the criteria of the IOCCP-BAS for occupying the academic position of "associate professor". The following documents are attached: a report on compliance with the minimum requirements, a habilitation report on the scientific contributions, a list and copies of the scientific publications submitted for the competition (16 in total, corresponding to the scientific field of the competition), the abstract of the dissertation for the acquisition of the educational and scientific degree 'Doctor', as well as a list of identified citations. The submitted materials are well organized and clearly present the candidate's scientific activity and achievements to date. In addition to the mandatory documents, information has been provided regarding participation in research projects and conferences, as well as a list of certificates, awards, and certificates of specialized training.

2. General characteristics of the candidate's activities

To participate in this competition, Dr. Ivalina Trendafilova has submitted a report on compliance with the minimum requirements for holding the academic position of "associate professor" at IOCCP-BAS, as follows:

In group A - 50 points (required 50 points): Dissertation on the topic "Development of new modified mesoporous silicate nanocomposites for controlled delivery of medicinal substances" for obtaining the ONS "doctor" in the professional field: 4.2. Chemical Sciences, scientific specialty: Organic Chemistry at IOCCP-BAS.

By indicator 4 in group V - 115 points (required 100 points): A total of 5 publications are presented (3 in quartile Q1 and 2 in quartile Q2), published in journals, referenced and indexed in world-renowned databases (*Materials Science and Engineering C, Microporous and Mesoporous Materials, Nanomaterials, Materials Today Communications* and *Journal of Solid State Chemistry*), in four of which Dr. Ivalina Trendafilova is the first or corresponding author.

By indicators 7 and 8 in group G – 234 points (required 220 points): 11 publications (7-Q1, 1-Q2, 1-Q3 and 2-Q4) are presented in publications, referenced and indexed in world-renowned databases. Dr. Ivalina Trendafilova is the first or corresponding author in 3 of them.

By indicator 12 in group D – 396 points (required 70 points): The number of citations of the scientific publications (198) of Dr. Trendafilova, included in the competition for associate professor, which are available in the scientific information database Scopus and/or Web of Science, is impressive.

The candidate's h-index is 13 according to the information in the scientific database Scopus after excluding self-citations and significantly exceeds the requirements of the Regulations for the Development of the Academic Staff of the IOCCP for holding the academic position of "associate professor" (required ≥ 5).

The total number of points from all indicators is **795**, with which Dr. Ivalina Trendafilova significantly exceeds the minimum requirements for holding the academic position of "associate professor" (total number of points 440) according to the Regulations of IOCCP-BAS, as well as the minimum national requirements (400 points) according to the Rules for the Application of the Development of Academic Staff in the Republic of Bulgaria Act.

Dr. Ivalina Trendafilova is a participant in a total of 13 scientific projects and has led 3 of them. The candidate is also a participant in numerous national and international scientific conferences. The large number of personal grants won by the candidate in prestigious scientific organizations in the USA, France, Belgium, Slovenia, etc. is also impressive. Dr. Trendafilova is also the winner of a large number of scientific awards, such as the BAS "Professor Marin Drinov" award for a young scientist in 2019 and the award of the National Endowment Fund "13 Centuries of Bulgaria", 2022.

3. Evaluation of the candidate's scientific and applied scientific activities

The scientific research activity of Dr. Ivalina Trendafilova is interdisciplinary, falling into several scientific fields - organic chemistry, pharmacology and medicine. The habilitation report presented by Dr. Ivalina Trendafilova outlines the main directions in scientific research, namely the development of new approaches for synthesis, modification and functionalization of mesoporous silicate carriers as effective platforms in modern drug delivery systems. The scientific contributions are clearly and precisely formulated.

Among the most significant scientific contributions are the syntheses of the following materials: a Zn-modified mesoporous silicate material and the incorporation of quercetin into it; Ag-containing silicate carriers loaded with curcumin, capsaicin, or a mixture of both compounds; NH_2-modified silicates containing quercetin, additionally coated with suitable polymer layers; Ag- and Mg-silicate materials loaded with morin and hesperetin; an Mg-modified carrier loaded with kaempferol; and zeolite–mesoporous silicate composite materials modified with sulfonic and carboxylic groups, loaded with verapamil, and subsequently coated with a polyelectrolyte layer composed of chitosan/κ-carrageenan/chitosan–polysulfobetaine.

Another significant scientific contribution is the elucidation of the relationship between synthesis and the physicochemical properties of the resulting materials through the application of modern physicochemical characterization techniques, together with the investigation of the interactions of biologically active molecules and polymer coatings with the surfaces of modified and pristine silicate carriers. Furthermore, the formation of a Zn–quercetin complex on the surface of silicates was observed for the first time by means of FT-IR spectroscopy.

Studies on the pharmacokinetics and biological activity of the developed delivery systems demonstrated that the incorporation of biologically active compounds (BACs) into modified mesoporous silicate materials leads to an increase in their solubility. Furthermore, the construction of a polyelectrolyte polymer layer around the loaded particles enables targeted delivery and sustained release of the incorporated biologically active compounds, thereby reducing the

frequency of administration while maintaining an effective concentration in the body. It was observed that quercetin loaded onto Zn-modified samples and onto NH_2-modified samples coated with polymers exhibited a higher antineoplastic potential against certain cell lines (HUT-29 and HUT-78) compared to the pure compound. In addition, the Mg-containing sample obtained via ion exchange and loaded with kaempferol demonstrated the highest free-radical scavenging activity against DPPH radicals, comparable to that of the pure compound. The observed lower antiproliferative activity of morin and hesperetin loaded onto Ag- or Mg-modified nanoporous carriers makes these compounds less harmful to healthy cells and more selective toward tumor cells.

The principal scientific contributions outlined by the candidate are of both fundamental scientific and applied research significance. The materials developed as carriers for natural bioactive compounds, as presented in the habilitation report, constitute a sound basis for the development of dermal and oral drug formulations with improved therapeutic effectiveness.

The significance and relevance of the research topic are further evidenced by the large number of citations (198) received by the publications of Dr. Ivalina Trendafilova submitted for this competition. Dr. Ivalina Trendafilova's contribution to the presented scientific work is indisputable. Her authorship contribution, reflected in her position as first and/or corresponding author in seven publications and as second author in an additional four, demonstrates her substantial role in the development of the scientific concept, the formulation of research objectives, the interpretation of results, and the derivation of scientific conclusions.

Based on the submitted materials, I assess Dr. Ivalina Trendafilova as an established researcher with a clearly defined scientific focus, significant scientific achievements, and proven ability to independently conduct and lead research at a high scientific level. This assessment is further supported by the research directions and future perspectives for scientific work over the next three years presented by Dr. Trendafilova.

4. Critical remarks and recommendations

I have no critical remarks about the materials presented by Dr. Ivalina Trendafilova.

CONCLUSION

The documents and materials submitted by Dr. Ivalina Trendafilova comply with all requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), its regulations for the implementation, the Regulations for the Implementation of the LDASRB of the Bulgarian Academy of Sciences, and the Regulations of the Institute of Organic Chemistry with Centre of Phytochemistry at the Bulgarian Academy of Sciences (IOCCP–BAS). The candidate in the competition has presented a substantial number of scientific publications produced after the materials used for the defense of her educational and scientific degree 'Doctor'. The candidate's works contain original scientific and applied contributions that have received international recognition, a representative portion of which has been published in journals and scientific proceedings issued by international academic publishers. Dr. Ivalina Trendafilova's scientific competence and qualifications are unquestionable.

The research achievements of Dr. Ivalina Trendafilova fully satisfy the specific requirements set forth in the Regulations of the Institute of Organic Chemistry with Centre of Phytochemistry, BAS, governing the implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria.

After familiarizing myself with the materials and scientific works submitted for the competition, and analyzing their significance as well as the scientific and applied contributions contained therein, I find it justified to give my positive assessment and to recommend that the Scientific Jury prepare a report-proposal to the Scientific Council of the Institute of Organic Chemistry with Centre of Phytochemistry at the Bulgarian Academy of Sciences (IOCCP–BAS) for the election of Dr. Ivalina Ognyanova Trendafilova to the academic position of 'Associate Professor' at IOCCP–BAS in professional field 4.2. Chemical Sciences, scientific specialty 'Organic Chemistry'.

10.06.2026 Opinion prepared by: .....

(Prof. Antoaneta Trendafilova, PhD)