# OPINION

**by Prof. Dr. Silvia Zhivova Todorova, Institute of Catalysis-BAS**

regarding the materials submitted by Senior Assistant Professor Dr. Nikolay Ivanov Velinov for participation in a competition for the academic position of "professor" in the professional field 4.2. Chemical Sciences, scientific specialty "Solid State Chemistry", for the needs of the laboratory "Design and Characterization of Catalytic Materials" in the thematic field "Synthesis and Structure of Catalysts and Sorbents", announced in the State Gazette No. 82/ 07.10.2025

***1. General presentation of the candidate's materials.***

Assoc. Prof. Dr. Nikolay Ivanov Velinov is the only candidate in the competition for the academic position of "Associate Professor". In 2001, Assoc. Prof. Velinov graduated from the University of Chemical Technology and Metallurgy - Sofia, majoring in " Silicate Materials". In 2009, Dr. Nikolay Velinov defended his doctoral dissertation on the topic "Synthesis and study of materials with perovskite and perovskite-like structure for cathodes in solid oxide fuel cells". Since 2009, Dr. Velinov has worked as a senior assistant at the Institute of Catalysis, and since 2013 he has been an associate professor at the same institute.

***2. Evaluation of scientific research activity***

The candidate is an established scientist with a total of 87 publications, over 73% of which are in prestigious international journals with an impact factor/rank. The scientific contribution for the period after assuming the position of "associate professor" is reflected in 29 publications, indexed in Web of Science and Scopus , distributed in groups of indicators "B" and "Г". Research activity is closely related to active project activity, covering 19 national and 4 international contracts. Assoc. Prof. Velinov is the head of two projects, for one of which he was awarded the Diploma of the Scientific Research Fund, for a successfully implemented project funded by the National Science Foundation.

The habilitation report (indicator B ) is built on 9 publications, distributed as follows: 2 in Q1; 2 in Q2 and 3 - Q3 and 2 in Q4. In 6 of the publications, the candidate is listed as the first author and corresponding author, in the remaining 3 he is the second author. This shows a significant contribution of the candidate to the development of scientific research. According to this indicator, the total number of points is 159. According to indicator Г, the publications are 18, distributed respectively Q1-7, Q2-3, Q3-3 and Q4 - 5. Here the points are 340 with a required minimum of 220. All of Dr. Velinov's publications are in some of the most renowned journals in the field of materials science and catalysis ( *Microporous and Mesoporous Materials , Materials Research Bulletin , Hyperfine Interactions )* . The quality of research is assessed by specialists in the field through the number of citations. According to the candidate's data, 573 citations were noted, with 539 in Web of Science and Scopus. The latter form an indicator D, which is also significantly exceeded, 1078, with a required 120 points.

***3. The candidate's scientific research activities***

***<u>Habilitation thesis</u>***

A habilitation report systematizes the results of research on the synthesis, structural specificity and catalytic activity of a wide range of materials: mixed ferrites (containing Co, Zn, Mn, Ni), ferrites on an activated carbon support and complex oxide-nitride systems.

The presented set of publications in the group of indicators "B" includes research published in authoritative international journals with high scientometric status (**Q1–Q4**). Among them are prestigious journals such as *Acta Metallurgica Sinica* (Q1), *Microporous and Mesoporous Materials* (Q1) and *Materials Research Bulletin* (Q2), with a significant part of the works being carried out in the renowned publishing houses *Springer Nature* and *Elsevier*. The research is related to the targeted modification of the crystal and electronic structure of Cu–M (M=Co, Zn, Mn, Ni) ferrites and ferrites deposited on activated carbon for the purpose of optimizing catalytic properties. In the publications, Assoc. Prof. N. Velinov plays a leading role.

**The key scientific contributions in the presented papers focus on:**

- **Phase-structural control:** Defining the relationships between synthesis conditions (mechanochemistry and autoignition) and the structure of mixed spinel ferrites.
- **Composition-Structure-Activity Correlations:** Establishing fundamental relationships in catalytic processes of environmental and energetic importance, such as methanol decomposition, ethyl acetate oxidation, and the water gas reaction (**WGSR**).
- **Innovative carriers:** Utilization of agro-waste for the synthesis of modified activated carbons used as an efficient matrix for ferrite catalysts.
- **Spectroscopic identification:** Precise detection of active phases (magnetites, carbides, alloys and nitrides) by applying Mössbauer spectroscopy.
- **Methodological contribution:** Validation of Mössbauer spectroscopy as a key tool for monitoring structural changes of catalytically active ferrite phases.

*Other publications*

The other publications submitted by Assoc. Prof. Velinov for participation in the competition form several thematic areas: Catalysts based on Fe–Ce oxides; Catalysts based on Fe–Hf–Ti oxides; Catalysts supported on activated carbon; Catalysts from ferrite materials; Research on iron-containing materials. I will not list all the achievements, I will only mention some. For example: Research in the field of mesoporous binary Fe–Ce oxides includes the development of an optimized hydrothermal method for controlling their phase composition and defect formation. An innovative mechanism has been proposed, clarifying the fundamental dependence "composition–structure–properties" in catalytic reactions such as NO reduction in the presence of Au-modified systems, methanol decomposition and oxidation of organic compounds. Synergy between NiO and Fe–Ce oxides has been established, leading to improved activity and stability in methanol decomposition, and highly efficient metal-carbon nanocomposites for electrocatalytic oxygen evolution (OER) have also been synthesized.

The comparative analysis of scientometric data shows that Assoc. Prof. Dr. Nikolay Velinov not only meets, but also significantly exceeds, both the minimum national requirements for holding the position of "professor" and the specific recommended criteria of the EC - BAS.

**Conclusion**

Scientific research on **Assoc. Prof. Dr. Nikolay Velinov** fully meet the subject matter of the announced competition for the award of the academic position of "professor". The publication activity and the citations on the published results prove that **Assoc. Prof. Dr. Nikolay Velinov** fully meets all the requirements of the Academic Staff Development Act and the Regulations on the Terms and Procedure for Acquiring Scientific Degrees and Holding Academic Positions in the EC - BAS. Therefore, I strongly recommend that the

members of the esteemed Scientific Jury and the esteemed Scientific Council of the EC, BAS award Assoc. **Prof. Dr. Nikolay** Velinov the academic title of " Professor " in the professional field 4.2 "Chemical Sciences" and the scientific specialty "Solid State Chemistry".

Sofia, 05.02.2026 . Signature:

/Prof. Dr. Silvia Todorova/