

OPINION

from Prof. Dr. Hristiyan Aleksandrov Aleksandrov

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on the application of Assoc. Prof. Dr. Dimitrinka Aleksieva Nikolova in competition for the academic position of Professor in Professional Field 4.2 Chemical Sciences, scientific specialty “Chemical Kinetics and Catalysis”, for the needs of the laboratory “Novel Heterogeneous Catalysts for Clean Energy and Environmental Protection”, within the thematic area “Design of Metal and Metal Oxide Systems with Applications in Energy and Improvement of Quality of Life”, at the Institute of Catalysis, Bulgarian Academy of Sciences, announced in the Bulgarian State Gazette, issue No. 82 of 07/10/2025.

Assoc. Prof. Dr. Dimitrinka Aleksieva Nikolova is the only candidate in the competition for the academic position of Professor. In 1995, she obtained a Master’s degree in Inorganic and Electrochemical Technologies (specialization Technology of Inorganic Materials) from the University of Chemical Technology and Metallurgy, Sofia. In 2005, she defended her PhD dissertation entitled “Effect of Potassium Addition on the Activity and Structure of NiO–MoO₃–Al₂O₃ Catalysts for the Water–Gas Shift Reaction in the Presence of Hydrogen Sulfide” at the Institute of Catalysis, Bulgarian Academy of Sciences (BAS). Since 1996, she has been employed at the Institute of Catalysis, BAS, holding consecutively the following positions: Research Chemist (1996–2007), Head Assistant Professor (2007–2016), and Associate Professor (2016–present).

Assoc. Prof. Nikolova is a co-author of 62 scientific publications, 37 of which are published in peer-reviewed and indexed journals, while 20 are in non-indexed journals as well as in peer-reviewed thematic proceedings of international or national scientific forums. She is also a co-author of two patents, one patent application, and two book chapters published by IntechOpen. A significant portion (15) of her articles in peer-reviewed and indexed journals are published in first-quartile (Q1) journals; 3 articles are in Q2 journals, 7 in Q3, and 12 in Q4 journals. Among these journals are some of the most respected in the field of catalysis, such as *Applied Catalysis A: General*, *Catalysis Today*, *Catalysts*, *Chemical Engineering Research and Design*, *International Journal of Hydrogen Energy*, *Nanomaterials*, and others. Over the past 10 years, Dr. Nikolova’s publications have received 217 citations.

In the competition, Assoc. Prof. Nikolova participates with 21 scientific publications in peer-reviewed and indexed journals, one book chapter, two patents, and one patent application, grouped under two indicators (*B* and *I*). Under Indicator *B* (habilitation work), 9 publications are presented, of which 5 are in Q1 journals, two in Q4 journals, and one each in

Q2 and Q3 journals. These publications correspond to 184 points, exceeding the required minimum of 100 points for fulfillment of Indicator *B*. For fulfillment of Indicator *Γ* (minimum requirement of 220 points), 12 publications, one book chapter, two patents, and one patent application are presented. Of these publications, five are in Q1 journals, two in Q2, one in Q3, and four in Q4, corresponding to a total of 308 points (together with 15 points for the book chapter and 65 points from the patents and patent application) (see the table below). The candidate has reported 217 citations of her publications, corresponding to 434 points; therefore, Indicator *Δ* is exceeded by more than threefold. Assoc. Prof. Nikolova has participated in eight national and two international research projects. In addition, she has served as principal investigator of three national projects and as leader of the Bulgarian team in five international projects. The total funding attracted through these projects exceeds 1,000,000 leva. Her project-related activities account for 639.63 points—more than four times the minimum required for fulfillment of Indicator *E* (150 points).

Fulfillment of the requirements for occupation of the academic position “Professor”

Indicator	<i>A</i>	<i>B</i>	<i>B</i>	<i>Γ</i>	<i>Δ</i>	<i>E</i>
National requirements	50	-	100	220	120	150
Fulfilled requirements of the candidate	50	-	184	308	434	639.63

From the scientific achievements of Dr. Nikolova and the data presented in the table above, it is evident that she fulfills all minimum national requirements stipulated in Law on the Development of Academic Staff in the Republic of Bulgaria for the academic position of "Professor".

The scientific contributions of Assoc. Prof. Nikolova can be grouped into four main areas:

- (1) Design, investigation, and optimization of catalysts and electrocatalysts for clean hydrogen production and green energy processes.
- (2) Development and investigation of efficient catalysts for the production of healthy foods.
- (3) Development and investigation of efficient catalysts for fuel production and purification, as well as clean energy generation.
- (4) Development and investigation of efficient catalysts for clean and safe industrial applications.

These research topics are highly relevant and address a wide range of catalytic processes, such as partial hydrogenation of vegetable oils, water–gas shift reaction, dry reforming of methane, CO₂ methanation, ethanol dehydrogenation, catalytic ozone decomposition, and others. For

example, it has been demonstrated that maximum conversion (>90%) of CO with steam to CO₂ and H₂ is achieved when an Au/TiO₂ catalyst is modified with cerium. The enhanced activity is associated with Ce–Ti interactions and with modifications of the structural and electronic properties of the catalytic system, which promote the key step of water dissociation. In other noteworthy studies, two types of catalysts (MnO_x/Al₂O₃ and co-precipitated Ni–Cu–Al systems) have been investigated for ozone decomposition to oxygen as significantly more cost-effective alternatives to conventional Pt-containing catalysts. A higher conversion degree (approximately 90%) was achieved with the Ni–Cu–Al catalyst, and it was found that increasing the nickel content in the system favors the process. Most of the synthesized and investigated catalysts are complex, multicomponent systems.

Assoc. Prof. Nikolova has presented her scientific results at more than 60 national and international scientific forums, delivering 27 oral presentations and 41 poster presentations. I have personally attended several of these events, and my impressions of her oral and poster presentations are excellent.

In conclusion, taking into account the applicant's scientific results and achievements mentioned above, I consider that Assoc. Prof. Dr. Dimitrinka Aleksieva Nikolova fully meets all the minimum national requirements for occupation of the academic position of Professor, and I strongly recommend that she should be selected as "Professor" in professional field 4.2 Chemical Sciences, scientific specialty “Chemical Kinetics and Catalysis”, at the Institute of Catalysis, Bulgarian Academy of Sciences.

Sofia

08/02/2026

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