

OPINION

by Associate Professor Nikolay Ivanov Velinov, PhD, Institute of Catalysis - BAS regarding a competition for the academic position "Associate Professor" in the professional field 4.2. Chemical Sciences, scientific specialty "Chemical Kinetics and Catalysis," for the needs of laboratory "Design and Characterization of Catalytic Materials" in the thematic field "Application of EPR Spectroscopy for the Study of Radical Processes," announced in the State Gazette, issue 47, dated 04.06.2024.

This opinion is prepared in accordance with Order No. ПД-09-54/29.06.2024 of the Director of IC-BAS.

The sole candidate in the competition is Assistant Professor Ralitsa Boykova Mladenova, PhD, a member of laboratory "Design and Characterization of Catalytic Materials" at IC-BAS, for which the competition has been announced. The candidate has submitted all the necessary documents in accordance with the Regulations for the Terms and Conditions for Acquiring Academic Degrees and Occupying Academic Positions at the Institute of Catalysis - BAS.

Assist. Prof. Ralitsa Mladenova completed her higher education at the Faculty of Chemistry at Sofia University "St. Kliment Ohridski" in 2000. Since 2001, she has worked as a chemist at IC-BAS. From 2003 to 2006, she was enrolled as a full-time doctoral student at IC. In 2007, she defended her dissertation on the topic "EPR Study of Thermally Generated Free Radicals in Foods" and obtained the educational and scientific degree "Doctor" in the scientific specialty 01.05.16 "Chemical Kinetics and Catalysis." In 2008, she was appointed as a Junior Research Fellow II, and since 2011, she has held the academic position of "Assistant Professor" at IC-BAS.

For this competition, Assist. Prof. Mladenova has submitted 22 publications, of which 20 are in journals with an impact factor (IF) or Scopus rank (SJR). These publications have been cited 64 times in specialized scientific literature. The articles submitted for the competition do not overlap with those presented for obtaining the degree of "Doctor." The significant role and personal contribution of Assist. Prof. Mladenova in the conducted research and the summarization of the results can be judged by the fact that she is the first author of 9 of the publications submitted for the competition. Assist. Prof. Mladenova has participated in 11 research projects as both a leader and participant.

The candidate has presented 8 publications as her habilitation work, thematically uniting studies on the effect of gamma radiation treatment on the anti-radical properties of natural products and foods. The objects of study in these publications are bee products, fruits, and nuts. Key contributions from these studies include:

1. Demonstrating that Electron Paramagnetic Resonance (EPR) is a suitable technique for assessing the effect of radiation treatment on the radical scavenging activity of natural products and foods;
2. For the first time, using the EPR method to study the generation of free radicals as a result of gamma irradiation, as well as the effect of irradiation on the anti-radical capacity of the samples;
3. Demonstrating the EPR method as an effective tool for determining the optimal dose of high-energy radiation for microbial decontamination of foods.

The publications presented by the candidate outside of the habilitation work, which also align well with the thematic direction of the announced competition, are divided into three areas:

1. Analysis of the effect of gamma irradiation on the anti-radical properties of foods and organic compounds using the EPR spectroscopy method. The objects of study include almonds and certain organic compounds – ascorbic acid, cysteine, and diphenylamine. Contributions include expanding the objects of study on the topic of the publications combined and presented as a habilitation summary.
2. Investigation of free radicals and the effect of external factors, such as high-energy radiation, on organic substances using the EPR spectroscopy method. Important information has been obtained regarding the type and stability of the generated paramagnetic particles as a result of external factors, such as high-energy radiation, heating, etc. Additionally, the effect of the preparation methods and storage conditions of some foods on the amount of induced radicals in them has been established using the EPR method.
3. Characterization of catalytic materials using EPR spectroscopy. Photocatalysts based on modified ZnO, TiO₂, and ZrO₂ have been studied. Key contributions from these studies include determining the oxidation and coordination state of paramagnetic ions in catalytic materials, which is significant for explaining their catalytic activity. Furthermore, information has been obtained on the types of defects and the influence of doping elements on the structure of catalytic materials, as well as on their photocatalytic properties.

From the presented report on meeting the minimum requirements under Article 4 of the Regulations for the Terms and Conditions for Acquiring Academic Degrees and Occupying Academic Positions at IC-BAS, it is evident that Assist. Prof. Mladenova exceeds the required number of points for the position of Associate Professor in all criteria.

Conclusion:

Candidate Assist. Prof. Ralitsa Boykova Mladenova, PhD meets the requirements for the academic position of "Associate Professor" in accordance with the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for its implementation, and the Regulations for the Terms and Conditions for Acquiring Academic Degrees and Occupying Academic Positions at IC-BAS. I give a positive evaluation and fully support the candidacy of Assist. Prof. Ralitsa Boykova Mladenova, PhD for the academic position of "Associate Professor" in the professional field 4.2. Chemical Sciences, scientific specialty "Chemical Kinetics and Catalysis" at IC-BAS.

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Sofia

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