

OPINION

On a competition to occupy academic position of Associate Professor
Professional field: 4.2. Chemical Sciences
Scientific specialty: Chemical Kinetics and Catalysis
Requesting laboratory: Design and Characterization of Catalytic Materials
Thematic area: EPR spectroscopy and quality of life
Announcement: State Gazette No. 77, 1 October 2019,
by request of Institute of Catalysis (IC) of the Bulgarian Academy of Sciences (BAS)
Reviewer: Assoc. Prof. Yordanka Karakirova, PhD
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Scientific jury member appointed by Order No. ПД-09-64/22.11.2019
of the Director of IC-BAS

This opinion was prepared in accordance with Act for the Development of the Academic Staff in the Republic of Bulgaria and Rules on the Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at IC-BAS.

Chief Assistant Professor Katerina Ivanova Aleksieva, PhD, is the only applicant to the competition to occupy academic position of Associate Professor at Laboratory for Design and Characterization of Catalytic Materials of IC-BAS.

Brief details of the applicant

Katerina Aleksieva received her Master's Degree from St. Kliment Ohridski University of Sofia in 2001. In 2002, she started working as a research chemist at Institute of Catalysis of the Bulgarian Academy of Sciences. During the period 2007–2009 she holds a doctoral degree and, after defending her dissertation on the topic: EPR spectroscopy capabilities to identify high-energy irradiated food of plant origin, received the educational and scientific degree Doctor. In 2010, she was elected Research Fellow Second Degree and since 2011, she is currently holding the position of Chief Assistant Professor at Laboratory for Design and Characterization of Catalytic Materials of IC-BAS.

Description of submitted materials

Dr. Katerina Aleksieva has presented the necessary documents and materials for participation in the announced competition. She is the co-author of 32 scientific publications. 27 entries have been submitted for the competition. According to Scopus database there are 15 articles published in impact factor journals after taking up the academic position of Chief Assistant Professor, which satisfies Article 51a of Rules on the Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at IC-BAS. All the works are in the field of thematic direction of this competition. These include one review published in impact factor journal (Q1/Web of Science), in which Dr. Aleksieva is the first author. The publications in impact factor journals are 22: 6(Q1), 4(Q2), 7(Q3), and 5(Q4), where the candidate is the first author of 11 and the second author of 4 papers. These data reveal Dr. Aleksieva's personal contribution to the articles submitted for participation in the competition. Because of our personal co-authorship, publications numbered 14, 26, and 27 in the list of scientific papers are not considered for this opinion. The list of scientific publications contains 5 articles in journals without impact factor. Dr. Aleksieva is the sole author of one of the latter journals, namely Journal of the Bulgarian Academy of Sciences. Evidence of active research activity is her co-authorship of 14 scientific articles in the last 5 years (2015–2019).

Dr. Aleksieva has 29 participations in national and international scientific events: 2 oral reports at conferences (1 international and 1 national), 2 oral reports at seminars in Bulgaria, and 25 poster presentations. In the majority of poster presentations (18), she is the first author.

The works of Dr. Aleksieva included in the competition have collected 87 citations out of a total of 166. All citations are from foreign authors in prestigious international journals. She has participated in 5 scientific projects funded by Bulgarian National Science Fund, being a co-ordinator of one, 2 equivalent non-currency exchange based projects, and one project under European Social Fund. She has co-ordinated a project sponsored by World Federation of Scientists (Switzerland) and a project funded by Bulgarian Academy of Sciences. Certificates are presented to prove successful participation in a project under Human Resources Development operational programme on the topic: Creation of highly qualified specialists in modern materials for environmental protection: from design to innovation. An indicator of the authority of Dr. Aleksieva among the specialists in the field of electron paramagnetic resonance (EPR) spectroscopy is the invitation to review 15 articles for publishing in impact factor journals.

Area of scientific interest and contributions

Dr. Aleksieva has provided two author's references for scientific contributions: one including publications presented in a habilitation treatise and one reference for scientific contributions from the other submitted publications. Her research activity is grouped in three directions: (i) identification of gamma-irradiated food products and drugs by EPR spectroscopy; (ii) EPR study of lignocellulosic waste materials as biosorbents of metals for water purification; and (iii) EPR determination of the oxidation state of paramagnetic ions in catalytic materials. All the studies are related to the use of the EPR spectroscopy method. Most of the contributions are in the field of identification of gamma-irradiated food products and medicines by EPR spectroscopy, which is one of the main topics developed at EPR Laboratory of Institute of Catalysis. Now ten standards are in place within the European Union, three of which use the EPR spectroscopy technique. A major part of the applicant's work is aimed at improving the existing standards of the European Community. In this regard, significant contributions are the new developments that extend the scope of European standards EN 1787 and EN 13708 for irradiated foods. For the first time, an approach is presented to investigate fresh samples of irradiated foods. The results show that European standards for irradiated foods using the EPR method can be extended to include 'fresh' studies along with the 'dry' samples used so far. Novelties include studies on irradiated fruit juices and syrups, which can be included in standards EN 1787 and EN 13708 and thus extend their application. Pioneering is also the study of certain types of medicines and excipients used as tableting facilities to identify radiation.

In the other two directions EPR spectroscopy capabilities have been used to determine the oxidation and coordination state of paramagnetic ions in materials. Concerning EPR study of lignocellulosic waste materials as biosorbents of metals for water purification, the oxidation and coordination state of paramagnetic ions in biological materials is determined using EPR spectroscopy, which is important for their application in practice as biosorbents. Regarding the topic of EPR determination of the oxidation state of paramagnetic ions in catalytic materials, the studies are aimed at clarifying the relationship between the catalytic behaviour and the physicochemical properties of the analysed samples.

Dr. Aleksieva's scientific commitment also includes the duties of Secretary of the Bulgarian EPR Society and a member of the Bulgarian Catalysis Society.

Conclusion

I know Dr. Katerina Aleksieva personally and I have excellent impressions of her professional and personal qualities. She is a skilled specialist capable of solving current problems in the field of EPR spectroscopy. Her studies and summaries are of a high scientific level. She demonstrates competence both in planning and conducting experimental measurements and in interpreting the results obtained. Her scientific contributions are indisputable and fully consistent with the theme of the announced competition. In terms of their volume and quality, the presented science-metric indicators cover and exceed the recommended requirements for occupation of the academic position of Associate Professor in accordance with Act for the Development of the Academic Staff in the Republic of Bulgaria and Rules on the Terms and Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions at IC-BAS. Being informed about the submitted materials for the competition, my personal impressions are complemented and I am convinced and happy to recommend to the distinguished Scientific Jury and the Honourable Scientific Council of IC-BAS to award to Chief Assistant Professor Katerina Ivanova Aleksieva the academic position of Associate Professor in scientific specialty 01.05.18 Chemical Kinetics and Catalysis and thematic area EPR Spectroscopy and Quality of Life.

15.01.2020

Signature:

(Yordanka Karakirova)