

STANDPOINT

Submitted by **Prof. Dr. Silviya Zhivova Todorova, Institute of Catalysis-BAS** in connection with the competition for occupying of the academic position Associated Professor in the professional field 4.2. "Chemical Sciences", scientific specialty "Chemical Kinetics and Catalysis" for the needs of the Institute of Catalysis at the Bulgarian Academy of Sciences, Laboratory "Design and characterisation of catalytic materials", announced in Newspaper of State issue 77/01.10. 2019 г.

1. Brief details of the applicant

Assistant Professor Katerina Ivanova Alexieva is the only candidate in the competition for the academic position "Assistant Professor". The set of materials submitted by the applicant is in accordance with Article 24 (1) of ZRABRB, Articles 44 and 47 (1) of the Rules on the Conditions and Procedures for Acquisition of Academic Degrees and Occupation of Academic Positions at IC-BAS.

For participation in the competition, Dr. Aleksieva presented the necessary documents: CV, diplomas for higher education and for the Doctoral degree, abstract of the PhD thesis, research publications, concerning index 4 about habilitation work from "group B", other publications according to the index 7- research publications that have been referenced and indexed in world-renowned databases of scientific information (Web of Science and / or Scopus), outside of habilitation work, from "Group D", lists of scientific papers, citations, list with the participations in the conferences, copies from scientific works, list of participating in national and international projects certificates.

2. Short biographical data about the candidate

Dr. Alexieva completed her higher education in 2001 at Sofia University "St. Kliment Ohridski", Faculty of Chemistry. From 2002 until now she has been working at the Institute of Catalysis-BAS, as a chemist-in the period 2002-2009, and after defending her dissertation was appointed as assistant professor. In the period 2007-2009 she is a PhD student at the IC-BAS. Dr. Alexieva specialized in one year (2003 -2004) at the University of Saarland Germany. She won a one-year scholarship from the World Federation of Scientists in 2007.

3. Evaluation of the scientific research works of the candidate.

Dr. Alexieva has co-authored a total of 32 publications, 26 of which are with IF, 1 review and 3 popular science articles. The candidate participates in the competition with 27 papers, 22 of which are distributed as follows: 6 in the Q1 category, 4 in Q2, 7 in Q3 and 5 in Q4. Dr. Aleksieva is the first author and author of correspondence in 11 of the publications, which clearly shows the leading role of the candidate.

The total number of citations (excluding all authors' quotes) is 166, 87 of which are on papers which are submitted for the competition. The applicant's Hirsch (H) index based on all publications is 8. The presented publications are divided into two groups corresponding to indices **B** and **Г**, in accordance with Regulations for the conditions and order for acquiring of scientific degrees and occupying of academic positions. In the first group, indicator **B** - "Habilitation work - scientific publications in journals that are referenced and indexed in world famous scientific information databases (WoS or Scopus)", there are presented 7 (five in the Q1 category and two in Q3), giving a total score of 155 points, higher than the required minimum of

100 points required. Dr. Alexieva is the first and corresponding author in 5 publications and in one she is a second.

The second group represents 20 publications (1- Q1, 4-Q2, 5- Q3 and 5- Q4) covering indicator Γ , with a total of 240 points, higher than the required 220 points. In the group of indices Δ , the requirements have been exceeded significantly – in view of the required 60 points, the candidate has 174 points. All citations are in prestigious international journals, which support the importance and relevance of Dr. Alexieva's scientific research. She takes in 10 projects (within the framework of inter-academic cooperation and funded by the NSF). This shows that Dr. Alexieva takes a very responsible attitude to the tasks assigned, which makes her a desirable participant in the work teams.

The habilitation work includes scientific studies aimed at identifying gamma-irradiated foods and medicines applying the method of EPR spectroscopy. Three of the standards used in the European Union to distinguish irradiated and non-irradiated foods are based on EPR spectroscopy. Research in this area is aimed at improving existing standards and creating new ones, which is the aim of candidate research.

In my opinion the main contributions of the applicant's investigations could be summarized as follows:

The contributions of the applicant are on the extending the validity of European Protocol EN1787 and EN 13708 for irradiated foods. In the case of Standard EN 1787, the presence of a cellulose-like EPR spectrum after irradiation is unambiguously evidence of the radiation treatment of samples. It is demonstrated that the availability of satellite lines in the EPR spectra can be used to identify the radiation treatment of fresh fruits, thus extending the validity of European Protocol EN 1787. For the first time, EPR food analyses has been expanded from dry to fresh foods, and for the first time some foods have been investigated to identify radiation treatments.

Different types of fruits (dates, plums, and figs) were investigated after radiation treatment, and a recommendation was made which part of the fruit is subjected to analysis, in order to establish the radiation treatment. Protocol EN 13708 applies to irradiate dried dates and figs and Protocol EN 1787 to dried prunes. Protocol EN 13708 is applicable to irradiated dried dates and figs, whereas Protocol EN 1787 for dried prunes.

For the first time, some types of medicines, including herbs, were investigated to identify radiation. High energy radiation is used to sterilize drugs that cannot be sterilized by conventional methods due to their thermal instability.

EPR spectroscopy has been applied for the investigation of waste lignocellulosic materials such as metal bio sorbents for water purification. The oxidation and coordination state of paramagnetic ions (Cu^{2+} , Mn^{2+} , Ag^+) in lignocellulosic materials after their adsorption from contaminated water was investigated. Mechanisms of adsorption and coordination of the corresponding ions are proposed.

The oxidation and coordination state of paramagnetic ions in catalytic for environmental important reactions were determined by EPR spectroscopy. Cobalt and palladium-based catalysts for the complete oxidation of methane, lanthanum and cerium oxides deposited on γ -alumina for the decomposition of nitric oxide, two-phase CuO-NiO solid CO oxidation systems, were investigated. The results obtained from these studies allow to clarify the state of the catalytic active centers before and after the reaction, to clarify certain aspects of the mechanism of the catalytic reaction, as well as some types of active species.

Conclusion

The research works of Assistant professor Katerina Ivanova Alexieva fully correspond to the topic of the announced competition for awarding the academic position of "Associated Professor". The number of publications and citations on the published papers prove that Assistant Professor Katerina Alexieva fully covers and exceeds all the requirements of the Law for Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for the conditions and order for acquiring of scientific degrees and occupying of academic positions in IC-BAS. Therefore, I strongly recommend to the members of the Scientific Jury and the Scientific Council of IC-BAS to award to Assistant Professor Dr. Katerina Alexieva the academic position "Associate Professor" in the professional field 4.2 "Chemical Sciences" and scientific specialty "Chemical Kinetics and Catalysis".

Data 05. 02. 2020

Sofia

Member of the Scientific Jury:

/Prof. PhD Silviya Todorova/