

## STANDPOINT

by Assoc. Prof. Dr. Ivanka Spassova, Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences, on the materials submitted for participation in the competition for awarding the academic position "*Professor*" in the professional field 4.2 "Chemical Sciences" (Chemical kinetics and catalysis) announced in State Gazette, issue no. 36 of 03.05.2019.

In the competition announced by IGIC-BAS for awarding the academic position "Professor" in the laboratory "Reactivity of solid surfaces" the only candidate is Assoc. Prof. Mihail Yordanov Mihaylov. The submitted materials for participation in the competition are in compliance with the Regulations for the Terms and Procedure for Acquisition of Academic Degrees and for Occupation of Academic Positions in IGIC - BAS and include all necessary documents. Assoc. Prof. Dr. Mihail Mihailov is registered in NACID (<https://ras.nacid.bg/dissertation-preview/29652>), where his doctoral degree and academic position as Associate Professor are recognized.

### **Brief details of the applicant**

Assoc. Prof. Dr. Mihail Mihaylov graduated in 1997 from Sofia University "St. Kliment Ohridski" with a Master degree in Chemistry. In 2002 he defended his PhD thesis at IGIC- BAS, and in 2008 he was elected as Associate Professor at Lab. "Reactivity of solid surfaces" at the same Institute. The candidate had a scholarship of the Alexander von Humboldt Foundation in 2006. Dr. Mihaylov is the winner of the "Marin Drinov" Prize in Chemistry for Young Scientists in 2003 and the IGIC- BAS Award for Best Scientific Publication with the participation of young scientists in 2005.

### **Scientific research activities**

Assoc. Prof. Dr. Mihail Mihailov exceeds considerably the minimum requirements recommended by the Bulgarian Academy of Sciences and the additional requirements of IGIC-BAS, according to the Regulations for the Terms and Procedure for Acquisition of Academic Degrees and for Occupation of Academic Positions in IGIC - BAS.

Assoc. Dr. Prof. Mihailov is co-author of 71 publications, 45 of which have been published since his habilitation. In this competition the candidate participates with 23 scientific papers. A strong impression makes the fact that all publications with which he competes are in journals indexed with Q1 (2 of them leading the rankings in the field). More than 1600 citations (1209, according to Scopus) have been observed on all articles and the citations on the publications for the competition are over 380. The H- index of Assoc. Prof. Dr. Mihail Mihaylov (according to Scopus) is 18. Results of the research with the participation of Dr. Mihail Mihailov are presented in 11 national and 17 international scientific forums with 15 oral and 13 poster reports.

The project activity of the candidate in the competition is also impressive. Assoc. Prof. Dr. Mihail Mihailov has participated in one international project under FP7 and in nine national scientific projects. He was leader of two successfully implemented NSF projects. Over 400,000 leva have been received from the projects he led.

## Scientific contributions

The Habilitation work of Assoc. Prof. Dr. Mihail Mihaylov is entitled "*IR Spectroscopic Study of the Adsorption Forms of NO<sub>x</sub> and CO<sub>x</sub> on Ceria: Revision of the Existing Conceptions*". It summarizes the results of 5 scientific publications. The contributions of the applicant are on the identification of the nature and the properties of surface species formed by the interaction of hydrogen, oxygen, nitrogen oxides and carbon oxides with ceria, both in stoichiometric and partially reduced form. IR spectroscopy studies of surface species, including those formed with isotopically-labeled molecules (<sup>15</sup>NO, <sup>13</sup>CO<sub>2</sub>, isotopic mixture <sup>14</sup>NO+<sup>15</sup>NO), are presented. Previous IR spectra interpretations of adsorption forms of nitrogen oxides and carbon oxides onto ceria have been revised. New surface compounds upon NO adsorption on non-stoichiometric oxide have been detected and new routes for the conversion of NO to N<sub>2</sub> are proposed.

The report for the contribution of Assoc. Prof. Dr. Mihail Mihailov on the non-habilitation publications for participation in the competition is built on 18 scientific papers. The main part of the research is related to the development and the application of IR spectroscopy method for obtaining valuable information in the study of active materials (adsorbents and catalysts) and their interaction with inorganic and organic gases or vapors. Most of the studies are aimed at elucidation of the oxidation and coordination state, dispersion, localization and acidity of metal cations in zeolites, oxide catalysts or metal-organic frameworks with potential for various adsorption and catalytic applications. Additional methods such as XRD, XPS, TPR, EPR, electron microscopy, UV-spectroscopy, catalytic tests, theoretical modeling, etc. are also used in these studies.

## CONCLUSION

The documents and materials submitted by Assoc. Prof. Dr. Mihail Mihailov, meet all the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for its Implementation and the relevant Regulations of the Institute of General and Inorganic Chemistry, BAS. A sufficient number of scientific papers published after his habilitation have been presented. The results achieved in the research activity by Assoc. Prof. Dr. Mihail Mihailov, fully correspond to the additional requirements of the Institute of General and Inorganic Chemistry, BAS, adopted in connection with the Regulations for the application of LDASRB, also.

Therefore, I strongly recommend to the members of the Scientific Jury and to the Scientific Council of Institute of General and Inorganic Chemistry, BAS to award to Assoc. Prof. Dr. Mihail Mihailov the academic position "*Professor*" in the field 4.2. Chemical Sciences (Chemical kinetics and catalysis).

01.08.2019

Member of the Scientific Jury:

(Assoc. Prof. Dr. Ivanka Spasova)