

STANDPOINT

Expressed by Prof. Dr. Konstantin Mavrodiev Petrov, Institute of Electrochemistry and Energy Systems "Acad. Evgeni Budevski" - BAS, member of the Scientific Jury, appointed in accordance with order No. ПД-09-65 / 25.11.2019 of the Director of the Institute of Catalysis - BAS, with regard to the competition to appoint a staff member to occupy the academic position of "Professor" in the professional field of "4.2 - Chemical Sciences", subject 01.05.16 "Chemical Kinetics and Catalysis", published in the State Gazette no. 77 of 01/10/2019.

Assoc. Prof. Dr. Margarita Gabrovska is the only candidate in the competition announced by the Institute of Catalysis (IC) to appoint a staff member to occupy the academic position of "Professor" in the Laboratory "New Heterogeneous Catalysts for Clean Energy and Environmental Protection", she has submitted all the necessary documents outlined in the Law on Professional Development and the Rules, Terms and Conditions for Occupation of Academic Positions at IC-BAS.

1. Concise biographical information

During her professional career Margarita Gabrovska was awarded the Educational and Scientific Degree – "Doctor" – subject "Chemical Kinetics and Catalysis" by the Higher Attestation Commission with the Council of Ministers of the Republic of Bulgaria – 2001. In 2010 she was appointed to the academic position of "Associate Professor" in the subject field of "Chemical Kinetics and Catalysis" at IC-BAS, where she is employed at present.

2. Science research and applied science activity

Assoc. Prof. M. Gabrovska is the co-author of 73 scientific works. As a participant in the current competition 34 works have been submitted, of these 31 are scientific publications, 2 are book chapters and 1 is a patent, all have been published while occupying the academic position of "Associate Professor". In part, the works have been published in reputable international journals in the field of the current competition. Separation protocols are presented heeding the applicant's contributions in the joint scientific publications together with other co-authors from IC-BAS. 150 of the citations of scientific works are presented for consideration in view of the current competition.

The popular dissemination of the results obtained during the competition period is reflected in their presentation at 77 scientific forums.

The participation of Assoc. Prof. M. Gabrovska in numerous national scientific projects is a contribution to applied science.

Especially noteworthy in her growth as a scientist is the work done in Israel, that I witnessed myself. A non-platinum catalyst was developed for the oxidation of hydrogen in a fuel cell – an exceptional achievement of global significance.

3. Contributive nature of the scientific works

The detailed review in summary of the results of Assoc. Prof. M. Gabrovska outlined in the Habilitation work on the topic: "Development and study of catalysts for the purification of CO and CO₂ gas mixtures", based on 8 scientific publications, unveils a clearly outlined research topic in the investigation in the relevant area of CO and CO₂ gas mixtures purging. Three directions are defined: (1) Development and investigation of catalysts for the wholesome oxidation of CO to CO₂; (2) Development and study of catalysts for the conversion of CO by water vapor; and (3) Development and investigation of catalysts for the hydrogenation of CO₂ to methane, with the three catalytic reactions being a complex catalytic

cycle not only for the purging of gas mixtures but also in obtaining pure hydrogen as an attractive energy source.

The results included in the Habilitation work are original scientific contributions cited 106 times.

An enquiry of the contribution of the works of Assoc. Prof. M. Gabrovska on the topic: "Development and application of metal and oxide composites", outside the Habilitation work, includes 13 scientific publications, 2 book chapters and 1 patent. The author's enquiry combines the design and selection of a wide range of nanoscale metal and oxide composites with an appropriate structure and properties of hydrogen energy related reactions, environmental protection, human health and improving the quality of life.

In my view, the main scientific contributions in the research presented can be summarized as follows:

(1) The importance of the carriers and modifiers used on the ability to control the activity of Ni/SiO₂ catalysts in the partial hydrogenation of vegetable oils for nutritional purposes and the selectivity in the process has been demonstrated;

(2) Novel highly active Fe-TiO₂ films have been developed for the photocatalytic degradation of nitrobenzene and a mechanism in accordance with which the reaction proceeds proposed. Despite the fact that this paper was published in 2018, the 15 citations noted prove the importance of the study;

(3) Active catalysts have been developed for the oxidative dehydrogenation of light alkanes based on Nd₂O₃ oxide composites;

(4) Ni-containing co-catalysts with precipitates for different applications have been developed;

(5) A technology has been developed to build a Ni-based anode catalyst, as a substitute for the traditionally used catalyst and the high-cost Pt catalyst used in alkaline fuel cells deposited on active carbon. The catalyst developed is incorporated in the regular production fuel cell models made by GenCell LTD, Petah Tikva, Israel;

Conclusion

The scientific achievements of Assoc. Prof. Dr. M. Gabrovska are undeniable and have gained high acclaim both in Bulgaria and internationally. They show that she is an established scientist with a clear thematic vision for development in the field of the creation of new highly active and efficient heterogeneous catalysts for the processes outlined, with a high qualification and experience in experimental work and results interpretation. Assoc. Prof. Gabrovska is a specialist who successfully combines the qualities of an experimental scientist who has a good theoretical background and is able to organize and lead teams involved in basic and applied scientific research.

The documents and materials presented by Assoc. Prof. M. Gabrovska for participation in the competition to appoint a staff member to occupy the academic position "Professor" meet the requirements in accordance with the Rules for the Conditions and Procedures for Occupation of Academic Positions at IC-BAS. The applicant's scientific study indicators exceed the specific requirements in the IC-BAS Regulations (Article 4) for occupying the academic position of "Professor". The research topics tackled by Assoc. Prof. Gabrovska are in accordance with the topics of IC-BAS and the Laboratory "New Heterogeneous Catalysts for Clean Energy and Environmental Protection", for which the competition was declared.

The overall analysis of the scientific activity and science research contributions of the applicant in the field of the competition leads me to give a positive assessment with a recommendation to the members of the distinguished Scientific Jury and the Honorable Scientific Council of IC-BAS to appoint the candidate Assoc. Prof. Margarita Gabrovska in the academic position of "Professor" in the professional field of "4.2 - Chemical Sciences", specialty subject 01.05.16 "Chemical Kinetics and Catalysis".

15.01.2020

Standpoint prepared by:

/Prof. Dr. Konstantin Petrov/