

OPINION

Submitted by Prof. Alexander Elias PhD

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In regard to the competition for occupying of the academic position “Associated Professor”

For the needs of the Laboratory “Reactivity of Solid Surfaces” in the Institute of General and Inorganic Chemistry-BAS, in professional field 4.2 “Chemical Sciences”, scientific specialty “Chemical Kinetics and Catalysis”, published in „Official Gazette”, issue 36 of 03.05.2019

I was appointed as member of a scientific jury by written order № ПД-09-86 dated 1 July 2019 issued by the Director of IGIC-BAS in connection with the competition for occupying of the academic position “Associated Professor”, announced by IGIC-BAS for the needs of the Laboratory “Reactivity of Solid Surfaces”. The only candidate in this competition is Senior Assistant PhD Nikola Lyudmilov Drenchev. I was given the “Regulations for the conditions and order for occupying academic positions in IGIC-BAS”, as well as a compact disc, containing all the necessary documents, indicated in the Regulations. There was a meeting of the jury on the 15th of July 2019 and it was agreed that I will write my opinion on the scientific contributions of the candidate. I acquainted myself carefully with the documents, revealing the steps in the scientific career of the candidate Sen. Ass. Drenchev. It is devoted to the field of IR spectroscopy and its application in materials science. He graduated from the Chemical Faculty of Sofia University „St. Clement Ohridsky” acquiring „Master of Science” degree in the year 2004. Thereafter he became PhD student there – regular form of education during the period 2005 – 2008, defending his PhD Thesis and acquiring PhD scientific degree on 05.01.2009. The topic of the PhD Thesis was „Synthesis and hydrogen-sorption properties of alloys on the basis of Mg₂Ni” in the scientific specialty 01.05.18 „Chemistry of Solid State Bodies”. Then he was appointed in the position of “Chemist” at IGIC-BAS, and since year 2009 until now he has been occupying the academic position of „Chief Assistant”.

The author’s information files on the contributions of his research works comprise a total of 13 articles, in which he has outlined 4 basic directions in his studies: IR spectroscopy characterization of surface coordinatively unsaturated cations in zeolites and oxide catalysts – this is the direction that I would put in the first place in view of its significance for catalysis. Among the other three directions I would point out the importance of the study of the surface acidity of OH groups, which is of special importance for example in studies of photocatalytic systems – I would recommend to extend his studies in this direction! The establishing of the nature of the adsorption sites and the geometry of the complexes being formed could be of some interest for specialists in the field of theoretical chemistry, so Ch.Ass. Drenchev could plan such studies for his future work. As far as the fourth direction is concerned – the isotopic exchange and isotopically labeled molecules for detecting surface compounds – this would be of essential importance, when one elucidates the mechanism and the respective elementary steps in view of determining the rate-determining step in the mechanism of the catalytic reaction. Isotopic studies require large expenses and this could be an obstacle, when the financial conditions are not favourable. So this consideration is in fact the reason to classify this research direction in the last position – practical considerations.

As one can see in the Table for the required number of points the candidate Drenchev not only answers all the requirements but he even exceeds considerably some of them. Index A requires 50 points (PhD thesis) – this requirement is fulfilled. Index B requires 100 habilitation points and the candidate has 120 points. The group of indices C requires 220 points from publications WoS and/or Scopus not included in the habilitation – he has 320 points exceeding this requirement too. Here I would like to point out too that he carefully and painstakingly has noted, what is the respective quartile JCR (Journal Citation Reports) or SJR (Scimago Journal Rank), although in both cases – Web of Science or Scopus the quartile Q1 gives the same number of 25 points. The candidate has also submitted and extended information list about his scientific contributions in accordance with the requirements of IGIC Regulations – a total of 62 citations have been noticed. Some additional requirements have been formulated by IGIC with respect to the research activities in index group D – he has Hirsch Index $H=7$ (Scopus) which again exceeds the required $H=5$. What makes good impression is the fact that he has attached to his set of documents “h-graph Scopus set of 23 Documents” as proof material.

A significant aspect in the evaluation of the candidate, which should not be omitted, is his involvement and active participation in scientific research projects during the period 2010-2019 – it amounts to a total of 9 projects, sponsored on Bulgarian side, which is considerable number for a period of 9 years. The candidate participated also in 2 other projects, sponsored abroad. All these projects have been focused on obtaining new materials having improved properties. I would outline, being catalysis scientist, among the Bulgarian projects two most important contracts: ДЦБП 02/2 referring to porous materials and their catalytic properties and the contract TK/02-64 about elaboration of new efficient catalysts for the control of harmful emissions – to be more specific – nitrogen oxides, a hot topic of the day acquiring special importance nowadays. Of course I do not underestimate the wide scope of knowledge he gained from the lectures during the fulfillment of Operating Program „Development of Human Resources”. In view of the importance of elucidation of the mechanisms of catalytic reactions – having both fundamental and practical importance with respect to improving the properties of the already known types of catalysts I would point out the participation of the candidate in two contracts under the guidance of BAS Corresponding Member Konstantin Hadjiivanov during the period 2014-2016, which convincingly revealed the strength of IR spectroscopy for elucidating the mechanisms of catalytic reactions. Two foreign projects make also strong impression, involving the participation of the candidate – the Seventh Framework Program of EU project in the field of energy production, and the Czech project with Pardubitz. Without a doubt the training how to improve writing of research projects would be very useful for the future activities of the candidate, when he shall have to prepare European research project by himself answering the high European requirements.

The achievements of Ch.Ass. Drenchev are in a very promising field of research giving strong arguments to appoint him in the position of “Associated Professor”. I recommend with conviction to the members of the jury and to the Scientific Council of IGIC-BAS to vote “YES” in the election of Ch.Ass. Drenchev for the academic position “Associated Professor” in professional field 4.2. „Chemical Sciences”, scientific specialty „Chemical Kinetics and Catalysis” in the laboratory „Reactivity of Solid Surfaces“ at the Institute of General and Inorganic Chemistry – BAS.

15.08.2019

Signature of Member of the Jury: Prof. A. Eliyas