R E V I E W

by Prof. Todor Minkov Dudev, D.Sc.
Faculty of Chemistry and Pharmacy
Sofia University “St. Kliment Ohridski”

Re: Competition for a Full Professor position at the Faculty of Chemistry, Sofia University in professional field 4.2 Chemical Sciences (Organic Chemistry - Organic Catalysis)

There is only one candidate applying for the Full Professor position, announced in the State Gazette 52/02.07.2019: Associate Professor Dr. Hristiyan Aleksandrov Aleksandrov. For the competition the candidate has provided a full set of documents in accordance with the Regulations for the implementation of the Law for development of the academic community in Republic of Bulgaria. Documents are prepared with great care and provide ample information for the scientific and pedagogical activities of the applicant.

Dr. Aleksandrov is a graduate from the Faculty of Chemistry, Sofia University. He obtained his B.Sc. degree in 2002 in the field of Theoretical and Physical Chemistry. In 2008, under the supervision of Prof. G. Vayssilov, he successfully defended a Ph.D. thesis entitled “Theoretical investigation of the structure of zinc-containing ions in the pores of ZSM-5 zeolites and the related mechanism of ethane dehydrogenation”. The same year he was appointed a Senior Assistant Professor at the Department of Organic Chemistry, Faculty of Chemistry, where, in the following years he was promoted to the Head Assistant Professor (2009) and Associate Professor (2014) positions. He has completed several specializations in renown research centers in Germany, Spain and USA.

For the competition, the candidate has presented a Habilitation thesis (“Elucidation of the factors, influencing the hydrogenation of alkenes on transition metals - a theoretical study”), one study guide ("A manual for laboratory exercises with a collection of problems in Organic chemistry for students in the specialty "Pharmacy“) and 36 scientific papers. The list of publications is quite impressive: the papers are published in journals with high impact factors belonging to Q1 (32 papers) and Q2 (4 papers) quartiles such as Angewandte Chemie International Edition, Nature Materials, ACS Applied Materials & Interfaces, Journal of Physical Chemistry C, Chemical Communications and ACS Catalysis. These papers have been cited 234 times in the scientific literature. Overall, Dr. Aleksandrov is a co-author of 61 papers, cited 637 times in specialized scientific journals. Research findings of Dr. Aleksandrov have been reported at numerous national and international meetings in the form of invited talks (11),

oral lectures (24), and poster presentations (20). He has participated (as a team member or head of the project) in 22 national and 8 international research projects. Dr. Aleksandrov was awarded prestigious awards such as Pythagoras prize for young scientist (2014), Annual prize of the Rector of Sofia University (2002) and Higher Education Assistance Foundation Award (2001).

The main scientific contributions of Dr. Aleksandrov are in the field of theoretical modelling (by quantum-chemical methods) of the structure and properties of catalysts of interest to heterogeneous organic catalysis. More specifically, his investigations and achievements could be grouped into the following domains:

(1) Theoretical modelling of zeolite systems containing metal cations and their complexes with catalytic properties. The factors determining the stability and catalytic activity of large series of zeolites containing various metal components such as W, Rh, Fe and Pd, have been elucidated.

(2) Quantum-chemical investigations of catalytic systems based on cerium dioxide. The studies conducted shed light on the mechanism of catalytic transformations of a number of low-molecular weight compounds on cerium dioxide, as well as modifications of the latter by doping with Pt or Y.

(3) Theoretical modelling of nano-particles of transition metals and related catalytic processes. As a result of systematic investigations by the applicant, the key determinants governing the processes of catalytic transformations of gaseous substances on metal nano-particles (Pd, Pt and Ni) have been elucidated.

(4) Quantum chemical characterisation of interactions between series of biologically active molecules with zeolites and graphene for assessing the potential of the latter as carriers for controlled drug delivery.

Dr. Aleksandrov is a respected university lecturer. He teaches several courses (to both undergraduate and graduate students) in Organic chemistry, Applied quantum chemistry, Modelling of periodic systems and nano-structures, and Heterogeneous catalysis. He has supervised one Ph.D. and one M.Sc. student and has acted as a consultant to several Ph.D. students in the University of Munich and University of Barcelona.

Conclusion

Scientific publications provided by the applicant fall into the scope of the announced competition and represent original investigations with significant contribution to the field of catalytic organic chemistry. They are innovative. The candidate is a proven scientist in his

scientific domain distinguished by creative thinking, maturity and originality in applying theoretical approaches for characterizing heterogeneous catalytic processes. In terms of scientometric indicators, he exceeds by far the minimal national requirements for acquiring the Full Professor position. In conclusion, as a result of the foregoing, I believe that with his scientific and pedagogical activities and achievements Dr. Hristiyan Aleksandrov fully complies with all the requirements of the Law for the occupation of the academic position "Full Professor".

In connection with the above, I propose Associate Professor Dr. Hrsitiyan Aleksandrov Aleksandrov to be elected Full Professor in the professional field 4.2 Chemical Sciences (Organic Chemistry - Organic Catalysis).

14.10.2019

Reviewer:

(Prof. Todor Dudev)