

REPORT

by Prof. Dragomir Yankov Ph.D.

regarding

the materials for the competition for the academic position of professor in a professional direction 4.2. Chemical Sciences (Unit operations in Chemical and Biochemical Technology) for the needs of the Laboratory "Transfer Processes in Multiphase Media", Institute of Chemical Engineering - BAS, announced in the State Gazette no. 66/ 16.08.2022

According to the announced competition, the only candidate who submitted documents was Assoc. prof. Maxim Boyanov.

Assoc. prof. Boyanov worked successively as a physicist in the Faculty of Chemistry of Sofia University "St. Kliment Ohridski", an assistant professor in the Faculty of Physics at the same university, as a physicist at the Argonne National Laboratory, USA, and since February 2014 he has been appointed at IChE, initially as an assistant, and then as an associate professor.

The candidate for a professor, Assoc. prof. Maksim Boyanov presented for the competition a total of 26 publications (one book chapter and 25 papers in scientific journals).

The articles are distributed as follows:

In journals with Impact Factor - 24: *Environmental Science & Technology*-11; *Water Research*-2; *Chemical Geology*-1; *ACS Applied Materials & Interfaces*-1; *Energy & Environmental Science*-1; *Journal of Environmental Management*-1; *Chemical Engineering Journal*-1; *Journal of Hazardous Materials*-1; *Journal of Physical Chemistry C*-1; *Applied and Environmental Microbiology* -1; *Environmental Pollution*-1; *Applied Geochemistry*-1; *Journal of Nanoparticle Research*-1;

In journals without impact factor – 1: *Current Inorganic Chemistry*-1;

Reports from scientific forums printed in full text - none.

Reports and posters at international events – 171, 27 of which are invited.

The listed publications have been cited a total of 765 times.

The cited articles are distributed by quartiles as follows: Q1-23, Q2-1, and one with no quartile.

M. Boyanov was the leader or co-leader of 7 research projects (4 between the Argonne National Laboratory and IChE), financed by external sources (the US Department of Energy). Assoc. prof. Boyanov completed 2 post-doctoral specializations at the Institute of Environmental Studies, Argonne, Illinois, USA (3 years) and the Institute of Molecular Ecology, University of Notre Dame, Indiana, USA (1 year). In the period 1997-2003, he was a graduate student at the Department of Condensed Matter Physics, University of Notre Dame, Indiana, USA, and defended his thesis on "Determination of the atomic structure of surfaces and bulk metal-organic complexes by X-ray spectroscopy" in 2003

Assoc. prof. M. Boyanov has lectured on Radiochemistry, Experimental Methods in Physics, and Surface Phenomena in Disperse Systems at the Faculty of Physics of SU "St. Kliment Ohridski" in the period 2007-2008 and led exercises of students in the Faculty of Physics of the SU "St. Kliment Ohridski" (2007-2008) and at "Notre Dame" University (1998-1999 and 2001). M. Boyanov was the supervisor of one post-doc and one doctoral student.

The main scientific interests of Assoc. prof. Boyanov are in the field of molecular biogeochemistry and in particular in the study of adsorption and reduction-oxidation mechanisms of heavy metals and radioactive pollutants and their interaction with various microorganisms.

The main contributions in the submitted materials for the competition can be systematized as follows:

- The mechanisms of various biological oxidation-reduction processes: U^{6+} to U^{4+} and the formation of various complexes in various biological systems were studied. (publ. 2, 8, 13, 15, 17, 18, 20, 21, 22, 24, and 25);
- Using synchronous X-ray spectroscopy, the influence of various factors on the formation of molecular U^{4+} and its oxidation back to U^{6+} was investigated. (publ. 10, 13, and 15);
- The structure of As, Zn, Pb, and Fe in different subsoil environments was determined. (publ. 3, 9, and 12);
- The metabolism and anaerobic transformation of various iron oxides by a newly isolated bacterium *Orenia metallireducens* strain Z, which is distinguished by the ability to function in a wide range of pH and salt content, was studied. (publ. 4 and 11);
- The mechanism of Se and Te adsorption on bacterial cell walls was determined. (publications 1 and 7)
- The transformation of various nanoparticles as a result of their uptake by plants has been studied. (publ. 5 and 19)

CONCLUSION:

The presented materials, in terms of volume and quality, fully meet the requirements of the Internal Regulations of the IIH, the Rules for the conditions and procedure for acquiring scientific degrees and holding academic positions in the Bulgarian Academy of Sciences, the Act on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations on the implementation of ADASRB. With full conviction, I give a positive assessment to the candidate in the competition for the academic position of professor in professional direction 4.2. Chemical Sciences (Unit operations in Chemical and Biochemical Technology). I will vote "Yes", the esteemed jury to propose to the Scientific Council of IEES to elect Associate Professor Dr. Maksim Boyanov as Full Professor.

Sofia

15.12.2022



(Prof. Dragomir Yankov PhD)