

## Attitude of Reviewer

on competition for occupation of the academic position of "professor" in the professional field  
4.2. Chemical Sciences, (Physical Chemistry) for the needs of the Laboratory of X-ray  
Diffraction Methods and Computed Tomography at the IPC-BAS,  
announced in SG. 20 / 10.03.2020

Candidate: Assoc. Prof. Dragomir Tatchev, PhD – IPC-BAS

Member of the Scientific Jury: Assoc. Prof. Vladislav Kostov, PhD – IMC-BAS

The only candidate for the competition is Assoc. Prof. Dr. Dragomir Mladenov Tatchev from the Laboratory of X-ray Diffraction Methods and Computed Tomography at the IPC-BAS.

To participate in the competition Dr. Tatchev submitted 23 scientific publications for the period after taking up the academic position of Associate Professor (2007), of which 12 are referred to group B – articles published in scientific publications, referenced and indexed in world-renowned databases with scientific information, equated (equivalent) to habilitation thesis. The articles are ranked according to the current rules of four quartiles, as follows: 10 articles with Q1; 6 articles with Q2; 2 articles with Q3; 1 article with Q4, and four articles are referred as scientific publications with SJR and without IF. Among the renowned international journals in which the candidate published are: *Nanotechnology*, *Journal of Applied Physics*, *Journal of Non-Crystalline Solids*, *Physical Chemistry Chemical Physics*, *Journal of the American Chemical Society*, *Physical Review Letters*, *Journal of Non-Crystalline Solids*, *Applied Surface Science*, *J. Mater. Chem. A*, *RSC Advances*, *Journal of Materials Science*, *Journal of Electroanalytical Chemistry*, *J. Appl. Polym. Sci.*, *Journal of Applied Crystallography*, *Journal of Solid State Chemistry*, etc. The publications have found a very good response in the international scientific literature. The total number of observed citations is equal to 488. After 2009 (the year of acquiring the academic position of "associate professor") the candidate's works have been cited nearly 400 times (reference is made only on Scopus and Web of Science). In 3 articles the candidate is the first author. The scientific contributions in all the works of Associate Professor Dr. Dragomir Mladenov Tatchev are declared correctly in the copyright report.

The candidate's scientometric indicators meet and exceed the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and of the effective regulations for its implementation, including the additional requirements laid down in the Regulations of the IPC-BAS for occupying the academic position of "Professor".

Associate Professor Dr. Dragomir Tatchev is a clearly recognizable researcher, both in terms of scientific topics and the objects he studies on it, and in terms of professionally mastered methods for characterization and study of the substance. For some of these methods only in the last few years Bulgaria has available its own equipment.

The occurrence of a nanometric phase in the form of nucleation and growth is a traditional theme of IPC-BAS, in which the candidate successfully fits and enriches with research on model systems of nickel-phosphorus alloy, gold particles in sodium-calcium glass, crystallization of  $Mn_xFe_{1-x}Fe_2O_4$  particles (based on magnetite) in oxide glass, etc. His knowledge and experience in this regard characterize him as a team researcher with the ability to both lead a scientific task and to be a desirable partner in joint research.

An indisputable achievement in the professional career of Dr. Tatchev is the mastery and application of various techniques and methods for investigation of the studied objects, among which: the small-angle scattering of X-rays (SAXS) and neutrons (SANS); grazing incidence small-angle x-ray scattering (GISAXS); anomalous small-angle X-ray scattering

(ASAXS) and, more recently, computed tomography. He successfully applies this knowledge and skills on various objects, both in the field of his own scientific interests and those outside it. The high degree of professionalism in mastering is evident in the introduction of additional methods, their combination and the development of variations depending on the applicability such as: thermomagnetic method and method for simultaneous determination of particle size distribution and composition for nickel-phosphorus alloys; the development of a new two-stage method of data analysis in the study of systems of metal particles in sodium-calcium glass with potential application in optoelectronics; the analytical derivation of a scattering form-factor of a spherical particle attached to the wall of a hollow sphere in the study of the production of a metal or oxide particle in the cavity of apoferritin or ferritin-like molecules, etc. The efforts of Associate Professor Tatchev for development of the theory of small-angle X-ray scattering by multiphase multicomponent systems are impressive. According to the applied reference, the two papers on theoretical developments have been cited a total of 17 times, which is evidence of the interest of researchers in this field, in which theory lags behind practice.

Summarizing in general the results achieved in the research activities of the candidate, I can say that their contributions are directly related to the enrichment of existing knowledge and theories, as well as to the creation of new theoretical statements related to ASAXS, but also valid for arbitrary methods of contrast variation in the study of a multicomponent multiphase sample.

I address the following recommendation to the candidate: To date, he is one of the few in the country and with undisputed authority a specialist in the application of the method of small-angle X-ray scattering with the ability to apply it and work on the appropriate equipment in our country. It is good to think about the popularization and dissemination of his knowledge and skills in this regard among the Bulgarian research community, for which there are many appropriate forums and tools.

In conclusion, I express my conviction that the level of scientific and research activity and scientometric indicators of Assoc. Prof. Dr. Dragomir Mladenov Tatchev fully meet the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and all the legal regulations for its application for the occupation of the academic position of professor. I recommend that the members of the Scientific Council of IPC-BAS vote for the award of the academic position of "professor" in the professional field 4.2. Chemical Sciences (Physical Chemistry) for the needs of the Laboratory of X-ray Diffraction Methods and Computed Tomography at the IPC-BAS of Assoc. Prof. Dr. Dragomir Tatchev.

Member of the Scientific Jury:

/ Assoc. Prof. Vladislav Kostov /