

REVIEWER REPORT

for the academic position "professor", professional field of science 4.4. "Earth sciences" ("Experimental mineralogy and crystallography") at the Institute of mineralogy and crystallography "Acad. I. Kostov" - BAS, Department "Experimental mineralogy and crystallography", according to a competition announced in the SG, issue 62/2020.

Candidate: Assoc. Prof. Dr. Vladislav Vladimirov Kostov, IMC-BAS

Member of the scientific jury: Assoc. Prof. Dr. Rositsa Hristova Titorenkova, IMC-BAS

Assoc. Prof. Dr. Vladislav Kostov has been the Head of the Department "Experimental Mineralogy and Crystallography" at IMC-BAS since 2012. His professional career began at the Institute of Applied Mineralogy since 1990, when he started working as a geologist. In 2005 he defended his doctorate dissertation on the topic: "Synthesis and crystal chemical features of lead-antimony chlorine containing sulphosalts" at Sofia University and obtained a PhD degree. In 2005 he was habilitated and until now he has held the academic position of Associate Professor, initially at the Central Laboratory of mineralogy and crystallography (CLMC), and subsequently at Institute of mineralogy and crystallography (IMC) - BAS. He is the author and co-author of 71 publications, 42 of which have been published in journals with an impact factor. The candidate is the sole author of 7 publications and the first author of 29 articles, which is an indicator of his leading role in these studies.

In the competition for the academic position "professor", 4.4. "Earth Sciences", Assoc. Prof. Dr. Vladislav Kostov participated with 32 publications, which do not repeat the publications for the academic position of "Associate Professor". Twenty-two of these publications have been published in scientific journals with an impact factor, 10 of them in journals with a quartile index of Q1 and 5 with a Q2. The publications of Assoc. Prof. Kostov have 212 citations reported in Scopus and 241 in total. The h-index of the author (Kostov-Kytin) in the various databases with bibliometric and scientometric indicators (Scopus; Research gate and Web of Science) is 8. Dr. Kostov is a member of the Bulgarian Geological Society and is among the founders of the Bulgarian Crystallographic Society. He has participated in 14 scientific projects, and in 3 of which he was a project leader. He presented a report on his participation, after habilitation, in 37 national and international scientific conferences with oral and poster presentations. The candidate is listed in the register of academic staff maintained by the National centre for information and documentation (NACID).

According to the requirements of the competition, Assoc. Prof. Kostov has attached a reference for fulfilment of the national criteria and those of BAS for PhD degree, for the academic position "Associate Professor" and for the academic position "Professor". To meet

the requirements for PhD degree a publication of which Dr. Kostov-Kytin is the sole author is attached. The total number of publications to meet the requirements for the academic position "Associate Professor" is 26. The candidate has attached a table with the indicators for the academic position "professor" in the professional field 4.4. "Earth Sciences", according to which he has on indicator A-50 points; according to indicator B - 178 points (required 100 points); according to indicator D - 232.8 points (required 220 points); according to indicator D - 710 points (required 120 points); according to indicator E - 285 points (required 150 points). The scientometric indicators of the candidate meet the requirements of the Regulations for the application of the Act for the development of the academic staff in the republic of Bulgaria and that of BAS, exceeding the minimum requirements for indicators B, D and E.

After habilitation, the research of Assoc. Prof. Kostov is focused on several areas:

I. Low temperature hydrothermal synthesis (up to 200°C) of titanium, zirconium and tin silicates. This group includes publications with numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 17, 20, 23, 28. The main contributions of Assoc. Prof. Kostov are in the synthesis, identification and structural refinements of a number of known and new mineral phases: 1) titanium silicates (microporous ETS-4, ETS-10, AM-2, GTS-1, sitinakite; with layered structures AM-1 and AM-4; with dense structures - natisite and paranatisite); 2) new zirconium silicates: $\text{Na}_{3-x}\text{H}_{1+x}\text{ZrSi}_2\text{O}_8 \cdot y\text{H}_2\text{O}$, $0 < x < y$ (glazerite type structure), $\text{Na}_2\text{ZrSi}_2\text{O}_7 \cdot \text{H}_2\text{O}$ (microporous), $\text{Na}_2\text{Zr}_7\text{Si}_2.5\text{O}_{20} \cdot 3\text{H}_2\text{O}$; 3) tin containing silicates - (microporous phase - $\text{Na}_2\text{SnSi}_3\text{O}_9 \cdot 2\text{H}_2\text{O}$ (AV-10), two new phases without natural analogues $\text{Na}_3\text{HSnSi}_4\text{O}_{12} \cdot 2\text{H}_2\text{O}$ (Sn-B), $\text{Na}_2\text{SnSi}_2\text{O}_6(\text{OH})_2 \cdot \text{H}_2\text{O}$ (Sn-C) and a monoclinic tin analogue of the mineral epistolite $\text{Na}_5\text{Sn}_3(\text{Si}_2\text{O}_7)_2(\text{OH,Cl})\text{O}_2 \cdot 4\text{H}_2\text{O}$).

II. Research on thermal stability, structural and functional characteristics of synthetic phases and their ion-exchanged forms. This group includes publications with numbers: 2, 3, 5, 8, 10, 14, 17, 23, 24, 25.

III. Powder X-ray diffraction analysis and structural refinements by the Rietveld method. This group includes publications with numbers: 6, 8, 12, 13, 14, 18, 20, 21, 22, 23, 32. The main contributions of Assoc. Prof. Kostov are in the implementation of specialized software packages of the programs GSAS, FullProf, TOPAS, PowderCell and others for solving and refining crystal structures according to powder X-ray data, for crystal chemical control in quantitative phase analysis, for obtaining microstructural characteristics of crystal phases after different treatment.

IV. Crystal chemistry and systematics of glazerite type crystal structures. Crystal chemical data have been summarized for over 100 compounds with glazerite type structure. A precise structural definition is made, a general chemical formula and geometric criteria for estimating the topological flexibility of the crystal structure are introduced [15].

V. The mineral diversity of Bulgaria. This group includes publications with numbers: 11, 16, 26, 30, 31. The main contributions of Assoc. Prof. Kostov are obtaining new data on natural zeolites, tetrahedron, columbite from Bulgarian deposits and especially in the

construction and completion of electronic information bibliographic database of minerals in Bulgaria.

The expert activity in which Assoc. Prof. Kostov participated includes: Participation in a scientific jury with preparation of reviews and reports for scientific degrees and academic positions (reviews for PhD degrees - 1 and for academic position "Associate Professor" - 1; reports for academic position "Professor" - 4; "Associate Professor" - 4); reviewer of publications in Bulgarian Chemical Communications and reviewer of manuscripts in Bulgarian Chemical Communications and Comptes rendus de l'Académie bulgare des Sciences - 10; member of the editorial boards in Proceedings of the National Crystallographic Symposia 2009-2016; member of the Organizing committees I-VI National Crystallographic Symposia; member of the Organizing committee for the 8th International Conference Zeolite 2010, Sofia.

CONCLUSION:

The presented materials for the scientific and expert activity, as well as the scientometric indicators of Assoc. Prof. Dr. Vladislav Kostov meet the requirements set by the Act for the development of the academic staff in the republic of Bulgaria, Regulations for its application and the Regulations of IMC-BAS for holding the academic position "Professor" in the professional field of science 4.4. Earth Sciences.

As a member of the scientific jury, I propose Assoc. Prof. Dr. Vladislav Kostov to be elected by the Scientific Council of IMC-BAS for the academic position "Professor" in the professional field of science 4.4. Earth Sciences (Experimental Mineralogy and Crystallography).

10.11.2020.

Member of the scientific jury:

Assoc. Prof. PhD Rositsa Titorenkova