

OPINION OF REVIEWER

on the competition for occupying the academic position Associate Professor in a professional field 4.2. "Chemical Sciences" (Solide State Chemistry), announced in Newspaper of State 36/03.05.2019 with the candidate Asisstant Professor Dr. Petar Tzvetanov Tzvetkov.

from Assoc. Prof. Dr. Elena Zdravkova Ivanova, member of the Scientific Jury.

The Competition for Associate Professor in the professional field 4.2. Chemical Sciences, scientific specialty Solid State Chemistry, for the needs of Laboratory "Crystal Chemistry of Composite Materials" at the Institute of General and Inorganic Chemistry (IGIC) - BAS was announced in Newspaper of State iss. 36 dated May 03, 2019. Dr. Petar Tzvetkov, who currently holds the position of Assistant Professor at IGIC-BAS, has submitted documents for participation in the competition. Petar Tzvetkov has presented the documents required by the law, incl. (1) a CV (2) the diploma for the acquisition of the PhD degree (3) summary of the scientific achievements, (4) the lists of scientific papers, citations and participation in conferences, (5) copies of scientific papers as well as other materials, (6) the announcement of the competition in the Newspaper of State.

I do not have critical remarks about the materials presented.

Short details of the applicant Petar Tzvetanov Tzvetkov was born in 1978. In 2002 he graduated from Sofia University "St. Kliment Ohridski", major in Mineralogy and Crystallography. He then worked at the Faculty of Geology and Geography at Sofia University, and since 2006 - at IGIC-BAS. Since 2010 he holds the position of Assistant Professor at the Laboratory for Crystal Chemistry of Composite Materials at IGIC-BAS. In 2015 he defended his PhD in Chemistry.

Dr. Tzvetkov is registered with the National Center for Information and Documentation databases, where his PhD degree is recognized.

The candidate has co-authored 45 publications and 37 participations in scientific conferences. His doctoral dissertation is based on 4 papers. For this competition he presented 23 scientific papers out of the remaining 41. 20 of them are in journals included in the Scopus database - 9 papers in journals of Q1 category, 1 papers of Q2, 3 papers of Q3, 7 papers of Q4 (see the Table below).

23 of his publications have a total of 240 citations. 187 citations were noted on the papers presented for the competition. The candidate's Hirsch index is 9.

All scientific production of the candidate for Associate Professor is in the professional field 4.2 "Chemical Sciences". There is no evidence of plagiarism.

Dr. Tzvetkov is a participant in a number of scientific projects. He is a member of the Board of Directors of the Bulgarian Crystallographic Society.

Scientific contributions. A review of scientific production shows that the contributions are mainly related to the use of X-ray diffraction to characterize different materials. The 5 papers included in the habilitation thesis are focused on obtaining data on the synthesis and structure of materials based on tungstanates and germanates with potential applications in lasers. In this case, the following important contributions can be noted:

- for the first time, detailed studies have been carried out on the conditions of solid-phase synthesis and growth of single crystals from solid solutions of aluminum-indium tungstanates;
- it has been found that single crystals of germanates with olivine type structure can only be obtained by the method of growth from high-temperature solutions;
- suitable alkali borates and molybdates have been found as solvents for the growth of single crystals of germanates;
- it has been shown for the first time that single crystals of germanates as LiAlGeO_4 , Zn_2GeO_4 , $\text{Ca}_5\text{Ge}_3\text{O}_{11}$ and $5\text{LiAlGeO}_4 \cdot 4\text{Zn}_2\text{GeO}_4$ can be grown from their own melt;
- a method has been developed for the production of glass ceramics based on oxide systems containing Ca, Ge and B with potential application as solid-state matrix for tunable lasers.

The rest of the publications are organized in three other directions. In short, their contributions are related to

- studies of changes in phase composition, dispersion, crystallinity and disorder degree of catalytic systems based on double layered hydroxides, phyllosilicates, supported molybdenum or tungsten after various thermal oxidation and reduction treatments and after their testing in CO oxidation, WGS, etc .;

- synthesis and structural characterization of perovskites of different composition; study of the effect of cationic substitution on their thermal, crystal chemical and catalytic properties;

- the degree of graphitization and the crystal size of various porous carbon materials have been determined with a view to their application as electrodes in fuel cells or batteries.

Satisfaction with the requirements for the position of Assistant Professor. The documents and materials presented by Petar Tzvetanov Tzvetkov meet all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for the implementation of the Law and the corresponding Regulations of IGIC - BAS.

After analyzing the documents, the points for the respective indicators were adjusted (raised) and presented in the Table. It should be noted that they significantly exceed the required points.

Group	Indicators	Required Points	Total Points
A	1. PhD thesis	50	50
B	3. Habilitation work	100	25 x 3 publ. of Q1 20 x 1 publ. of Q2 12 x 1 publ. of Q4 Total: 107
C	7. Publications not included in the Habilitation work	220	25 x 5 publ. of Q1 15 x 3 publ. of Q3 12 x 6 publ. of Q4 Total: 242
D	11. Citations in publications indexed in Scopus	60	2 x 187 Total: 374
G	21. H-index and participation in projects	50	90
	Total Points	480	863

Conclusion. The Petar Tzvetkov's research field is in full accordance with the research topic of the Laboratory "Crystal Chemistry of Composite Materials", for whose needs the competition has been announced.

On the basis of the above facts I recommend with conviction to the Scientific Jury at IGIC - BAS to award to Dr. Petar Tzvetkov the academic position "Associate Professor" in the professional field 4.2 "Chemical Sciences", scientific specialty "Solid State Chemistry".

29/08/2019

Sofia

Reviewer:

(Assoc. Prof. Dr. Elena Ivanova)

Member of the Scientific Jury