

## REPORT

on the materials presented for participation in the competition for the academic position „Associate Professor”, professional field 4.4. Earth Sciences (Applied Mineralogy, Innovative Building Materials), announced in the State Gazette, issue 56/ 19.07.2022.

Candidate: (*Assist. Prof. eng. Aleksandar Nikolaev Nikolov PhD, Institute of Mineralogy and Crystallography "Acad. Yves. Kostov" (IMK) – BAS*)

Member of the Scientific Jury: (*Assoc. Prof. eng. Ekaterina Stoyanova Serafimova PhD, University of Chemical Technology and Metallurgy - Sofia*)

### **1. General characteristics of the presented materials.**

The candidate, Assist. Prof. eng. Aleksandar Nikolaev Nikolov PhD, holds from 2018 until now the position of "Associate professor" at IMC-BAS, which corresponds to Art. 24 of ZRASRB. The same satisfies the minimum requirements for occupying the academic position "Associate Professor" in the field of science 4.4. Earth Sciences (Applied Mineralogy, Innovative Building Materials), according to the "Regulations on the Terms and Procedures for Acquiring Scientific Degrees and Holding Academic Positions at the Institute of Mineralogy and Crystallography" Acad. Ivan Kostov" - BAS" and art. 2b para. 2 and 3 of ZRAS of the Republic of Bulgaria. The candidate's personal total number of points is 1311.13 with a minimum required of 400 points per group of indicators for the academic position "Associate Professor ". The points under indicator 1 are sufficient and the obtained educational scientific degree "PhD" is in the same specialty. Points under indicator 4 are a total of 227 out of a required 100. Points under indicators 5-11 are a total of 271.43 under of a required 200. Points under indicators 12-15 are a total of 657 out of a required 50. Additionally, the candidate has from indicators 18 to the end – 105.7 points.

Assist. Prof. eng. Aleksandar Nikolaev Nikolov PhD participated in the competition for the academic position " Associate Professor " with a total number of 22 scientific publications, 10 of which are equivalent to a monograph, 16 are publications in refereed and indexed editions. No texts, models or studies were found that were not the work of the author collective and/or the applicant. 135 are the citations without self-citations in refereed and indexed editions by other authors of the candidate's publications.

According to the provided scientific results, in addition to being in the form of articles, they also resonate in the scientific community, as the candidate has presented them at 20 scientific events. 25 reports were given - 8 oral and 12 posters. Their success is evidenced by the five awards received for achievements in the scientific direction from youth scientific and practical conferences.

The relevance of scientific research is evidenced by the three led scientific projects and successfully completed by the candidate in the field of relevant scientific activity and the three participations as a member in scientific projects, as funds were attracted for projects led by the candidate in the amount of BGN 78,485.

A good testimonial is also his membership in authoritative professional organizations such as the Bulgarian Crystallographic Society and the Bulgarian Geological Society.

### **2. General characteristics of the candidate's scientific, scientific-applied and pedagogical activities.**

The conducted research is up-to-date with a clear goal and consistency in the scientific development of publication works. The topic related to the use of natural zeolite and technogenic materials (fayalite waste, fly ash, metakaolin), their alkaline and acid activation to obtain geopolymers to be used in construction. Work is being done on different types of mixtures and

improvement of strength and adhesion of geopolymers. Acquired knowledge and skills in a wide range of analytical techniques and handling different types of equipment. Attempts were also made to utilize two types of industrial waste and enviable results were achieved by obtaining new materials.

### **3. Basic scientific and/or scientific-applied contributions**

The candidate's research contributions have scientific and applied resonance and represent a basis for new applications and research. The scientific and scientific-applied contributions can be summarized as follows: Physico-chemical have been established factors affecting to the strength, structures and applicability of geopolymers; The possibility has of creating new materials such as screed and plaster, pavement pavers, one-component cement and lightweight geopolymer, by using waste (fly ash), which in turn leads to sustainable waste management and a contribution to achieving zero-waste material cycles in production processes; New data and information were obtained about the mixtures and their mechanical, physical and physico-chemical characteristics and properties during their various mixing and activation processes; In 18 of the publications, he is the first author, and in 10 he is the only one, which gives me reason to believe that to a large extent the contributions are the personal work of the candidate.

### **4. Critical notes and recommendations.**

The results of the scientific research Assist. Prof. eng. Aleksandar Nikolaev Nikolov PhD are undoubtedly useful. They are reduced to characterization of materials, synthesis of new products, analysis of thermal processes, physical, physico-chemical and mechanical parameters. Additional and more in-depth interpretation of the results would lead to the development of the candidate's research work and to the expansion of its scope.

Reiterations of texts and analyzes are observed in the articles. Work could be done on improving, for the future, the visualization of some graphs (for FTIR and TG-DTA-DSC), as well as an additional economic evaluation of the possible application of the materials. The observed omissions are minor, easy to correct and do not detract from the results of the candidate's research activity.

### **5. Conclusion.**

Based on the presented scientific works, their significance and the contributions of Assist. Prof. eng. Aleksandar Nikolaev Nikolov PhD, I believe that he is a suitable candidate and a productive researcher. Assist. Prof. eng. Aleksandar Nikolaev Nikolov PhD is fully meet the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB) and the Regulations for the Implementation of ZRASRB for occupying the academic position of ASSISTANT PROFESSOR in the field of science 4.4. Earth Sciences (Applied Mineralogy, Innovative Building Materials).

03.11.2022

Prepared the report:  
/Assoc. Prof. eng. Ekaterina Stoyanova Serafimova PhD/