OPINION

on competition for the academic position of associate professor
in doctoral program 4.4. Earth Sciences "Mineralogy and Crystallography",
announced in the "Darzhaven vestnik" (State Gazette), issue 36 of 29.04.2025

Candidate: Chief Assistant Professor Dr. Elena Slavcheva Tacheva, IMC-BAS

Member of the Scientific Jury: Associate Professor Dr. Irina Kircheva Marinova, IMC-BAS

1. General characteristics of the presented publications

In the announced competition, the only candidate, Senior Assistant Professor Dr. Elena Tacheva, participated with 34 scientific publications. All publications are collective, of which 30 publications are written in English and 4 in Bulgarian. There are 23 publications in journals indexed in WoS, Scopus, and ERIH+. In three publications, the candidate is the first author, in eight publications she is the second author, and in the remaining 23 publications she is the third and subsequent author. Of the publications presented, 10 have an impact factor; of these, 1 has a quartile Q1, 5 have a quartile Q2, 0 has a quartile Q3, and 4 have a quartile Q4. The number of scientific publications in peer-reviewed journals, including proceedings of international and national scientific forums, is 24. The citations found number 30 or 215 points, with the majority of them in scientific publications, referenced and indexed in world-renowned databases of scientific information or in monographs. On this indicator, the candidate significantly exceeds the minimum national requirements, which are 60 points.

Elena Tacheva is present on the Scopus platform with 10 publications and an h-index equal to 2. The candidate meets the minimum required points by indicator groups for the academic position "associate professor" according to the national requirements and the requirements of IMC-BAS.

2. General characteristics of the candidate's scientific and applied scientific activities

Several topics are outlined in the candidate's scientific and applied research:

1. Mineralogical, geochemical and geochronological characteristics of igneous rocks.
2. Electron microscopic studies of natural and artificial mineral phases.
3. Geochemistry of natural minerals and geochemical behavior of chemical elements.
4. Archaeomineralogical studies.

The publications of the first group (*Mineralogical, geochemical and geochronological characteristics of igneous rocks*) are focused on the rocks of the Petrokhan pluton (Western Stara Planina, Bulgaria). These are 5 publications on accessory minerals of the pluton – titanite, ilmenite, magnetite, and apatite. New data on the morphology, zonation, chemistry and alteration products of these minerals have been obtained and considerations for their origin have been presented. In one publication (No. 7) data on the age of the Petrokhan pluton have been obtained, which also allows for a more accurate tracing of its geological history.

Electron microscopic studies of natural and artificial mineral phases are a scope of scientific work, reflected in another group of 7 publications. Two of them (No. 16 and No. 19) present new data on the mineralogy, textures and origin of the mineralization in the Kuklitsa deposit and the Kupel occurrence from the Krumovgrad goldfield (Eastern Rhodopes). In publication No. 10, samples containing turquoise and wavelite from the Chala deposit, Eastern

Rhodopes, were examined. Publication No. 18 presents for the first time morphological, chemical and structural data on a mineral from the deviline group found in Bulgarian deposits. Publication No. 29 investigated the presence and content of Rare Earth Elements and trace elements in clinoptilolite tuffs from the four major zeolite deposits in Bulgaria: Beli Plast, Golobradovo, Most and Beliya Bair (Eastern Rhodopes).

Electron microscopic studies of artificial mineral phases are reflected in 4 publications. In publication No. 11, geopolymers based on natural zeolites were studied; in publication No. 20, synthesized blue ceramics based on the mineral α-willemite (Zn_2SiO_4) were examined; in publication No. 21, a compound called "Br-gordaite" ($NaZn_4(OH)_6(SO_4)Br_6H_2O$) was characterized; and in publication No. 34, the photocatalytic efficiency of synthesized catalysts based on zirconium-modified titanosilicate in the degradation of violet and methylene blue colorations in aqueous solutions was evaluated.

Geochemical studies of pyrite and marcasite from the Sarnak deposit, Krumovgrad goldfield (Eastern Rhodopes) are reflected in 3 publications (Nos. 25, 27, and 30), and the behavior of tungsten on the surface: in soils, waters, and the oxidation zone of the Grancheritsa tungsten deposit (Western Rhodopes) is discussed in 7 publications (Nos. 22, 23, 24, 26, 28, 31, 32).

Eight publications (Nos. 5, 6, 8, 9, 13, 14, 15, 17) are devoted to *archaeomineralogical research*. Rock and mineral artifacts, metallurgical slag, plasters, and wall paintings from archaeological sites were studied.

3. Major scientific and/or applied scientific contributions

In the publications presented in the competition, the main contribution of the candidate is in the application of scanning electron microscopy and electron probe microanalysis in the characterization of natural and synthetic materials. I have no doubt that in this activity the results are the candidate's personal work, which I have been convinced of from personal experience. The new data obtained with these methods enrich existing knowledge and theories, but also support the development of science in the field of geology, petrology, mineralogy and materials science.

4. Критични бележки и препоръки по представените трудове.

The reviewer has no comments on the candidate's work.

5. Conclusion

The candidate, Senior Assistant Professor Dr. Elena Tacheva, in the IMC-BAS competition for the academic position "associate professor" has met and exceeded the minimum required points by groups of indicators for the academic position "associate professor" according to the national requirements and the requirements of IMC-BAS. Senior Assistant Professor Dr. Elena Tacheva uses successfully the methods of scanning electron microscopy and electron probe microanalysis and combines them successfully with her qualification as a geologist and petrologist. Her skills in various scientific fields are proven by publications.

I state with convintion - in my opinion, the only candidate in the considered competition of the Institute of Mineralogy and Crystallography of the Bulgarian Academy of Sciences deserves to occupy the academic position of "associate professor" for the needs of the scientific department "Mineralogy and Mineral Raw Materials" at the Institute.

Date 12.09.2025 г. Author:

(signature)