

OPINION

on a competition for the academic position of "ASSOCIATE PROFESSOR"
in 4.4 Earth Sciences (Mineralogy and Crystallography; for the needs of the department
"Mineralogy and Mineral Raw Materials" at the Institute of Mineralogy and Crystallography of
the Bulgarian Academy of Sciences)

announced in the "State Gazette", issue 36 of 29.04.2025

Candidate: *Senior Assistant Professor Dr. Elena Slavcheva Tacheva, IMC-BAS, Department of
Mineralogy and Mineral Raw Materials*

Member of the Scientific Jury: *Prof. Dr. Irena Mincheva Peycheva, Geological Institute of the
Bulgarian Academy of Sciences (GI-BAS)*

1. General characteristics of the candidate and the submitted materials

The only candidate in the competition announced by the Institute of Mineralogy and Crystallography at the Bulgarian Academy of Sciences (IMC-BAS) for the academic position of "ASSOCIATE PROFESSOR" in 4.4 Earth Sciences - Mineralogy and Crystallography, is Senior Assistant Professor Dr. Elena Slavcheva Tacheva. She graduated from the Faculty of Geology and Geography of Sofia University "St. Kliment Ohridski" in 2002. Since 2006, she was a full-time PhD student at the Institute of Mineralogy and Geochemistry of the Bulgarian Academy of Sciences with dissertation theme "Mineralogical and Geochemical Characteristics of Accessory Minerals from the Petrokhan Pluton", which she successfully defended in 2013 (after an interruption due to maternity leave). Her scientific interests are related to the topics developed by the Institute of Mineralogy and Geochemistry of the Bulgarian Academy of Sciences, where she remained after her doctoral studies, initially as an assistant, and since 2018 as a senior assistant. An important step in the scientific growth of Dr. Elena Tacheva is the training in specialized methods for mineral, material and rocks studies, and especially the development of knowledge and skills for working with an electron microscope with EDS-WDS over the past ten years. This has given her the opportunity to develop as a valuable specialist and expert not only for the Institute of Mineralogy and Geochemistry of the Bulgarian Academy of Sciences, but also for the scientific community in Bulgaria.

To participate in this competition, Dr. Elena Tacheva has submitted a total of 34 articles outside the list of the dissertation work for the award of the educational and scientific degree "Doctor". The documents for participation in the competition for the academic position "ASSOCIATE PROFESSOR" are well arranged and all materials are clearly and precisely separated. In all categories, there are articles submitted that exceed the minimum requirements for the award of the academic position. According to the requirements of indicator "B" of the new Act on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its Implementation at IMC-BAS, in the documents submitted for the competition, the candidate has included 11 scientific publications with a total of 107 points, with a required score of 100 points. The evidentiary materials under indicator "D" are publications

with a total of 226 corresponding points, allowing for "overfulfillment" of the indicator of at least 220 points. The articles submitted by the candidate are in various journals. Among the journals with a high impact factor (quartiles Q1 and Q2) are Archaeological and Anthropological Sciences (Q1 by SJR for 2019), Journal of Thermal Analysis and Calorimetry (Q2), Minerals (Q2), ChemistryOpen (Q2). The majority of publications are in Bulgarian journals that have long-term (Comptes rendus de l'Academie Bulgare des Sciences - Reports of the Bulgarian Academy of Sciences) or recently acquired impact factor or impact rank (Journal of the Bulgarian Geological Society, Geologica Balcanica).

The impact of the publications presented by Elena Tacheva can be assessed from their citations; in the presented reference, they are in a quantity that allows exceeding the required minimum (215 at a minimum of 60 points), with the majority of citations being in international journals with an impact factor. The Hirsch index of Dr. Elena Tacheva is 2 according to SCOPUS.

2. General characteristics of scientific, applied scientific and pedagogical activities.

Senior Asst. Prof. E. Tacheva has participated in 4 national and 3 international scientific projects. The topics of the presented projects are focused on research of magmatic processes, on indicator minerals in magmas, on geochemistry and indicative elements/ratios in minerals and rocks. Her successful cooperation with the team of the Department of "Mineralogy and Mineral Raw Materials" broadened her interests to ore deposits and archaeometry/archaeomineralogy. In collaboration with researchers from other departments of IMC-BAS, Elena Tacheva also develops scientific and applied directions related to natural materials and organic phases. In the IMC-BAS regulations for the implementation of the Act on the Development of Academic Staff in the Republic of Bulgaria (ZRASRB), there are no numerical requirements for indicator "E", but they would be significantly above the 30 points required in the BAS Regulations (90 points only from participation in projects).

3. Main scientific and/or applied scientific contributions

The scientific and applied scientific contributions of Senior Assistant Professor Dr. Elena Tacheva are in three main thematic areas: 1) Mineralogy and geochemistry of rock-forming, accessory and ore minerals; 2) Electron microscopic studies of natural and artificial mineral phases; 3) Archaeomineralogy.

In thematic area 1, the scientific and applied scientific contributions are to a significant extent the merit of Elena Tacheva, which is also evident from her leading role in the author team (first or second author). The most important are: using the case study of the Petrochan pluton, characteristic features in the geochemistry of accessory zircon, apatite, titanite and the ore magnetite and ilmenite have been deduced, marking processes of mixing of magmas with contrasting composition; accessory apatite sensitively reacts to changes in the crystallization environment, forming needle-like crystals (a result of the rapid crystallization of the mineral at relatively high super-cooling of the basic magma after mixing of the contrasting melts) and compositional zones with clear signs of growth interruption and dissolution, whereas the various

trace elements in the growth zones are controlled by the melt/phosphate mineral equilibrium; with high-precision CA-ID-TIMS dating of zircons and titanites, the later emplacement of gabbroic magma into an unconsolidated middle-upper crustal chamber with an intermediate magma composition has been proven.

In areas 2 and 3, the contributions are shared between the authors, with Elena Tacheva's contribution being in the development and application of microscopic and electron microscopic techniques for acquisition of important new data and characteristic features in the morphology, (geo)chemistry of known and new mineral and artificial/organic phases.

4. Critical notes and recommendations on the presented works

My recommendations for Elena Tacheva's work are mainly for more independence and confidence in the own abilities and knowledge. Knowing her research from her PhD work, as well as the additional data on the Petrochan pluton, my expectations were (and are) for publications as a lead author in high-ranking scientific journals. Despite the broad profile of her research (mineralogy, geochemistry, materials science, archaeomineralogy), the researcher's preferences should be evident from her projects and publications and determine her main expertise. I hope that as an associate professor she will be able to prepare and implement her own projects, attract and engage colleagues from different fields of research, as well as young colleagues. This will provide opportunities both for her own academic growth and recognition, and for the training of future researchers and their guidance towards priority areas in Earth Sciences and Materials Science.

5. Conclusion

Elena Tacheva has met and exceeded the requirements of the Act on the Development of Academic Staff in the Republic of Bulgaria and the Regulations for its Implementation at the IMC-BAS for holding the academic position of "ASSOCIATE PROFESSOR" in the scientific specialty 4.4 Earth Sciences – Mineralogy and Crystallography; furthermore, and the department "Mineralogy and Mineral Raw Materials" needs her committed participation in research projects and the training of doctoral students and young scientists. Summarizing the materials presented by Dr. E. Tacheva on the competition and their analysis in points 1-4, **I positively assess the candidate for holding the academic position of "ASSOCIATE PROFESSOR"** and recommend that the Scientific Jury and the Scientific Council of the IMC-BAS accept the candidacy.

Sofia, 15.09.2025

Signature:

Заличено съгласно
чл.2 от ЗЗЛД

(Prof. Dr. Irena Peytcheva)