

ATTITUDE OF REVIEWER

regarding the materials submitted for participation in the competition for holding of the academic position "**professor**" in Higher Education Area 4. Natural Sciences, Mathematics and Informatics and Professional field 4.2. Chemical Sciences (Analytical Chemistry), announced in State Gazette no. 46 of 26.05.2023 for the needs of "Atomic Spectrometry Methodology Laboratory" in the Institute of General and Inorganic Chemistry (IGIC) at the Bulgarian Academy of Sciences (BAS)

The only candidate in the current competition is **Assoc. Prof. Dr. Albena Kirilova Detcheva-Tchakarova**. She has submitted all the necessary documents specified in the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations on its implementation and the Regulations on the conditions and order for acquiring scientific degrees and for holding academic positions in BAS and IGIC-BAS. The quantitative indicators formed by the scientific research activity of Assoc. Prof. Dr. Detcheva meet the minimum requirements of ADASRB and the additional criteria of BAS and IGIC-BAS for holding of the academic position "professor" in Professional field 4.2. Chemical Sciences.

In the present competition for holding of the academic position "professor" in Professional field 4.2. Chemical Sciences (Analytical Chemistry), Assoc. Prof. Dr. Albena Detcheva participates with 79 scientific papers (58 in SCOPUS and Web of Science), all of them are on the topic of the present competition - Analytical Chemistry. 528 citations were observed on the publications (over 430 in SCOPUS). The candidate's H-index is 14 (12 according to SCOPUS). Assoc. Prof. Dr. Detcheva is co-author of three teaching aids, two author's certificates and one scientific-applied development. Research results have been presented at more than 150 scientific forums in Bulgaria and abroad. During her scientific career, Assoc. Prof. Dr. Detcheva conducted a number of successful specializations (Free University, Amsterdam, Netherlands, Chemical-Geological Institute of Friedrich Schiller University, Jena, Germany and the Institute for Comparative Materials and Measurements of the United EC Research Center (IRMM-JRC), Geel, Belgium). She was an authorized lecturer on TrainMiC (Training in Metrology in Chemistry) program for training in metrology in chemistry (since 2004), as well as a guest lecturer at Plovdiv University "Paisii Hilendarski", within the master's program "Spectrochemical Analysis". She lectured on PROJECT BG051PO001-3.3.06-0050: "Creation of highly qualified specialists in advanced materials for environmental protection: from design to innovation"; she prepared two lecture courses for PhD students at the Educational Center of BAS; conducted exercises on ICP-OES with masters of the program "Advanced Spectral and Chromatographic Methods for Analysis" in the Faculty of Chemistry and Pharmacy of Sofia University "St. Kliment Ohridski". She was co-supervisor of four undergraduate internships and the supervisor/co-supervisor of three PhD students.

Assoc. Prof. Dr. Detcheva's scientific interests, publications and teaching activity are entirely in the field of the present competition - Analytical Chemistry. She knows in depth and successfully applies a number of analytical methods, including atomic emission spectrometry with an excitation source inductively coupled plasma (for analysis of solutions and solid samples), flame atomic absorption spectrometry, electro thermal atomic absorption spectrometry (for analysis of solutions,

suspensions and solid samples), flow injection analysis and total reflection X-ray fluorescence spectroscopy.

Simultaneously with the scientific research, Assoc. Prof. Dr. Detcheva actively participates in 11 scientific projects. She was the head of the project "Application of X-ray fluorescence analysis with total internal reflection for the development of ecological analytical chemistry in Bulgaria", funded by the National Scientific Fund at the Ministry of Education and Science (Contract DTK 02/05 of 2010), which was successfully completed in 2014. She participated as an expert at the National Evaluation and Accreditation Agency - Analytical Chemistry program.

The habilitation reference, describing the scientific contributions of Assoc. Prof. Dr. Detcheva, covers 6 scientific articles (Group B, Indicator 4), which are referenced and indexed in Web of Science and/or Scopus). In five of them, Assoc. Prof. Dr. Detcheva is the first author, and in four - she is the corresponding author, which testifies to her leading role in the research. Assoc. Prof. Dr. Detcheva's contributions consist in the development, optimization, validation and application of "green" methods of the atomic spectrometry for direct electro thermal analysis of solid samples. Her research on this topic has led to a number of valuable results that are relevant to the environmental protection.

The development and application of "green" analytical methods is also a major theme in many publications from Group Γ, Indicator 7. The contributions of Assoc. Prof. Dr. Detcheva are related to a critical review of publications on the direct analysis of solid samples and suspensions, the application of Total Reflection X-ray fluorescence spectroscopy (TXRF) and the significance of the GAMA project. A special emphasis in group Γ research is the development, optimization and validation of TXRF-methods that meet the concept of "green" analytical methods. Other scientific contributions are related to the analytical characterization of materials used as sorbents for water purification from metal ions. "Green" analytical methods for direct analysis of solid samples, based on electro thermal evaporation coupled with optical emission spectrometry with an inductively coupled plasma excitation source (ETV-ICP-OES), have been developed, optimized and validated. "Green" analytical methods have been applied to the simultaneous determination of elements in three different types of objects: ultrapure copper, plant materials and sodium-calcium glass. The mineral elemental composition of seven widespread essential oil plants was investigated. Of particular interest are the Dr. Detcheva's studies of window glass from an early Christian basilica (IV-VI century, Batak region), which was used as an internal laboratory standard in the development of a direct ETV-ICP-OES method for the simultaneous determination of 27 main, minor and trace elements in sodium-calcium glass (CRM BAM-S005c - "candidate" for certified comparative material) and for participation in inter-laboratory comparisons in the certification procedure. Three publications with the participation of Assoc. Prof. Dr. Detcheva are dedicated to the statistical processing and interpretation of elemental analysis databases. Two papers (Group Γ, Indicator 8) address direct atomic spectrometry methods for the analysis of solid samples without prior decomposition or solubilization and of suspensions. A special place is devoted to the features of direct electro thermal atomic absorption analysis in the determination of mercury.

Conclusion. My impressions of Associate Professor Dr. Albena Detcheva as a scientist, teacher and expert in the field of Analytical Chemistry are excellent. She has in-depth knowledge and

professionalism, proven over the years of her scientific career through innovative scientific research, participation and management of scientific projects, training of students, PhD students and interns and joint research work with colleagues from various scientific institutions, incl. international. I vote with conviction “yes” for **Assoc. Prof. Dr. Albena Kirilova Detcheva-Tchakarova** to hold the academic position of "**professor**" in the Higher Education Area 4. Natural sciences, mathematics and informatics and Professional field 4.2. Chemical Sciences (Analytical Chemistry) at IGIC-BAS.

September 1, 2023, Sofia

Member of the Scientific Jury:
(Natasha Trendafilova, Prof. PhD, IGIC-BAS)