

STATEMENT

from Prof. Zara Cherkezova-Zheleva, Institute of Catalysis - Bulgarian Academy of Sciences (member of the Scientific Jury)

on the competition for occupying the academic position "Associated professor" in the professional field 4.1 "Physical Sciences", scientific research area "Electric, magnetic and optical properties of condensed matter"

announced in the State Gazette 35/10.05.2022 by the Institute of Optical Materials and Technologies (IOMT) "Acad. J. Malinowski", Bulgarian Academy of Sciences

According to the Order № ПД-15-463/08.07.2022, issued by the Director of the Institute of Optical Materials and Technologies (IOMT) "Acad. J. Malinowski", Bulgarian Academy of Sciences, I was appointed as a member of the Scientific Jury for accomplishing the procedure in the competition for occupation of the academic position „Associated professor" in IOMT-BAS in the professional field 4.1 "Physical Sciences", scientific research area "Electric, magnetic and optical properties of condensed matter", for the needs of the Institute of Optical Materials and Technologies "Acad. J. Malinowski"-BAS, announced in the State Gazette 35/10.05.2022.

Attitude on the obtained materials

Assistant Professor PhD Velichka Strijkova-Kenderova from the Institute of Optical Materials and Technologies "Acad. J. Malinowski", Bulgarian Academy of Sciences is the only candidate, applying for the academic position "Associated Professor" in the competition, announced by the IOMT-BAS. She has submitted all the required documents that are listed into the Regulations for the Terms and Procedure for Acquisition of Academic Degrees and for Occupation of Academic Positions in the Institute of Optical Materials and Technologies, BAS. Dr. Velichka Strijkova-Kenderova fulfills all the relevant law requirements for occupation of the academic position "Assoc. Professor". She received academic degree in Master of Sciences" (MSc) from the Faculty of Physics at Sofia University "St. Kliment Ohridsky", in year 1998 and she was appointed as a physicist at the IOMT-BAS. From 2002 to 2005 she was PhD student at IOMT-BAS. She was appointed at the IOMT-BAS on different positions, respectively: as a physicist (2005-2007); assist. prof. III degree (2007-2009); assist. prof. II degree (2009-2010); assist. prof. I degree (2010-2011); chief assist. prof. (since 2011). In 2014 she acquired "Philosophy Doctor" (PhD) degree in the scientific specialty "Physicochemistry", with PhD Thesis entitled: "Vacuum deposited polyimide layers - properties and application possibilities". As of 22.06.2022 she has professional experience which is more than required according to the normative documents for participation in the competition for the academic position Associated Professor at IOMT-BAS.

The set of materials submitted by Dr. Velichka Strijkova-Kenderova in electronic form shows that her overall scientific production consists of 67 publications. She has participated with 19 publications in the competition, which are different from the works included in her Ph.D. thesis. All of these papers have been published in peer-reviewed and indexed scientific journals in the field of physicochemistry and materials science (Web of Science и Scopus), all these papers are in a co-authorship.

The candidate participates in the competition with two groups of scientific works: 6 publications are presented as equivalent to habilitation work and 13 are outside the habilitation work. In the first group, 3 of the scientific works were published in high-impact journals with rank Q1 (Int. J. Mol. Sci.-2 and Optical Materials) and 3 – in journals with rank Q2 (Optical and Quantum Electronics, Photonics, Optical Materials). In the second group (under item 7), the scientific works are distributed: 5 publications are in journals with rank Q1

(Nanomaterials-2, Optics and Laser Technology, Sensors, Biosensors), 4 – in journals with rank Q2 (Coatings-3, Crystals) and 3 – in a journal with rank Q4 (J. Phys. Conf. Ser.-3). The mentioned publications collect respectively 135 points for indicator B and 266 points for indicator D, with minimum required points of 100 and 220 respectively for the group of indicators according to the Regulations for the Application of DASRB and the Regulations of IOMT - BAS.

A certificate of the high level of Dr. Velichka Strijkova-Kenderova's scientific research are also the presented 50 citations (in total) of the works submitted for the current procedure for an associate professorship, all of them are referred in the Web of Science and Scopus databases. These citations are distributed as follows: 23 citations are on 2 of the articles equivalent to the habilitation thesis and 27 citations - on 6 publications outside the habilitation thesis. This citation gives a score of 100 points in total against the minimum required 60 points for this metric. The Hirsch index of the candidate is 6.

From the analysis of the scientific indicators, it can be clearly seen that for each of them Dr. Velichka Strijkova-Kenderova has the required number of points, and for some indicators this number exceeds the minimum requirements for occupying the academic position of associate professor, laid down in the Rules of the IOMT - BAS. The candidate participated in the competition with a total of 551 points, out of the required 430 points.

Ch. Assist. Prof. PhD Velichka Strijkova-Kenderova is a member of the working team of 10 projects financed by the Bulgarian National Scientific Research Fund, ministries and other departments. The results of the conducted scientific research were presented as 13 oral reports and 26 poster presentations at 26 international and national scientific events.

The presented references for the teaching activities of Dr. Velichka Strijkova-Kenderova are impressive. They are a real proof of her active role in the improvement of the qualification of new specialists in the research area. The candidate is a lecturer at the EUROOPTIC Professional Training Center in Optics and Optical Devices (academic years 2015 – 2019); teacher of physics and astronomy for students from 7th to 12th grade (from 2008 to present); trains students, PhD students and specialists with the principles of operation of the ZETA optical profilometer and the Atomic Force Microscope (AFM) at the IOMT-BAS, for which he is responsible; conducts educational practice at IOMT for scholars and students.

The scientific research activities of Dr. Velichka Strijkova-Kenderova are focused on emerging problems related to preparation of new high-technology materials by using and combining different synthesis and processing methods; characterization of materials with Atomic Force Microscopy and optimisation of their functional properties. A main focus of her work is the investigation of the surface properties of materials with nanometric dimensions (bulk nanomaterials or thin layers), as well as the characterization of biological objects. The candidate and her co-authors developed a methodology for measuring the elastic forces and determining the Young's modulus for biological objects (cells).

The candidate's original scientific contributions to the scientific research submitted for participation in this competition are presented correctly and in details in the respective documents. The research contributions submitted for participation in the competition in the Habilitation Work section are divided into two topics. The first one is the study and analysis of morphometric and nanomechanical characteristics of normal and pathologically changed erythrocytes. For the first time, specific morphometric characteristics of erythrocytes from women with early pregnancy loss were identified using AFM, as well as a study on the aging process of erythrocytes obtained from patients with neurodegenerative diseases was conducted. The second topic is related to research of the conditions of holographic recording of tunable polarization gratings and surface relief realized in azopolymer PAZO and in azopolymer nanocomposites (ZnO, Au and goethite (α -FeOOH)).

The candidate's scientific research regarding her original scientific contributions on publications outside of the habilitation thesis are divided into five topics: (1) investigation of the surface of transparent conductive doped zinc oxide layers with applications as transparent electrodes and energy harvesting devices. For the first time, Al ZnO (AZO) doped transparent conductive layers on transparent and flexible muscovite mica substrates were obtained and characterized using the sequential atomic layer deposition (ALD) technique, resulting in improvement of their properties. (2) preparation of two-dimensional (2D) transition metal dichalcogenides with applications in optoelectronics. (3) Atomic layer deposition of aluminum nitride (AlN) with application in surface acoustic wave (SAW) devices. (4) Development of a polymer dye medium as an active medium for lasers. (5) Application of surface plasmon resonance as a basis of measurement techniques in biology and medicine as biosensors and for clinical analysis.

Therefore, it can be concluded that the scientific contributions of Dr. Velichka Strijkova-Kenderova are significant and correctly presented. They logically follow the obtained results and can be summarized as enriching of the existing knowledge on the discussed problems by using Atomic Force Microscopy to study and optimize the functional properties of new and improved materials important for practice.

CONCLUSION: The documents and the materials presented by Chief Assist. Prof. PhD Velichka Strijkova-Kenderova meet all the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its implementation and the corresponding rules for the implementation of the law in the Institute of Optical Materials and Technologies "Acad. J. Malinowski", Bulgarian Academy of Sciences (IOMT-BAS). The candidate submitted a sufficient number of scientific papers, published after receiving her PhD degree. The obtained results based on the research activity of Dr. Velichka Strijkova-Kenderova are original and have significant scientific contribution to the studied area. They completely fulfilled the relevant requirements of IOMT-BAS for occupation of the academic position "Associate Professor" in the field of this competition and are far above them. I strongly support the application and also recommend to the members of the Scientific Jury and to the Scientific Council of the IOMT – BAS to award to the Chief Assist. Prof. PhD Velichka Strijkova-Kenderova the academic position "Associated Professor" in the professional field 4.1 "Physical Sciences", scientific research area "Electric, magnetic and optical properties of condensed matter".

07/09/2022
Sofia

Reviewer:

(Prof. Dr. Z. Cherkesova-Zheleva,
Member of the Scientific Jury)