

REPORT

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on the competition for filling the academic position of an Professor
announced in State Gazette No. 12 / 11.02.2020 in the Professional
Field 4.1. Physical sciences, Scientific Specialty: Wave processes
with a single applicant: Assoc. Prof. Dr. Dimana Ilieva Nazarova

by Prof. Dr. Darinka Christova, Institute of Polymers - BAS

This report was prepared in response to Order № RD-15-277 of 15.06.2029 of the Director of the Institute of Optical Materials and Technologies "Acad. J. Malinowski" - Bulgarian Academy of Sciences (IOMT-BAS) and following the decision made by the Academic Jury that was held on 25.06.2020. It is in compliance with Development of Academic Staff in the Republic of Bulgaria Act (DASRB), the Rules for the Application of the Development of Academic Staff in the Republic of Bulgaria Act, the Rules of Bulgarian Academy of Sciences and with the Rules set at IOMT-BAS for applying the Act aforementioned.

The materials submitted by Assoc. Prof. Dr. Dimana Nazarova for participation in the competition are well designed and fully meet the regulatory requirements of the DASRB, the Rules of BAS and the Rules of IOMT-BAS.

Evaluation of the applicant's research activity:

Dr. Nazarova is the author/co-author of a total of 91 scientific publications, of which 71 have been published in peer-reviewed journals with impact factor/rank. In the current competition for the academic position "Professor" she participates with 21 publications, which are different from the works in the dissertation for the educational and scientific degree "Doctor" and in the competition for the academic position "Associate Professor". All presented publications are co-authored, Dr. Nazarova is the first author in 6 and the corresponding author in 3 of them. The scientific papers for participation in the competition are distributed as follows: 6 publications in editions, referenced and indexed in world-famous databases, 2 of which are published in journals with rank Q1 (*Optical Materials* and *Journal of photochemistry and photobiology A: Chemistry*) are presented as equivalent to a habilitation thesis, 3 - in a journal with rank Q3 (*Journal of Physics: Conference Series*) and 1 - in a refereed conference proceedings. Out of the habilitation thesis, 15 refereed and indexed in Scopus articles are presented, 6 of which published in journals with rank Q1 (*Optics and Lasers in Engineering*, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* and *Optics Express*), 1 - in a journal with rank Q3 (*Physica Scripta*) and 8 - in a journal with rank Q4 (*Bulgarian Chemical Communications*). The analysis of the scientific production of the applicant shows full compliance and exceeding the minimum requirements for holding the academic position of professor, provided in the Regulations for application of ZRASRB and in the Regulations of IOMT-BAS.

The reference provided by Assoc. Prof. Nazarova accounts a total of 132 citations of 32 of the applicant's publications. The number of citations in scientific journals referenced and indexed in *Scopus* and *Web of Science* is 69, which fully fulfills the regulatory requirements. Most of these citations quote the latest works of the applicant from the last 5 years. In addition, some of the publications of Assoc.

Prof. Nazarova (e.g. publications № 23, 26, 27 and 32 from the submitted list of applicant's citations) received feedback in the year of publication, which is a good certificate for the

The activity of Assoc. Prof. Nazarova in the dissemination and promotion of the scientific results is impressive. In the competition materials, she presents an impressive list of over 110 participations in a total of 67 national and international scientific forums including 79 posters and 32 oral presentations, 5 of which - invited and plenary talks. However, information on the presenting authors is not provided and this makes it difficult to assess objectively applicant's personal contribution.

Associate Professor Dimana Nazarova is a participant in the implementation of a total of 18 national research and educational projects, 5 of which are funded by the Research Fund (NSF); 3 - funded by various programs of the Ministry of Education and Science, 1 - under Operational Program "Development of the competitiveness of the Bulgarian economy", and 1 - by the National Innovation Fund, as well as 3 international projects with research centers in Korea and Finland. In addition, Assoc. Prof. Nazarova has been and currently is the leader of a total of 4 projects funded by the NSF (one of which to support participation in a project under the COST program of EC) and a number of contracts under the program "Student Internships".

Scientific contributions in the publications submitted for participation in the competition:

An assessment of the submitted scientific publications shows that the applicant works in a clearly defined thematic area related to polarization holography and the development of photoanisotropic materials for optical recording of information. The scientific contributions in the publications submitted as equivalent to habilitation thesis can be briefly summarized as follows:

- New organic-inorganic composite materials are synthesized and studied based on various azopolymers - newly synthesized or commercially available, which are doped with nanoparticles of different type (ZnO, Au) and size.
- Conditions to produce thin layers from the developed anisotropic materials are established (e.g. concentration and size of nanoparticles, concentration of polymer solution) under which improved stability and high values of photoinduced birefringence of the layer are obtained. This outcome is an excellent basis for application as media for polarization holographic recording and data storage.
- Significant improvement of the photo response and reduction of the recording time is achieved for the layers based on the developed composite anisotropic materials in comparison with those from the initial azopolymers.

In the publications submitted outside the habilitation thesis I would outline the following major scientific contributions:

- Significant scientific and applied contribution makes the research on the reversibility of polarization recording on the thin layers of the developed new organic-inorganic composite materials based on azopolymers. The conditions for erasing the recording are established when using two different methods - by

raising the temperature or by irradiating with polarized light. Of interest is also the significantly higher birefringence stability found in a liquid crystalline polymer than in an amorphous one.

- Of interest are also the anisotropic properties of thin layers obtained on the basis of the synthesized new perylene bis azo-imide dyes with a wide spectral range. The recording kinetics, relaxation and erasure of the birefringence for dyes immobilized in polymer matrices are studied and the reversibility of the recording at wavelength of 355 nm and 491 nm is established. It is also found that the incorporation of dyes into polyimide nanocomposite layers improves the photo response at 532 nm compared to the dye layers

Critical remarks and recommendations:

I have no significant critical remarks on the submitted documents. I do not know Assoc. Prof. Dr. Dimana Nazarova in person, but based on the submitted materials me she is undoubtedly a recognizable scientist with consistent professional development and successful performances at home and abroad. I am convinced that Assoc. Prof. Dr. Nazarova is motivated to continue her original research in the field of new materials for polarization holography - a scientific field with significant innovation potential, so I would recommend her to work actively for intellectual property protecting by patents or utility models.

Conclusion:

Based on the assessment of the overall research activity of Assoc. Prof. Dr. Dimana Nazarova, as well as on merit and importance of the scientific contributions in submitted publications, I strongly support the applicant in the competition. According to Art. 26 (3) of DASRB I express my positive opinion and recommend to the respected members of the Scientific Council of IOMT-BAS to vote for **Assoc. Prof. Dr. Dimana Ilieva Nazarova** to be elected **professor** at the Institute of Optical Materials and Technologies "Acad. J. Malinowski" - BAS.

14.08.2020

Member of the Academic Jury:

Prof. Dr. Darinka Christova