

REPORT

in a competition for the academic position "PROFESSOR"

in the professional field 4. 1 "Physical science", scientific specialty "Physics of wave processes" published in the Newspaper of State no. 12/11.02.2020, by the Institute for Optical Materials and Technologies (IOMT) "Acad. J. Malinovski", Bulgarian Academy of Sciences

a single candidate assoc. prof. PhD Dimana Ilieva Nazarova

Member of the scientific jury: prof. PhD Snejana Kitova - IOMT, BAS

1. General characteristics of the presented materials

The overall scientific production of the only candidate for the competition assoc. prof. Dimana Ilieva Nazarova includes 91 scientific papers, of which 71 published in international scientific journals with IF or SJR. She participated in the competition with 21 publications, all of which are co-authored, and are different from the works included in the PhD thesis and for the academic position of "Associate Professor". They are published in peer-reviewed and indexed scientific journals in the field of physics of wave processes and physics of condensed matter.

The scientific papers for participation in the competition are grouped in two groups: 6 publications are presented as equivalent to a habilitation thesis, of which 2 are published in referenced and indexed in the databases Web of Science and Scopus journals with rank Q1 (Optical Materials, J. Photochem. Photobiol. A: Chemistry), 3 - in Q3 rank journals (J. Phys.: Conf. Ser.), and 1 - in a journal with SJR (Proc. SPIE). According to the Implementing Regulations of the DASRB and Rules of IOMT - BAS, these publications collect a total of 105 points at a required minimum of 100 points for the corresponding group of indicators B.

Outside the papers substituting the habilitation thesis, 15 articles are presented in refereed and indexed in Web of Science and Scopus editions, of which 6 are published in Q1 rank journals (Optics Express, Optical Materials, Optics and Lasers in Engineering, Spectrochim. Acta Part A: Mol. and Biomol. Spectros.), 1 - in Q3 rank journal (Physica Scripta), 6 - in Q4 rank journal (Bulg. Chem. Commun.) and 2 - in the journal with SJR (Proc. SPIE). They collect a total of 257 points at a required minimum of 220 points for this group of indicators G, according to the Rules of IOMT - BAS.

The reference provided by assoc. prof. Dimana Nazarova presents a total of 67 citations, reflected in the Web of Science and Scopus databases, which is a good certificate for the level of her research and the relevance of the thematic areas in which she works. They accumulate 138 points at a required minimum of 120 points for this group of indicators D according to the Rules of IOMT - BAS.

Assoc. prof. Dimana Nazarova is a coordinator of 5 projects funded by the National Science Fund (NSF), of which 2 are ongoing. She has participated in the implementation of another 10 projects funded by the NSF, of which 7 are ongoing, and in the implementation of 3 projects under international programs with South Korea and Finland. D. Nazarova collects 281 points at a required minimum of 150 points for this group of indicators E according to the Rules of IOMT - BAS. It should be noted that she is also a participant in 2 projects with Bulgarian companies.

According to the presented information, the candidate has active expert and pedagogical activities. She has many participation in scientific juries for the occupation of the academic positions assistant and associate professor, Masters and PhD theses, as well as reviewer of european projects and international journals with IF. Assoc. prof. D. Nazarova is a supervisor of 2 PhD, 3 bachelor, 2 master students, and 7 student internships. She is also a lecturer in PhD

school at the Bulgarian Academy of Sciences with a lecture course on "Light-sensitive materials for optical recording: reversible, irreversible and of a new type of organic-inorganic composites".

The dissemination of the candidate's research results is also impressive. Assoc. prof. D. Nazarova has exported 29 oral reports, of which 6 are invited as well as 38 poster reports on national and international scientific forums.

The analysis of the scientometric indicators achieved by the candidate shows full compliance and exceeding the requirements for occupying the academic position of "professor" set out in Implementing Regulations of the DASRB and Rules of IOMT - BAS

2. Evaluation of the research activity of the candidate.

The scientific works of the applicant are mainly in the field of polarization holographic recording in anisotropic materials based on new organic and inorganic composite materials. Since the possibility, established by L. Nikolova and T. Todorov in 1984 to record highly efficient polarization holographic gratings in azobenzene-containing polymers, they became the subject of intensive research. Various methods have been applied to increase the value of photoinduced anisotropy in the azopolymers and to provide a more efficient polarization record.

One of the most important parameters characterizing the optical anisotropy, directly related to the diffraction efficiency of holographic grating recorded in the film is the birefringence. The main object of the candidate's research is the study of new nanocomposite materials consisting of nanoparticles with different types, sizes, and shapes incorporated in a polymer matrix. This is a new, unexplored approach for increasing the birefringence in composite anisotropic materials.

The major scientific contributions of publications substituting the habilitation thesis can be described as the development of new nanocomposite materials consisting of three different azopolymers synthesized in IOMT, doped with nanoparticles of ZnO and Au with different size. These nanocomposites exhibit enhanced morphological, chemical, and physical properties in comparison with the undoped azopolymers. The stability and high values of photoinduced birefringence in newly obtained materials imply their application as a medium for polarization holographic data storage and recording of diffractive optical elements with high efficiency and unique polarization properties.

Another major part of candidate's research is dedicated to the study of the characteristics of polarization recording in anisotropic materials, in various newly synthesized dyes or dye and matrix systems, the development of algorithms for dynamic speckle analysis and their applications for the analysis of various activities, investigating the spectral characteristics of thin layers by applying the genetic algorithm.

I would characterize the obtained contributions as an enrichment of existing knowledge of the problems the candidate is working on using different experimental and theoretical methods for optimizing the properties of known materials and structures, as well as creating new ones. Some of the results were obtained for the first time and are cited by other researchers. I believe that these studies are important for the practical use of the materials and structures being studied.

CONCLUSION

The comprehensive research activity of assoc. prof. Dimana Nazarova shows that she is an internationally recognized scientist with extensive knowledge and experience in the field of physics of wave processes and condensed matter. I have known the candidate personally for many years, I have witnessed her growth as a researcher and I do not doubt her leading personal

contribution to the researches carried out. Based on the review of the competition documents, taking into account the evaluation of the submitted publications and the importance of scientific contributions, as well as my impressions of the candidate's qualities, I express a **positive opinion** and recommend to the honorable members of the Scientific Council of IOMT - BAS to vote assoc. prof. **Dimana Nazarova to be elected for the academic position "PROFESSOR"** at IOMT - BAS.

08.08.2020

Report prepared by:

/prof. S. Kitova/