

OPINION

by Prof. Dimana Ilieva Nazarova, PhD,  
Institute of Optical Materials and Technologies  
"Acad. Yordan Malinovski" - Bulgarian Academy of Sciences, member of a scientific  
jury, appointed by order No. RD-15-461 of 08.07.2022 of the Director of IOMT-BAS

regarding the materials submitted for participation in a competition for the occupation of  
the academic position " **Associate Professor** " at the Institute of Optical Materials and  
Technologies "Acad. Yordan Malinovski" - Bulgarian Academy of Sciences  
in areas of higher education 4. Natural Sciences, Mathematics and Informatics; professional  
field 4.1. Physical sciences, (Electrical, magnetic and optical properties of condensed matter)

Assist. Prof. Dr. Katerina Lazarova, from the Institute of Optical Materials and  
Technologies "Acad. Yordan Malinovski", participates as the only candidate in the "associate  
professor" competition proclaimed both in State Gazette no. 35, dated 10. May 2022 and in  
the Institute of Optical Materials and Technologies website.

**1. General presentation of the procedure and the candidate**

The set of materials presented by Assist. Prof. Katerina Lazarova (in paper and  
electronic form) is in accordance with the Law on the Development of the Academic Staff in  
the Republic of Bulgaria and the Development of Academic Staff Regulation in the Institute  
of Optical Materials and Technologies "Acad. Yordan Malinovski" - BAS and includes all  
necessary documents for participating in the competition.

Katerina Lazarova has been an assistant professor in the Institute of Optical Materials  
and Technologies for 5 years, and has been working at the Institute for 9 years. My personal  
opinion of her is that she is a very hard-working, diligent and ambitious scientist with high-  
level experimental and theoretical skills.

Assist. Prof. Dr. Katerina Lazarova is a co-author of 41 scientific papers, 20 of which  
she submitted for participation in the competition and were not used to obtain the educational  
and scientific degree "Doctor". She has 96 noticed citations in refereed publications, 61  
participations in scientific forums. she is leading 5 projects, of which 3 are financed by the  
Ministry of Education, one by the BAS and one by NP Young scientists and postdoctoral  
fellows. She is a participant in 14 projects, of which 3 are international.

The scientific activity presented by the candidate fully corresponds to and even exceeds  
the minimum national requirements for professional field 4.1. Physical sciences.

**For criterion A (min. 50 p.) - 50 points**

She obtained a PhD in Physical Chemistry in IOMT - BAS with the thesis topic:  
"Porous one-dimensional photonic crystals of metal oxides and nano-sized zeolites for sensor  
applications"

**For criterion B (min. 100 p.) - 117 points**

6 articles are presented, of which 3 with factor Q1 with 25 points each, 1 with factor Q2  
with 20 points, 1 with factor Q4 with 12 points and 1 with SJR with 10 points, making 117  
points.

**For criterion Г (min. 200 p.) - 230 points**

14 journal articles are presented, of which 9 in IF journals and 3 in impact rank journals, giving a total of 230 points.

**For criterion Д (min. 60 p.) - 62 points**

31 citations are presented, each of which has 2 points and the total number of points is 62.

**2. General characteristics of the activities of the applicant**

Assist. Prof. Dr. Katerina Lazarova is very active in scientific research.

The main scientific activity of ch. a.c. Katerina Lazarova is in the field of sensor applications of thin films of different composition: humidity-sensitive polymers, nanocomposites of metal oxides and zeolites or rare earth elements.

In the reference for original scientific contributions in scientific publications, included in group of indicators "B" (equivalent to habilitation thesis publications), results published in 6 articles are summarized, of which 3 with factor Q1, 1 with factor Q2, 1 with factor Q4 and 1 with SJR. The articles have been published in prestigious international journals. The main scientific contributions of the candidate, reflected in the habilitation report, are related to the improvement of the optical and sensor properties and optimization of the sensitivity of thin films of humidity-sensitive polymers, by doping, by the influence of the substrate, the color change dependence on humidity, etc. The two topics formulated by the candidate are as follows:

1. Investigation of the optical and sensory properties of thin films of different humidity-sensitive polymers;
2. Development of a flexible humidity sensor with optical detection.

In the author reference for the scientific contributions in the publications under indicator "Г", 14 publications are included, of which 9 in journals with IF and 3 in journals with impact rank, and they are divided into several main groups. In addition to the first group, which is also reflected in section "B", three more main groups of contributions are listed here, as follows:

- Characterization of the optical and sensor properties of nanocomposites of metal oxides and zeolites.
- Development of photonic crystals from metal oxides and/or composites.
- Study of optical characteristics of thin films of zirconium oxide obtained by different synthesis and doped with rare earth elements.

The author reference for this group of articles is competently prepared and adequately reflects the scientific contributions of the candidate. The most significant contributions, in my opinion, can be formulated as:

- The achievement of an increase in the sensor properties over 3 times of the layers of SiO<sub>2</sub> doped with 20% Si-MFI zeolites.
- The development of photonic crystals from metal oxides and zeolites in order to optimize the sensor properties of the stack structures and achieve increased sensitivity over 10 times in the detection of acetone and, respectively, over 20% when introducing a defect layer compared to a stack without a defect layer.

There is no doubt that the scientific contributions are the personal work of the candidate.

I have no critical comments on the materials provided for the competition.

I do not find any plagiarism in the candidate's scientific works.

### **CONCLUSION**

The scientific papers submitted for participation in the competition, the number of citations, the participation in projects by the candidate exceed the requirements for occupying the academic position "Associate Professor" according to the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations for the implementation of the Law on the Development of Academic Staff in the Republic of Bulgaria, as well as the minimum requirements of BAS and, respectively, IOMT for scientific and teaching activities of the candidates for the academic position " Associate Professor ". The candidate's papers contain original scientific and applied contributions that have received international recognition through their publication in journals and scientific collections issued by international academic publishing publishers. Based on all this, I unhesitatingly support the candidacy of Assist. Prof. Katerina Lazarova, I give my positive assessment and recommend to the members of the Scientific Jury and the Scientific Council of IOMT-BAS to choose Assist. Prof. Katerina Lazarova for " Associate Professor " in direction 4.1. Physical sciences scientific specialty "Electrical, magnetic and optical properties of condensed matter".

09. 08.2022

Opinion issued by:

(Prof. Dimana Nazarova, PhD)