

OPINION

in the competition for the occupation of the academic position "Professor"
Specialty 4.2 Chemical Sciences (Inorganic Chemistry)
at the Institute of General and Inorganic Chemistry, Bulgarian Academy of Sciences (IGIC-BAS)
declared in the State Gazette, issue 36 of 03/05/2019

Candidate: Assoc. Prof. Dr. Reni Yordanova (IGIC-BAS)

By Assoc. Prof. Dr. Diana Todorova Rabadjieva (IGIC-BAS), member of the Scientific Jury,
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General characteristics of the research and teaching activities

Assoc. Prof. Dr. Reni Yordanova participates in the competition with 37 scientific publications. In accordance with the requirements of the Rules for the Implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB) at IGIC - BAS of 2019, they are divided into two groups: (a) habilitation work – 15 scientific publications in world-renowned databases of scientific information (Web of Science and/or Scopus) - group „B“, 332 credits at minimum 100 credits required and (b) 22 scientific publications in editions that have been refereed and indexed in world-renowned databases of scientific information (Web of Science and/or Scopus), outside the habilitation work - group „Г“ 449 credits at minimum 220 credits required. It is striking that these works represent only 41% of the total number of works (91), published with the co-authorship of Assoc. Prof. Reni Yordanova after her habilitation as an Assoc. Professor. I cannot but mention the large number of citations, a total of 918 after habilitation (H index 16), 331 of which on articles included in the competition (H index 10), which is an evidence for the relevance of the candidate's scientific topics.

The H-index of the candidate on all publications significantly exceeds the specific requirements of the regulations of IGIC for a candidate for occupation of the academic position "Professor" (H-index minimum 10). The research activities of Assoc. Prof. Dr. Reni Yordanova also include participation in 8 projects funded by the Research Fund of the Ministry of Education and Science (leader of three projects) and in one project under the Operational Program "Science and Education for Intelligent Growth". In addition to research, the applicant has experience in teaching. She was leader of 2 courses of laboratory exercises of master's students at the University of Chemical Technology and Metallurgy in Sofia; she was supervisor of the graduate works of 3 students and 1 PhD student (successfully defended); supervisor of 1 PhD student, deducted in 2015 with the right of defense; consultant to 3 PhD students and mentor in the "Student Practices" program.

Scientific topics and scientific contributions

Assoc. Prof. Dr. Reni Yordanova is involved in the study of high-temperature oxide systems with a view to obtaining new materials (glasses, amorphous or crystalline substances and composites) with new or improved properties, which makes them potential candidates for practical applications as amorphous semiconductors, electrolytes, optical materials, new active media with luminescence properties, catalysts, etc.

Assoc. Prof. Yordanova's scientific contributions can be summarized as follows:

- More than 20 two-, three- or four-component oxide systems are studied. The concentration limits of glass-, gel- or phase-formation in them are determined;
- Molybdate and tungstate glasses containing transition metal oxides (Al, Bi, Cu, Zn, Pb), rare earth oxides (La and Nd), with or without the presence of the classic network generator B_2O_3

are synthesized and structurally characterized. Topological models are developed to describe the amorphous glass-forming networks. Data on their thermal stability are obtained. The relation between composition-structure-tendency for amorphization-optical properties is established;

- Multicomponent selenite and tellurite glasses with the participation of Ag_2O , CuO , V_2O_5 , MoO_3 , B_2O_3 and Nb_2O_5 are synthesized. The glasses are structurally characterized and their optical properties are examined;
- A series of amorphous and composite selenite and tellurite materials with the participation of TiO_2 , ZnO_2 and B_2O_3 are obtained and characterized by applying the sol-gel method. Some of the materials display good antimicrobial properties;
- Molybdate (NiMoO_4) and a series of tungstate oxide phases of the general formula AWO_4 ($\text{A} = \text{Ni}, \text{Zn}, \text{Mg}, \text{Cu}$) having a tungstate-type structure are synthesized by mechanochemically activated synthesis and are characterized. The optimal experimental parameters of the mechanochemical activation for phase synthesis are established. The catalytic activity and photocatalytic properties of the phases are evaluated.

Conclusion

The scientific production and the activities of Assoc. Prof. Dr. Reni Yordanova exceed the national minimum requirements, as well as those of BAS and of the specific requirements of IGIC-BAS for occupying the academic position "Professor". Moreover, as a longtime successful head of the High Temperature Oxide Materials Laboratory, she has proven her ability to lead a team of researchers, to develop and deepen the scientific topics of the laboratory. Based on all of the above, I give my positive assessment of the entire research activity of Assoc. Prof. Dr. Reni Yordanova and strongly recommend her approvement by the Scientific Jury to take up the academic position "Professor" in the Specialty 4.2 Chemical Sciences.

22.08.2019

Sofia

/Assoc. Prof. Dr. Diana Rabadjieva/