

R E V I E W

on the competition for the academic position Associate Professor scientific direction 4.2. Chemical Sciences (Inorganic Chemistry)

at the Sofia University "St. Kliment Ohridski" – Faculty of Chemistry and Pharmacy
(SU-FCP)
announcement in бр. 21 from 15.03. 2022

Applicant: Assistant Prof. Dr. Nina Veselinova Kanave - Dobrevska (SU-FCP)

Member of the Scientific Jury: Prof. Dr. Radostina Konstantinova Stoyanova (IGIC-BAS)

A. Report on the fulfilment of the minimal criteria of SU-FCP

In the competition for associate professor of inorganic chemistry, Dr. Kaneva participated with 6 scientific publications devoted to the use of zinc oxide as a photocatalyst for the degradation of dyes and pharmaceuticals. One of these publication was published in an international journal from the first quartile in field of materials chemistry (i.e. Q1), and two were in the Bulgarian journal Bulgarian Chemical Communications (Q4). In accordance with the requirements of the FHF-SU, Dr. Kaneva has also presented a habilitation thesis dealing with the same topic - photocatalysis. Along with the above publications and habilitation thesis, Dr. Kaneva presents also 12 scientific papers published between 2009 and 2019, which focus on the modification of the photocatalytic properties of zinc oxide. All papers are published in journals with an impact factor, with 25% of them in journals classified as Q1, 33% in Q2, 25% in Q3 and 17% in Q4. From the applied documents, I think that the applicant submitted rather a full text of an article in the proceedings of an international conference "International black sea coastline countries symposium-5" instead of the stated "book chapter". Until now, 35 independent citations were noticed on the presented publications from the habilitation thesis, and on the other publications – 142, were 47 of them (submitted for participation in the competition) are only on one publication published on 2011. Dr. Kaneva participated in nine research projects in the period between 2007 and 2022, financed under various programs. The total Hirsch index (H-factor) of Dr. Kaneva's overall scientific output is 12 (SCOPUS database). In 2011-2012, she was a fellow of the prestigious Eureka Foundation.

Dr. Kaneva takes part in the educational and teaching activities of the Department of Inorganic Chemistry at the FHF-SU by conducting practical exercises and seminars on the courses "General Chemistry", "General and Inorganic Chemistry", "Inorganic Chemistry" and "General Chemistry and Stoichiometric Calculations " of various specialties (13 in total). She is the supervisor of 11 theoretical and 2 experimental coursework for the specialty "Chemistry" under "Practice in Inorganic Chemistry". In addition, two students (first year) from the specialty "Chemistry" are attracted for research circle work.

The above report (comprising 18 publications, relevant citations and participation in projects) reveals that the research and teaching activities of Dr. Kaneva cover the thematic topic of the competition and fulfills the minimal national requirements for occupying the academic position of "associate professor" in the field of "Natural sciences, mathematics and informatics", field of Chemical Sciences (as is specified in the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its Application and the Regulations for the Terms and Conditions for Acquiring Scientific Degrees and Holding Academic Positions at SU-FHF).

B. General characteristics of the candidate's research activity

B1. Main scientific contributions presented in the habilitation thesis. Heterogeneous photocatalysis is considered as one of the effective methods for purifying water from organic pollutants. Dr. Kaneva's habilitation thesis falls into this field, in which the focus is on the applicant's research. It is worth to mention that this topic is developed as a continuation of the applicant's doctoral dissertation. The main contributions of Dr. Kaneva are related to the development of synthetic methods for photocatalysts, the performance of photocatalytic experiments, the calculation of the rate constants of the relevant processes and the discussion of the results obtained. Thin films of zinc oxide are the subject of research. The relationships between synthesis method, morphology and photocatalytic properties at the decomposition reactions of dyes (such as malachite green and brilliant green) and drugs (such as paracetamol and chloramphenicol) are experimentally demonstrated.

B2. Scientific contributions presented in works outside the habilitation work: these studies comprise the modification of zinc oxide through using two approaches: doping of ZnO with nickel, copper and gallium ions and forming composites between ZnO and zinc ferrite and titanium dioxide. In general, the research aims to go inside into peculiarities of the modified materials and correlate them with their photocatalytic properties. It was established that, among the modified photocatalysts, the composites between ZnO and TiO₂ exhibited the highest photocatalytic activity. Moreover, the ZnO/TiO₂ composites outperform the performance of the single components. After treatment of ZnO powders with rare earth elements (such as La, Eu, and Ce), the highest photocatalytic activity was observed for La/ZnO photocatalysts.

All the applicant's studies were carried out in a wide research team composed of scientists from BAS institutes (such as IGIC-BAS and IC-BAS) and the Department of Nano- and Microelectronics in Penza and St. Petersburg (Russia). The role of Dr. Kaneva consists in the synthesis of the catalysts, as well as in carrying out the photocatalytic experiments

C. Recommendations

The state-of-the-art research in the field of photocatalysis is mainly directed into the understanding the reaction pathways of organic pollutants degradation, and in particular the identification of intermediate and end products of degradation. I think that the future research of Dr. Kaneva could be better to develop and deepen in this area. Also, a better interrelation of the candidate's research with that of the global scientific community could help in hers future scientific development.

D. Conclusion

The research of Dr. Kaneva contributes mainly to expanding knowledge on the photocatalytic properties of zinc oxide. Along with this, Dr. Kaneva has the teaching activity at the Department of Inorganic Chemistry at FHF-SU. Based on the minimal national requirements, as well as on the awards and scholarships received, I propose to the Scientific Jury to award Dr. Nina Kaneva, the academic position of "associate professor" in inorganic chemistry at the Faculty of Chemistry and Pharmacy of SU "St. Kliment Ohridski"..

11.07.2022 г.

Radostina Stoyanova