

REPORT

from Dr. Tsvetanka Krumova Babeva, professor in the Institute of Optical Materials and Technologies – BAS for competition for academic position "Associated Professor" in the professional field 4.1 Physical Sciences, scientific specialty "Electric, magnetic and optical properties of condensed matter", according to the announcement in SG, issue no. 93 of 26 November 2019.

Applicant: Dr. KIRIL MLADENOV KIRILOV, Assistant Professor in Faculty of Physics, Sofia University "St. Kl. Ohridski"

The sole candidate in the competition, Dr. Kiril Kirilov submitted 16 scientific papers, 10 of them with impact factor (IF) and 6 of them with SJR. All papers, except one, were published after acquiring PhD degree. One paper (# 6 from document 10b) was published in the year of defense and I suppose that it is not a part of his PhD thesis. It is worth to note that most of the papers were published in reputable journals, such as *Applied Surface Science* (IF = 5.16), which is ranked 1 in the *Materials Science, Coatings & Films* category, *Semiconductor Science and Technology* (IF=2.65), *Journal of Physics D: Applied Physics* (IF=2.89) etc. The candidate provided a list of 89 citations all cited one paper. According to the database *Scopus* the total number of citations of the applicant is 160 and his *h*-index is 5 (inquiry on 09.02.2020).

Dr. Kirilov has disseminated the results of his work through 21 poster reports, but the documents presented do not contain information on the type of forums – international or national, the place and the date.

The documents submitted in the competition are with sufficient quality and quantity in order the applicant to meet the minimum national requirements. The documents in the competition were submitted before the date of the last change of the Regulation of Sofia University for acquiring academic degrees and occupying academic positions therefore I am not going to discuss the presence or lack of compliance with the additional requirements placed there.

The applicant's research fields correspond completely to the professional field of the competition. The scientific results and contributions are mainly in the field of condensed matter physics and are particularly related to the preparation and characterization of new materials and structures as thin carbon films, graphene oxide, nitrides, CdSe quantum dots, Si nanoparticles etc. Various deposition methods have been used: pulsed laser deposition (PLD), thermal vacuum evaporation, liquid phase epitaxy, molecular beam epitaxy etc. Conventional characterization methods such as Raman, UV-VIS and X-ray photoelectron spectroscopy, electron and atomic force microscopy, ellipsometry and photoluminescence have been implemented. Additionally, techniques such as cathode luminescence, surface photovoltage spectroscopy, emission measurements at low temperatures have been optimized and applied for characterization.

The major scientific contributions consist of enriching existing knowledge and obtaining new results for the materials, which opens the possibility of future application. I will highlight two major contributions: i) Low temperature studies of the photoluminescence from colloidal CdSe nanocrystals prepared by the hot injection method in liquid paraffin and their interpretation and ii)

developing of a vector model for analyzing the surface photovoltage (SPV) amplitude and phase spectra which facilitates the interpretation of the SPV spectra of complex semiconductor structures.

The submitted documents show good project activity of the applicant. Dr. Kirilov is a project leader of one project funded by the NSF of Sofia University and has been a team member of 21 projects (Bulgarian NSF-15, NSF of SU-5, EC-1) and one COST action.

Regarding teaching activity - as an assistant professor Dr. Kirilov delivers lectures and teaches students in experimental work on "Experimental physics", "Practical physics" and "Experimental methods in solid state physics". He also teaches experimental work in "General physics", "Physical electronics 2 - solid state electronics" and "Solid state physics and Microelectronics". His workload in the last 3 academic years exceeds significantly the common accepted workload. There is an increasing trend in his teaching activity. Dr. Kirilov was a supervisor of 3 bachelor's and 1 master's thesis. He works very well with students as well - since 2011 the applicant has been a member of the National Commission for Physics Olympiad.

According to the personal contribution of the applicant, I do not personally know him but after studying carefully the documents submitted in the competition, I got the impression that Dr. Kirilov is an energetic and motivated scientist who works well in collaboration. In the detailed report of the scientific contributions of the applicant, written by him and submitted as part of the competition's documents, the applicant distinguishes in a clear manner his personal contributions to each topic, which leaves a good impression. Mainly they are related to the measurements and characterization of the materials and to processing, interpretation and discussing the results.

Conclusion

After I have looked closely at the scientific and teaching activity of the applicant, I can conclude without hesitation that Dr. Kiril Mladenov Kirilov is a talented and motivated researcher who has already shown that has the necessary skills to conduct independent scientific research at a high level. The results achieved are original and with potential for practical application at a later stage.

All written above gives me the confidence to support the application of Dr. Kirilov and to propose to the members of the Faculty Council of the Faculty of Physics Dr. Kiril Mladenov Kirilov to be selected for the academic position "Associated professor" in professional field 4.1 Physical Sciences, specialty "Electric, magnetic and optical properties of condensed matter".

9th February 2020



Professor Dr. Tsvetanka Babeva