

REVIEW

Assoc. Prof. Dr. Elena Dimitrova Vassileva

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regarding the submitted documents of Assistant Professor Dr. Nikolay Aleksandrov Grozev in a competition for an Associate Professor in a professional field 4.2. Chemical Sciences, scientific specialty Biophysical Chemistry for the needs of the Department of Physical Chemistry of the Faculty of Chemistry and Pharmacy, Sofia University "St. Kliment Ohridski" announced in the State Gazette, issue 63/30.07.2021

The only candidate who has submitted documents and admitted to the competition is Assist. Prof. Dr. Nikolay Grozev, PhD, who works in the Laboratory of Biophysical Chemistry at the Department of Physical Chemistry of the Faculty of Chemistry and Pharmacy.

Biographical data on the applicant:

Nikolay Grozev has a Master's Degree in Molecular Biotechnology from the Faculty of Biology at Sofia University "St. Kliment Ohridski" which he graduated in 1998 with excellence. Since 1999 he has been a full-time doctoral student in the Laboratory of Biophysical Chemistry, Department of Physical Chemistry, Faculty of Chemistry, Sofia University "St. Kliment Ohridski". His doctoral dissertation was successfully defended in 2003. In the same year he was appointed as an Assistant Professor, and in 2008 as a Senior Assistant Professor in the Department of Physical Chemistry, as he is so far. Dr. Grozev was on two short-term specializations abroad, namely in the Unité Mixte de Recherche 'Fractionnement des Agro-Ressources et Emballage', INRA, Reims, France, in the Roger Douillard group in 2000 and 2001 respectively.

General characteristics of the received materials and eligibility

Dr. Nikolay Grozev presented on electronic media all documents required in accordance with the The Law on the Development of Academic Staff in the Republic of Bulgaria, its Rules, the Rules on the Terms and Conditions for Acquisition of Academic Positions in Sofia University "St. Kliment Ohridski" and the Recommendations for the Criteria for acquiring the scientific degrees and academic positions at Sofia University for the Professional Field of Chemical Sciences, related to the procedure for holding the academic position of Associate Professor. The presented documentation is prepared correctly, clearly and in accordance with all requirements and recommendations. Attached are:

- **Indicator A: 50 points**

The candidate Nikolay Grozev has defended his dissertation on "Mechanical, electrical and chemical properties of layers of linear polyester and cross-linked lignin-like polymers on the water-air interface", developed at the Department of Physical Chemistry, Faculty of Chemistry, Sofia University. Cl. Ohridski" in 2003.

- **Indicator B: 105 points**

A habilitation thesis on "Structure formation in thin polymer films of diblock copolymers and in monolayers of twin molecules derived from L-Asp" in the volume of 108 pages is presented. The habilitation work includes results from the research activity of the candidate, published in 5 scientific publications - 3 with Q1 and 2 with Q3, as the total number of points on this indicator exceeds the required 100 points. The presented results are clearly described, adequately explained and are of great scientific interest. The way of presentation shows the deep and critical thinking of the candidate, as well as a very good knowledge of the subject.

- **Indicator D: 242 points**

There are 13 publications presented, outside the habilitation thesis, with which the candidate participates in this competition. Of them: 4 with Q1, 4 with Q2, 2 with Q3, 1 with Q4 and 2 with SJR, as the total number of points on this indicator is 242, which exceeds the required 200 minimum number of points under ZRASRB, as well as the required 220 points of the Regulations of the Faculty of Chemistry and Pharmacy.

- **Indicator E:** 230 points for all scientific publications and 176 for the articles (18 in number) with which the candidate participates in the competition.

Until the submission of the documents, 115 citations on all articles of the candidate and 88 citations of the articles with which he participated in the competition were noticed. The minimum requirements for this indicator for the Faculty of Chemistry and Pharmacy are 70 points, the candidate has submitted 115 citations, which significantly exceeds these requirements.

- **Indicators F: 190 points**

This indicator is part of the additional requirements of the Faculty of Chemistry and Pharmacy. Dr. Grozev is a co-leader of 1 and participant in 3 research projects funded by the Sofia University Research Fund. Dr. Grozev's h-index in Scopus is 9. In addition, Dr. Grozev participates in 5 international (funded by the European Commission) and 5 national projects (funded by the Bulgarian National Research Fund). The total number of points on this indicator is 190, which again significantly exceeds the required minimum of 70 points.

- **Author's report on major scientific contributions** in a volume of 11 pages

The Scientific Contributions Report clearly outlines the candidate's personal contributions to the study of phase boundary phenomena, including the water/air phase boundary, thin solid films on a solid substrate where crystallization of polymers and sol-gel systems has been studied, and liquid films on solid and liquid substrates. I accept the author's reference for his scientific production contributions, which is in line with the field of the competition.

- **Information on teaching activity**

The presented documents show that Dr. Grozev also develops active teaching activity, not only performing, but also on most indicators exceeds the minimum requirements of the competition. The presented courses led by the candidate are in the scientific field in which the competition was announced.

- **Research activities**

The research of Senior Assistant Professor Dr. Nikolay Grozev can be summarized in the following topics:

o Investigation of phenomena and processes occurring on the water / air boundary surface:

- *adsorption of inorganic ions*, where the role of ion-specific volume coefficients of activity in the effect of the Hofmeister series on the surface tension of concentrated salt solutions is shown, taking into account the nonideality of the solutions and the presence of a diffuse electric layer. For the first time a model of hydration interaction between ion and water surface is presented, in which the surface structure is taken into account.

- *a chemical reaction* occurring at the water / air phase boundary to produce Pt nanoparticles.

- *characterization of the action of pharmaceutical products* - pulmonary surfactants, commercial products used to overcome respiratory distress syndrome, confirming the mechanisms of serum protein deactivation and the restorative effect of hydrophilic polymers.

- *characterization of twin surfactants*, derivatives of L-aspartic acid in monolayer and in solution, studying their ability to form fibers with nano- and micro-dimensional arrangement in Langmuir monolayer.

o Examination of hard films on a hard surface:

- *Structure formation* in thin polymer films of diblock copolymers consisting of a crystallizing and an amorphous part, the morphology of the obtained single crystals depending on the film thickness as well as the crystallization temperature was studied in detail. The formation of structures in solutions of branched polypeptide star block copolymer - poly (γ -benzyl-L-glutamate) (PBLGlu) in chloroform was also studied, and the influence of the presence of water on the critical concentration of structure formation was shown. .

- *Sol-gel films* are deposited on solid substrates that contain Ru (II) - complexes for use as oxygen sensors

o Investigation of wetting, surfactant and and wetting phenomena

- *The effect of Ag nano-clusters* (~ 2 nm) stabilized by poly (methacrylic acid) (PMAA) on the leakage of foam films from their suspension was studied and compared with the leakage of foam films containing aqueous solutions of PMAA with and without AgNO₃. Silver nano clusters determined reduced steric repulsion in the tested suspensions, leading to stable thinner films.

- *The phenomena of wetting, friction, flotation and coalescence* in various systems have been studied in detail, and specific characteristics of these processes have been determined.

• **Conclusion**

In conclusion, I believe that Senior Assistant Professor Nikolay Grozev meets all the requirements of the Law on Occupying the Academic Position of Associate Professor of Biophysicscochemistry, both in terms of his scientific achievements and his teaching activities, and has met all additional recommended criteria of the Faculty of Chemistry and Pharmacy, Sofia University "St. Kliment Ohridski". Based on the submitted documents and my personal impressions, I strongly suggest to the esteemed Scientific Jury and the Scientific Council of

the Faculty of Chemistry and Pharmacy to award the scientific title "Associate Professor" to Dr. Nikolay Alexandrov Grozev in professional field 4.2. Chemical sciences, scientific specialty Biophysical Chemistry.

Signature

/ Assoc. Dr. Elena Vasileva /

Sofia, 17.12.2021