

REPORT

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on the competition for filling the academic position of *Professor* in the Faculty of Chemistry and Pharmacy, Sofia University *St. Kl. Ohridski*

in the area of *Natural Sciences, Mathematics and Informatics*, Professional Field 4.2 *Chemical Sciences (Polymers)*

In the competition for filling the academic position of *Professor*, announced in Official State Gazette, issue. 24 from 17.03.2023, for the needs of Faculty of Chemistry and Pharmacy, Assoc. Prof. Dr. Elena Dimitrova Vassileva from the Faculty of Chemistry and Pharmacy, Sofia University *St. Kl. Ohridski* is the only candidate.

1. General information about the procedure and the candidate

Only one candidate submitted documents for participation in the announced competition: Assoc. Prof. Dr. Elena Dimitrova Vassileva from the Faculty of Chemistry and Pharmacy, Sofia University *St. Kl. Ohridski*. The set of materials presented by Dr. Elena Vassileva is in accordance with the requirements of the Rules for acquisition of scientific degrees and academic positions in Sofia University and the Recommended criteria for acquisition of scientific degrees and academic positions for Professional fields 4.2 *Chemical Sciences* and 7.3 *Pharmacy* of Faculty of Chemistry and Pharmacy.

The candidate has submitted a total of 16 scientific papers, as well as lists of projects, participations in scientific forums, Master theses she has supervised, citations, and a list of all her publications. All 16 scientific papers (in the groups of indicators B and Γ) are accepted for evaluation in the competition. None of those 16 papers have been included in her PhD thesis and in the competition for acquiring the academic position of *Assoc. Professor*. The distribution of the scientific papers is as follows: 7 publications in journals falling into quartile Q1 with impact factors (IF) in the 3.108 – 5.997 range; 7 – in Q2 (IF 0.615 – 4.432); 1 – in Q3 and 1 book chapter. Dr. Elena Vassileva has also presented a habilitation thesis entitled *Polyzwitterions and Polyzwitterion Materials with Application in Medicine and Pharmacy*, which is based on 5 publications in the group of indicators B (indicator 4). The habilitation work outlines the relationship between the zwitterionic nature of monomeric units and the resulting properties of polyzwitterion-based

materials and their application in medicine and pharmacy as materials for chronic wounds dressings and materials for modified drug release.

Elena Vassileva graduated from Sofia University in 1995. From 1996 to 2000 she was a PhD student in the same university. In 2000, under the supervision of Prof. DSc Stoyko Fakirov, she defended her doctoral dissertation *Studies on Some Physico-Mechanical Properties and Biodegradation of Modified Gelatin*. Dr. Vassileva has had short-term specializations in the Institute of the Structure of Matter (Madrid, Spain) as well as in the Universities of Cincinnati (USA), Kaiserslautern (Germany), and Palermo (Italy). From June 2001 to May 2002, she is a Marie Curie fellow (Post-doc position) in the Institute of Composite Materials, University of Kaiserslautern (Germany). In the Faculty of Chemistry of SU *St. Kl. Ohridski* she has worked successively as an Assistant (2003 – 2004), Senior Assistant (2004 – 2005) and Assistant Professor (2005 – 2008), and from 2008 until now she holds the academic position of *Associate Professor* at the Faculty of Chemistry and Pharmacy of SU *St. Kl. Ohridski*.

2. General characteristics of the candidate's research activity

All scientific papers with which the candidate participates in the competition are published. Most of the publications fall into quartiles Q1 and Q2 (7 in each of the quartiles, 14 on aggregate), one is in Q3, and one is a book chapter. The candidate is the corresponding author in 11 of them. The citation record shows 68 citations of 11 publications; the most cited paper is [P. S. Shestakova, R. Willem, E. Vassileva. Elucidation of the chemical and morphological structure of Double Network Hydrogels by HRMAS-NMR. *Chemistry – A European Journal* 17(52), 14867-77 (2011)] with 18 citations. It must be noted that 6 of the publications are from the last two years and have not reached yet the “citation age”. Dr. Vassileva is a co-author of 48 papers and 2 book chapters, 38 of which are in peer review journals with impact factors, and more than 716 citations. The Hirsch index, according to Scopus, without self-citations of the candidate is 13.

Assoc. Prof. Vassileva's scientific research is mainly focused on the creation, development and research of polymer materials with application in medicine, such as polyelectrolytic hydrogels, polymer networks and polymer particles. Various approaches and methods have been used to obtain them, and the ultimate goals, purpose and potential application are usually related to specific medical problems – materials for wound dressings, for modified drug release, drug delivery systems. In several articles and a review, the application of polyelectrolytic networks as a material for dressings of chronic wounds has been shown for the first time, employing their specific

properties – excellent bio- and blood compatibility, low non-specific adsorption of proteins on polyzwitterionic surfaces, as well as "intelligent" behavior and abilities to respond to changes in parameters of the biological environment. The advantages of polyzwitterionic hydrogels as materials for chronic wound dressings have been demonstrated, whereas in one of the first reviews in this field, their own and similar studies are critically presented and discussed [Konstans Ruseva, Elena Vassileva. Polyzwitterionic Hydrogels as Wound Dressing Materials. Chapter 9 in Multifunctional Hydrogels for Biomedical Applications. Editors: Ricardo A. Pires, Iva Pashkuleva, Rui L. Reis, 2022 Wiley-VCH GmbH. <https://doi.org/10.1002/9783527825820.ch9>]. The ability of polyzwitterions, in particular poly(sulfobetaine methacrylate), to form a physical network by association of macromolecules in dipole-dipole clusters and the resulting properties have been intelligently and originally employed to create copolymer networks that have been investigated as materials for soft contact lenses for modified drug (timolol maleate) ocular release that can be controlled by copolymer composition.

In addition to purely fundamental research to characterize the interactions between polymer components of interpenetrating networks, research is aimed at creating smart biomaterials, matrices for polymer composites, and drug delivery systems based on interpenetrating networks. Some of this research are pioneering – for example, the triply sensitive materials responding to three external (biological) stimuli and the biomineralization in interpenetrating networks used as matrices for precipitation of calcium phosphates and the preparation of polymer composites. Others are original as a combination of a given drug substance and a specific formulation, a component selection, and properties of the interpenetrating network that control loading efficiency and drug release.

In the third group of publications, most of which are placed in the group of indicators Γ , various approaches are described for the preparation of polymer particles, representing gelatin droplets obtained by a sonochemical method, polyzwitterionic particles obtained by chemical and physical crosslinking, polyelectrolyte complexes of oppositely charged chitosan and alginate, and anisotropic polymer particles and polymer-composite particles obtained by heterogeneous emulsion polymerization. The contributions of these publications consist of determination of a number of (fundamental) parameters and conditions through which the size, shape, morphology, properties of the particles can be controlled, and some of them have also been studied as drug carriers and for controlled release of medicinal substances. Given the interdisciplinary nature of

most of the works, the contributions could be formulated as *proving by new means substantial new aspects of already existing scientific fields, problems, theories and hypotheses*.

Assoc. Prof. Dr. Elena Vassileva has been a co-supervisor of two PhD students (group of indicators E) and supervised 11 Master theses (group of indicators Ж) in the period after 2011. Evidence of participation in national and international projects as member (1) and leader, including team leader and work package leader (10) and of active teaching activity - elective and compulsory courses for master's degrees. The sums of the points for these two groups of indicators (E and Ж) significantly exceed the requirements for the Faculty of Chemistry and Pharmacy.

3. Critical notes and recommendations

I don't have any significant critical remarks about the candidate's scientific works and activities and presentation of the documents and materials in the competition. I believe, however, that the applicant's presentation of prospects for the development of her future research and research interest, as well as for her activity in the academic position of *Professor*, would be useful.

CONCLUSION

Based on the overall research and teaching activity and the fulfilled and exceeded quantitative indicators from the Recommended criteria for professional field 4.2 *Chemical Sciences* of the Faculty of Chemistry and Pharmacy, SU *St. Kl. Ohridski*, I believe that the only candidate for the announced competition, Assoc. Dr. Elena Dimitrova Vasileva, fully meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria for acquiring the academic position of *Professor*. This gives me reason to propose that Assoc. Prof. Dr. Elena Dimitrova Vassileva be elected to the academic position of *Professor* in professional field 4.2. *Chemical Sciences*.

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