

## REPORT

**on competition for filling the academic position of Professor  
in a Professional Field 4.2. Chemical Sciences (Polymers),  
published in the SG no. 24/17.03.2023**

**Candidate:** Associate Professor Dr. Elena Dimitrova Vassileva

**Member of the Scientific Jury:** Prof. Dr. Olya Stoilova Stoilova,  
Institute of Polymers - BAS

This Report is prepared in response to Order № RD 38-162/06.04.2023 issued by the Rector of the Sofia University “St. Kl. Ohridski” (SU), following the decision made by the Academic Jury that was held on 23.05.2023. The Report is in compliance with Development of the Academic Staff in the Republic of Bulgaria Act (DASRBA), the Regulations on the implementation of the Development of Academic Staff in the Republic of Bulgaria Act (RIDASRBA), the Rules on the Conditions and Procedure for Acquiring Science Degrees and Holding Academic Positions in SU, as well as with the recommended criteria of the Faculty of Chemistry and Pharmacy for acquiring the academic position Professor at SU in the Professional Field 4.2. Chemical Sciences.

**Associate Professor Elena Dimitrova Vassileva, PhD**, is the only candidate on the competition for filling the academic position Professor in Professional Field 4.2. Chemical Sciences (Polymers), announced in SG no. 24/17.03.2023 at the Faculty of Chemistry and Pharmacy, SU. Dr. Vassileva graduated in 1995 as a Master of Chemistry with a specialization in Organic and Analytical Chemistry at the Faculty of Chemistry of Sofia University “St. Kl. Ohridski”. In 2000 she received educational and scientific degree Doctor of Philosophy in the scientific specialty 01.05.06 Macromolecular Chemistry, based on a defended dissertation on “*Some studies on the physico-mechanical properties and biodegradability of modified gelatin*”. From 2003 to 2007 she held the positions “assistant”, “senior assistant” and “assistant professor”, and since 2008 until now she has held the academic position of Associate Professor at the Faculty of Chemistry and Pharmacy at SU. She held fellowships at the Institute of Structure of Matter in Madrid (1997), at the Center for Polymer Research at the University of Cincinnati (1998), at the Institute for Composite Materials at the University of Kaiserslautern (1999, 2001 and 2002) and at the University of Palermo (2000 - 2001).

In the competition, Dr. Vassileva has participated with 15 research publications (5 in Group C.4 and 10 in Group D.7) and one book chapter (in Group D.8) all co-authored. The publications are refereed and indexed in *Scopus* or *Web of Science (WoS)* and included 14

articles published in international journals with impact factor and one with SJR without IF. 10 of the publications are published in high-ranking journals (quartile Q1) for the respective year of publication, 4 are published in Q2 and one is in Q3. In group of indicators C.4. a habilitation thesis was presented on the topic “*Polyzwitterions and materials based on them with application in medicine and pharmacy*”. It summarizes the results of 5 publications in which Dr. Vassileva is a corresponding author. This proves her leading role and significant contribution in their development. No quartile is available for the journal *Gels* in the year of publication (2023), but the one available for the nearest year (2022) is Q1 according to *WoS*. Thus, the publications in this group give a total score of 120, instead of the calculated by the candidate 110 points, against the minimum 100 required. Out of the habilitation thesis, 10 publications are presented (all of them are outside those used to fill the position of “Associate Professor”) additionally in the Group D.7 and one book chapter in Group D.8, which give a total of 250 points, instead of the 245 points calculated by the candidate, out of the minimum required 220. In the Group E.11 a list of citations of 11 publications submitted for participation in the competition is provided. A total of 68 citations were noted, making 136 points out of the minimum required 120. In the Group F the co-supervision of two PhD students (F.13), the participation (F.14 and F.15) and the management (F.16 and F.17) of research projects, as well the attracted funds for projects led by the candidate (F.18) are presented. The total score for this indicator is 380 points out of the minimum required 150. It should be noted the significant contribution of the candidate in the management of both national and international research projects, which prove her leading role in the development of the research projects, as well as the accumulated administrative experience. In the Group G a *h-index* of the candidate (G.21.), introduced one mandatory and two optional courses (G.22) and 11 successfully defended MSc graduates (G.23) are provided. Thus, the score in this group gives a total score of 270, with the minimum 120 points required. **The applicant's scientific output evaluation shows that in all Groups of indicators (A, C, D, E, F and G), the candidate Dr. Elena Vassileva significantly exceeds the minimum requirements (total 1206 out of 760) for filling the academic position Professor in the Professional Field 4.2. Chemical Sciences.**

The publications submitted for assessment are thematically related and are in the field of polymer materials and their potential application in medicine. The scientific contributions can be grouped thematically with respect to the type of polymeric materials obtained, namely: (i) hydrogels of polyzwitterions, mainly suitable as dressings for chronic wounds healing or soft contact lenses; (ii) interpenetrating polymer networks suitable as sustained drug delivery systems (verapamil hydrochloride and diclofenac sodium) and (iii) polymer particles obtained

by different approaches. An interesting approach with potential application is the use of interpenetrating polymer networks as matrices for the *in situ* calcium phosphate deposition in an attempt to mimic the naturally occurring biomineralization. A methodology for characterizing interactions in interpenetrating polymer networks by high-resolution magic angle spinning NMR spectroscopy has also been developed. In addition, it should also be noted the introduced method for the synthesis of polymer particles with regular anisotropic shapes, which can be successfully controlled by appropriate selection of the conditions and the ingredients used.

The presented habilitation thesis “*Polyzwitterions and materials based on them with application in medicine and pharmacy*” is an overview and summarizes the results of the publications presented in the group C.4. In general, these results reveal the candidate 's high scientific potential not only in the field of stimuli responsive interpenetrating polymer networks (IPN) based on polyzwitterions and in particular of their hydrogels, but also on their potential applications as dressings for chronic wounds healing and drug delivery systems. An applied contribution is the synthesis of poly(sulfobetaine methacrylate) (PSBM) and poly(carboxybetaine methacrylate) (PCBM) hydrogels. Moreover, a comparison was made with the action of these hydrogels with those available on the market and thus their high potential for making dressings for chronic wounds healing was proven. A significant applied contribution is the synthesis and characterization of novel triple stimuli (temperature, pH and ionic strength) responsive IPN based on two polyzwitterionic networks, namely PSBM and PCBM. Two types of polymer carriers were also considered - particles of PSBM and hydrogels of PSBM and its copolymers with vinyl pyrrolidone, as suitable carriers for sustained delivery of timolol maleate or for ocular drug delivery. As a remark of the thesis, I will mention the absence of abbreviations or the use of different abbreviations for the same compounds.

Undoubtedly, the scientific contributions of Assoc. Prof. Elena Vassileva are original, innovative and have significant applied potential. Thus, the candidate has significantly contributed to the development of the scientific topics of the Laboratory for Structure and Properties of Polymers. My personal opinion of Dr. Vassileva is excellent – she is an established and respected scientist and teacher, with valuable scientific knowledge and competence in the field of polymers and polymer materials, and possesses all the necessary personal and professional qualities to occupy the academic position of “Professor”.

### **Conclusion**

Based on the above analysis and evaluation of the presented materials, I am convinced that the research metrics of Dr. Vasileva meets and significantly exceed the minimum national

requirements, as defined in the DASRBA, RIDASRBA, the Rules on the Conditions and Procedure for Acquiring Science Degrees and Holding Academic Positions in SU, as well as with the recommended criteria of the FCP for acquiring the academic position “Professor” at SU in the Professional Field 4.2. Chemical Sciences. **Therefore, my overall assessment is positive and I strongly recommend to the members of Faculty Council of the FCP at SU "St. Kl. Ohridski" to support the election of Assoc. Prof. Dr. Elena Dimitrova Vassileva for the academic position of “Professor” in professional field 4.2. Chemical Sciences (Polymers).**

**10.07.2023**

**Report prepared by:**

Prof. Dr. O. Stoilova, IP-BAS

Member of the Academic Jury