

Statement

In competition for the academic position of "Professor" in the professional field 4.2. Chemical sciences, for the scientific specialty "Electrochemistry", for the needs of the section "Electrochemistry and Corrosion",

announced in the State Gazette No. 99 of 13.12.2022.

with candidate Assoc. Prof. Dr. Maria Hristova Petrova-Nikolova

Member of the Scientific Jury: Prof. Dragomir Mladenov Tatchev, PhD

1 GENERAL CHARACTERISTICS OF THE CANDIDATE'S SCIENTIFIC RESEARCH AND APPLIED ACTIVITIES

Associate Professor Dr. Maria Hristova Petrova-Nikolova has presented a total of 70 scientific publications of which 7 are included in her doctoral dissertation, and 24 are used to acquire the scientific position of associate professor. Eight of all publications are in journals with Q1 rank, 27 in journals with Q2 rank, 5 in journals with Q3 rank and 4 with Q4 rank. Twenty-four articles are in journals without impact factor or SJR. Three national patents and one university textbook were also submitted.

In order to meet the national minimum requirements set out in the PHASB and the requirements of the Institute of Physical Chemistry "Acad. R Kayshev" - BAS to the scientific activity of the candidates for the academic position of "professor" the publications are distributed so that under letter "C" the candidate has 100 points with 100 required, and under letter "D" - 453 points with 220 required. In the attached list of citations to the applicant's works, 489 citations are listed. A reference to Scopus to date gives 491 citations of Dr. Petrova-Nikolova's works, not counting self-citations by all co-authors. The candidate's reference for meeting the requirements of item "E" gives 437 citations issued since holding the position of Associate Professor, which contributes 874 points. The Hirsch index of Assoc. Petrova without taking into account self-citations is 10.

Assoc. Prof. Dr. Maria Hristova Petrova-Nikolova was the supervisor of a PhD student who successfully defended her thesis in 2015. The candidate has participated in 6 and supervised 4 national scientific or educational projects, which contributes 230 points in group "F". In addition to these, a further 170 points are accumulated from funds attracted under contracts led by Assoc. Prof. Dr. Maria Hristova Petrova-Nikolova. The total number of points in group "F" is 410.

The scientific production of Assoc. Prof. Dr. Maria Hristova Petrova-Nikolova is on the topic of the competition and exceeds the minimum national requirements for the academic position of "Professor" in the field of "Natural Sciences, Mathematics and Informatics", field of Chemical Sciences, specified in the Law for the Development of Academic Staff in the Republic of Bulgaria, the Regulations for its Application and the Regulations for the Conditions and Procedure for the Acquisition of Scientific Degrees and the Holding of Academic Positions at the Institute of Chemical Sciences and Biology of the Bulgarian Academy of Sciences: with the required minimum 640 points, the candidate has 1887 points.

2 MAIN SCIENTIFIC AND APPLIED CONTRIBUTIONS

The scientific activity of Assoc. Prof. Dr. Maria Hristova Petrova-Nikolova is related to the preparation of composite coatings of non-metallic particles of nano- or micron size in copper or nickel coating on metal or polymer substrate. The aim is to obtain polishing materials, improve the wear resistance of metallized plastics, in the manufacture of printed circuit boards, etc. A second widely covered topic is the chemical deposition of initial thin conductive layer on plastics for subsequent electrochemical deposition of a thick

metallic coating. The work is entirely experimental using chemical deposition and subsequent characterization of the resulting coatings.

The main contributions in the works of Assoc. Dr. Maria Hristova Petrova-Nikolova can be summarized as follows: 1) development of comprehensive procedures for the incorporation of non-metallic inorganic nano- and micro-particles, from diamond, BN, ZrO₂, SiC, ZrW O₂₈ ZrO₂, graphite, SiO₂, Al₂O₃ and TiO₂, in the chemical deposition of copper and nickel-phosphorus coatings on polymer substrates such as PET, ABS and PLA, and on a series of metal substrates Al, Fe, Ti, Ni, Cu. A distinct part of the procedures addressed is methods for pre-treatment and activation of the polymer substrates; 2) development of procedures for chemical deposition of copper coatings from solutions not containing toxic reducing agents. 3) development of a procedure for depositing nickel and cobalt dispersion coatings that can be used as an alternative to hard chromium plating and thus avoiding the use of the highly toxic hexavalent chromium.

3 REFLECTION OF THE CANDIDATE'S SCIENTIFIC PUBLICATIONS IN THE BULGARIAN AND FOREIGN LITERATURE

The significant number of citations in international publications of the works of Assoc. Prof. Dr. Maria Hristova Petrova-Nikolova shows good acceptance of her work by the international scientific community. Judging by the citation rate of the papers of the last few years, the papers on nickel plating of ABS, and on formaldehyde-free electrolyte for chemical deposition of Cu are particularly well received.

The protection of two patents on the subject and with the participation of Assoc. Prof. Dr. Maria Hristova Petrova-Nikolova is worth highlighting.

4 CRITICAL NOTES AND RECOMMENDATIONS TO THE CANDIDATE'S SCIENTIFIC WORKS

I have no critical comments or recommendations for the applicant.

Conclusion

The research activity of Assoc. Prof. Dr. Maria Hristova Petrova-Nikolova has contributed to the modification by nano- and micro-particles of copper and nickel-phosphorus coatings, as well as to finding an environmentally friendly procedure for the chemical deposition of Cu on dielectrics. The developments made have potential applications in areas such as mechanics, electronics and corrosion protection .

The scientific production of Assoc. Prof. Dr. Maria Hristova Petrova-Nikolova exceeds the minimum national requirements for the academic position of "Professor" in the field of "Natural Sciences, Mathematics and Informatics", professional field 4.2. Chemical Sciences, for the scientific specialty "Electrochemistry" for the needs of the section "Electrochemistry and Corrosion". On this basis, I most confidently propose to the Scientific Jury to award to Assoc. Prof. Dr. Maria Hristova Petrova-Nikolova the academic position of "Professor".

21.04.2023

Prof. Dragomir Tatci