

## OPINION

by Prof. DSc. Eng. Panteley Petrov Denev,  
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of the materials submitted for participation in the competition  
for the occupation of the academic position "Associate Professor" in  
Area of Higher Education - 5. Technical sciences  
Professional field - 5.13. General engineering  
Specialty - Engineering Ecology

In the competition for associate professor, announced in the State Gazette, issue 68 / 31.07.2020 and on the website of TU-Gabrovo for the needs of the Department of Mathematics, Informatics and Natural Sciences at the Faculty of Economics, as a candidate participates Ch. Assistant Professor Dragomir Stoyanov Vassilev, Ph.D.

### 1. Overview of the content and results in the presented works

Dr. Eng. Dragomir Stoyanov Vassilev is registered with National Centre For Information and Documentation as a Ch. assistant at the Technical University of Gabrovo, which covers the minimum national requirements for group A of 50 points.

From the 79 publications registered in National Centre For Information and Documentation, the candidate has submitted for participation in the competition a list of 31 publications, 5 published textbooks and teaching aids and one monograph.

For the minimum required 100 points in group B, Dragomir Vassilev presents: Modern engineering solutions for synthesis, modification and application of organic compounds through the application of ultrasonic and microwave energy - monograph, University Publishing House "Vasil Aprilov" - Gabrovo, 2020, ISBN: 978- 954-683-619-9. It contains five chapters, a bibliography of 134 scientific articles, dissertations and textbooks, and is written on 130 standard typewritten pages. The monograph presents modern engineering solutions for the synthesis, modification and application of organic compounds through the introduction of green technologies, which seeks to limit the application of conventional methods in chemical technologies and to replace them with those aimed at limiting of pollutants in the three spheres (water basins, soils, air with harmful or non-degradable waste from chemical production). The bibliography lists 134 sources, of which only 11 are before 2000. The sources used reflect current trends and engineering approaches to the application of highly efficient, energy efficient and environmentally friendly methods in the synthesis of organic compounds. The monograph provides many examples of successful solutions to a wide range of engineering, environmental and technological problems in the field of chemical production. The considered issues and the shown solutions give me full grounds to determine that the monograph "Modern engineering solutions for synthesis, modification and application of organic compounds by application of ultrasonic and microwave energy" meets the requirements of the Regulations for the implementation of the Academic Staff Development Act. Republic of Bulgaria.

According to the scientometric indicators by group D, the candidate declares 272.3 points with a minimum required of 200, all of which are collected from indicators G8. Scientific publication in unrefereed journals with scientific review or in edited collective volumes. The candidate presents 31 publications in scientific conferences, scientific collections and journals with ISSN. All publications are verified on the NACID website. The counting of the points was done correctly, and for each individual publication the weight was distributed equally among the authors.

According to the scientometric indicators for group E, the candidate declares 76 points with a minimum required of 50. The points are scored on two indicators:

- Citations or reviews in scientific journals, referenced and indexed in world-famous databases with scientific information or in monographs and collective volumes - 70;
- Citations or reviews in non-peer-reviewed journals with scientific review - 6.

The analysis of the content and results in the presented papers shows that the submitted scientific papers cover the necessary scientometric requirements for acquiring the academic position of "Associate Professor" in a professional field - 5.13. General engineering and specialty - Engineering ecology.

## **2. General characteristics of the candidate's activity**

### **2.1. Educational and pedagogical activity (work with students and doctoral students)**

Dragomir Vassilev began his teaching career as an assistant at the Technical University of Gabrovo in 2004. During this period he has published a textbook and four manuals.

The textbook "Methods and techniques for improving results" addresses issues related to the use of certain methods and techniques for improving the results of any type of activity. It is designed for students, PhD students and assistants, to create an entrepreneurial spirit and culture and to support the creation of a business environment. It can also be used by students, teachers and other professionals involved in various activities in order to improve them.

The four manuals are on chemistry: "Manual for laboratory exercises in environmental chemistry", "Manual for exercises in chemistry", "Quantitative methods for chemical analysis" and "Test tasks in chemistry". The manuals are oriented towards bachelor's and master's degrees for students majoring in Technical University - Gabrovo. The exercises illustrate and supplement the lecture material in the respective discipline and support the mastering of the study material.

The candidate has submitted a reference for management of 6 graduates, review of 21 diploma projects, 16 taught disciplines, participation in the development of educational documentation for 4 curricula, group management of students majoring in "Social Activities" and "Public Administration", participation in the state examination commission for defense of diploma theses of students majoring in "Environmental Protection and Sustainable Development" in the academic year 2018/2019 and 2019/2020.

### **2.2. Scientific and scientific-applied activity**

The scientific and scientific-applied activity of Dragomir Vassilev is directed in three directions.

In the main of them "Application of ultrasonic and microwave energy for synthesis and modification of organic compounds", the candidate synthesizes and finds application of esters obtained with ultrasonic and microwave energy. The use of biodegradable fillers in plastics also solves part of the problem of environmental pollution. Esters of fatty acids with mono-, oligo- and polysaccharides are cheap and safe raw materials that can be used in both the chemical and food and pharmaceutical industries. Proper selection of a particular type of carbohydrate and definition of fatty acids can lead to a significant increase in their biological activity, increased antimicrobial and antibacterial activity. This is proof that the applied innovative methods for synthesis - ultrasonic and microwave effects meet the basic requirements of scientific approaches to solving environmental problems - energy savings, minimum consumption of raw materials, reagents, consumables, reduced waste of non-renewable products, preservation of biological value of natural products.

The second thematic area is "Engineering Ecology and Environmental Protection".

There, the applicant's interests are focused on oxide catalysts for transition metals. It has been shown that controlling the temperature and pH of the medium in catalytic oxidation reactors is of great importance for the proper course of the oxidation process. The high activity of oxide catalysts is largely due to the amount of active oxygen (in most cases also super stoichiometric) contained in the catalyst. The content of total and surface active oxygen in the obtained oxide systems, as well as its influence depending on the pH of the medium were studied. The specific surface of the catalytic systems was studied. The density of the obtained catalysts was studied. The resulting catalysts can be successfully used in environmental catalysis for the catalytic purification of fluids (gases and liquids) containing organic substances, which is favored by the high content of active oxygen due to the method used to prepare. The activity of catalysts in the oxidation of organic compounds in solutions was studied

Thematic area 3. Ensuring safety at risk of exposure to chemicals

New approaches have been proposed for assessing the risks associated with working with chemicals. A methodology is proposed, which is based on the classification of chemical substances or their mixtures, according to the current legislation.

Dragomir Vassilev is registered in three scientific networks - Research gate, ORCID (<http://orcid.org/0000-0003-0579-894X>), as well as the publications in SCOPUS are with Scopus Author ID 57127984800. According to the information in Scopus, the candidate has a Hirsch index  $h = 3$ .

### **3. Contributions (scientific, scientific-applied, applied). Significance of contributions to science and practice**

As more important contributions of an applied nature, I can make the following summary:

- Ultrasonic and microwave effects have been applied in the preparation of aliphatic and sugar esters of higher fatty acids for the synthesis of new organic substances with potential biological activity. Their antimicrobial and antifungal activity is shown. The applicability of sucrose palmitate and inulin acetate as a biodegradable plasticizer in the processing of plastics (PVC) was studied, and the morphology of plasticized polyvinyl chloride with sucrose palmitate was studied using scanning electron microscopy.
- Catalytic systems for complete oxidation based on nickel and cobalt oxides have been obtained, and their applicability for treatment of wastewater contaminated with organic substances has been studied. A tool for monitoring the parameters of a flow-circulation reactor for complete catalytic oxidation has been prepared.

### **4. Conclusion:**

After getting acquainted with the materials and scientific papers presented in the competition, analysis of their significance and contained in them scientific, scientific-applied and applied contributions, I declare that they meet the minimum national requirements and the relevant Regulations for academic positions in the Technical University - Gabrovo.

I declare that I have not found any plagiarism proven in accordance with the law.

I give my positive assessment and recommend to prepare a report-proposal to the Faculty Council of the Faculty of Economics of the Technical University - Gabrovo, Ch. Assistant Professor PhD Dragomir Stoyanov Vassilev **to take up the academic position of "Associate Professor" in the Area of higher education 5. Technical sciences, professional field 5.13. General Engineering, specialty - Engineering Ecology.**

October 27, 2020

Jury member:            /signature/  
Prof. DSc. Eng. Panteley Petrov Denev