

# OPINION

of Prof. DSc Maria Plamenova Nikolova

University of Ruse "Angel Kanchev"

to occupy an academic position "Associate professor"

in the field of higher education 5. Technical Sciences,

Professional direction 5.6 Materials and Materials Science,

Speciality "Materials science and technology of engineering materials"

In the competition to occupy an academic position "Associate professor" promulgated in SG, № 54/25.06.2024 for the needs of the Department "Materials Science and Mechanics of Materials" (MMM) at the Faculty of Mechanical Engineering and Instrumentation, as a candidate participates Ch. Assist. Dr. Eng. Vladimir Petrov Todorov from TU-Gabrovo.

## 1. Brief biographical data

Ch. Assist. Prof. Dr. Eng. Vladimir Petrov Todorov graduated from TU-Gabrovo in 2004 with a Bachelor's in Materials Science and Technology. In 2006, at the same university, he obtained a Master's degree in Materials Science and Technology. He held an academic position as an assistant and currently works as a chief assistant professor in the MMM department at the Faculty of Mechanical Engineering and Instrumentation at TU-Gabrovo. In 2016, at TU-Gabrovo, he received a PhD by defending his doctoral thesis on "Influence of the carbide phase on the mechanical and operational characteristics of bainitic cast irons".

## 2. General description of the presented materials

The candidate Ch. Assist. Prof. Dr. Eng. Vladimir Petrov Todorov fully satisfies the minimum national requirements and the requirements of TU-Gabrovo for occupying the academic position "associate professor", regulated in the LAW ON THE DEVELOPMENT OF THE ACADEMIC STAFF IN THE REPUBLIC OF BULGARIA and its IMPLEMENTATION RULE in the field of higher education 5. Technical sciences. He participates in the competition with:

- 1 printed monograph on "Improving the mechanical characteristics and operational behavior of iron-aluminum bronze with  $\beta$ -transformation" University Publishing House "Vasil Aprilov" - Gabrovo, 2024;
- 2 printed textbooks - Maximov Y., VI. Dunchev, VI. Todorov. Metal Science and Heat Treatment Part I Metal Science. VI V. Aprilov. Gabrovo. 2024. ISBN 978-954-683-696-0, and Maximov Y., A. Anchev, VI. Todorov. Metal Science and Heat Treatment Part II Heat Treatment of Metals. VI V. Aprilov. Gabrovo. 2022. ISBN 978-954-683-664-9;
- 25 publications, of which 4 are in journals with impact factors, 2 are referred in the world databases (Scopus, Web of Science) and 19 are other publications that are not referenced in global databases but are peer-reviewed (have an ISBN code).

## 3. Reflection of the candidate's scientific publications in the literature (known citations)

According to the information presented in the world information system SCOPUS (without self-citations), a total of 57 citations from 7 documents were noticed. Dr. VI. Todorov's Hirsch index is  $h=2$  (Scopus).

According to the information system Web of Science, for the registered 4 publications, 55 citations have been noticed, and the h-index is 2 (Web of Science).

According to the Google Scholar information system, 11 publications are registered and the citations noticed for them are 91, and the h-index is 3 (Google Scholar).

In the competition, the candidate participates with 42 citations in scientific publications, referenced and indexed in world-famous databases, which many times exceed the minimum required number.

#### **4. General characteristics of the applicant's activity**

##### **4.1. Educational and pedagogical activity**

Lecture courses in the six subjects are a component of the candidate's educational and pedagogical activities. These include Materials Science; Materials science and technology of engineering materials; Casting of materials; Heat treatment of metals; Resource-saving technologies in material processing; Materials technology and materials science. The candidate conducts exercises in 7 disciplines as follows: Materials science; Materials science and technology of engineering materials; Casting of materials; Heat treatment of metals; Resource-saving technologies in material processing; Materials Technology and Materials Science; Non-metallic materials. Even for the academic position of associate professor, his workload is far more than what is required for statutory employment.

Part I of the textbook "Metal Science and Heat Treatment" is intended for students in Bachelor's and Master's studies of Engineering in the fields of "Materials Technology and Materials Science", "Computer Technologies in Mechanical Engineering", "Mechatronics"; "Computer Design", "Industrial, Heat and Gas Systems", studying the disciplines: "Materials Science and Engineering Materials Technology", "Materials Technology and Materials Science", "Metallurgy" and "Industrial Materials". Part II of the textbook is intended for Bachelor and Master students from "Materials Technology and Materials Science" and "Computer Technologies in Mechanical Engineering" specialities, studying the disciplines: "Heat Treatment of Metals" and "Low-Temperature Thermo-chemical Treatment".

The content of the monograph is also intended for students from the "Materials Technology and Materials Science" at the Technical University of Gabrovo when studying the "Bachelor's" disciplines "Metal Science", "Thermal treatment of metals and alloys", "Investigation of the structure and properties of engineering materials" and "Master" courses in "Casting of non-ferrous metals and alloys", "Surface plastic deformation" and "Surface engineering" (Technologies for modification of surface layers).

For the period 2021/2024 under the leadership of Ch. Assist. Dr. Eng. Vladimir Todorov have successfully defended 18 Bachelor and 4 Master students.

From what was written above, it follows that the candidate has a sufficient and successful pedagogical activity with the students and graduates of TU-Gabrovo.

##### **4.2. Scientific and scientifically applied activity**

Ch. Assist. Prof. V. Todorov, Ph.D., is the author of 1 monograph and co-author of 25 published scientific articles. The total impact factor of the publications submitted for the competition is 9.64.

The main results of the monograph submitted for participation in the competition are published in four scientific articles, two of which are referenced in Web of Science and Scopus, namely:

1. Jordan Maximov, Galya Duncheva, Angel Anchev, Vladimir Dunchev, Yaroslav Argirov, Vladimir Todorov and Tatyana Mechkarova. Effects of Heat Treatment and Severe Surface Plastic Deformation on Mechanical Characteristics, Fatigue, and Wear of Cu-10Al-5Fe Bronze. *Materials* 2022, 15, 8905. <https://doi.org/10.3390/ma15248905>, IF = 3.4, Q2

2. Jordan Maximov, Galya Duncheva, Angel Anchev, Vladimir Dunchev, Vladimir Todorov, Yaroslav Argirov (2023). Influence of an Ageing Heat Treatment on the Mechanical Characteristics of Iron-Aluminium Bronzes with  $\beta$ -Transformation Obtained via Centrifugal Casting: Modelling and Optimisation. Metals, 13 (12), 1930; <https://doi.org/10.3390/met13121930>, IF = 2.9, Q1.

The monographic work is necessary and useful for students - bachelors and masters, as well as professionals in the field of materials science, mechanical engineering, materials technology, metalworking and engineering sciences in general. Based on the relationships between "processes used - surface integrity - mechanical properties - operational behaviour", researchers and engineers can select the right process parameters according to the operational purpose of  $\beta$ -transform iron-aluminium bronzes.

The thematic directions of the candidate's scientific publications can be divided into nine main groups:

- Improvement of the mechanical characteristics and operational behavior of iron-aluminum bronze with  $\beta$ -transformation:
  - Electron beam treatment of dissimilar metals and alloys;
  - Photopolymerization of dental composites;
- Improvement of the operational behavior and mechanical characteristics of medium carbon low-alloy steels, through heat treatment processes;
- Development of methods for researching the properties of spheroidal cast irons with a bainite metal base;
- Alloying cast iron with spheroidal graphite;
- Study of the mechanical characteristics and operational behaviour of carbide-bainite spheroidal cast irons;
- Bottle-shaped dead heads;
- Calculation method for choosing a steel brand for machine elements according to a set of indicators.

Generally, Dr. VI. Todorov's scientific research is up-to-date and of high scientific and applied value. The reviewer reference dated 3.11.2024 in Scopus shows that of the seven refereed scientific publications, 1 is from 2021, 3 are from 2022, 2 from 2023 and 1 from 2024. The increasing number of publications in journals with an impact factor leads to a rise and almost linear trend of citations, which in turn reflects the candidate's development as a scientist.

Ch. Assist. Dr. Eng. VI. Todorov participated in 4 international scientific forums, namely "Mechatronics, eco and energy-saving systems and technologies" in Plovdiv, "UniTech" in Gabrovo, "AmTech" in Gabrovo and "RaDMI" - Užice, Serbia, having delivered a total of 11 reports.

He was a member of the scientific teams of 4 projects financed by the Operational Programs "Innovations and Competitiveness" and "Human Resources Development", one project financed by the National Fund "Scientific Research" (KP-06-PN47) and 1 project financed by "National Innovation Fund" (NIF-02-87/07.03.2008). Also, as a member of the scientific collectives, he participated in the development of 10 university research projects of TU-Gabrovo.

Ch. Assist. Prof. VI. Todorov is a member of the "Scientific and Technical Union of Mechanical Engineering". He was involved in the design and manufacture of a stand for accelerated dry friction wear, as well as the modernization of a metallographic microscope, a heat treatment furnace, and a Brinell and Vickers hardness tester.

I firmly believe that Ph.D. VI. Todorov is a well-rounded scientist who consistently upholds high standards in both his scientific and pedagogical work.

#### **4.3. Invention, inventions and other intellectual property products**

No data are available.

#### **4.4. Contributions** (scientific, applied science, applied)

Corresponding scientific-applied and applied contributions are listed in great detail for the monograph and each of the scientific articles' thematic directions. I accept the indicated research contributions of the candidate participating in the competition for "associate professor" at TU-Gabrovo. They have a lasting scientific and applied impact and represent a basis for new directions of research and applications, mainly in the professional field of "Technical Sciences".

#### **5. Evaluation of the candidate's contribution.**

To participate in the competition, the candidate submitted 25 publications, of which 4 were single-authored, in 2 publications he was the lead author (in first place), in 3 publications he participated in second place, in third place in 8 publications, in fourth place in 2 publications, and in the others it is in fifth, sixth and other places. The works in a collective have an approximately constant composition. Due to the lack of distribution protocols between the authors, it can be assumed that the candidate has at least equal participation in the presented works in collaboration.

#### **6. Critical Notes**

I attach the following recommendations to the candidate, which in no way detract from what was written above:

- Although it is not explicitly stated in Law on the development of the academic staff in the Republic of Bulgaria and its implementation rule, I consider the use of publication Г7.4, on which the main results in the monograph are based, as additional in category Г7, is a repetition of the asset at the same time for both indicators B3 and Г7. This is the reason why the contributions of the monograph and the article G7.4 completely coincide.
- I would recommend the candidate to participate more actively in scientific research projects and studies, in which he would be present as a supervisor or lead author;
- It would be good for the candidate to focus on a specific thematic direction, deepening his research in the area.

#### **7. Personal impressions**

Though do not know Dr. VI. Todorov personally, I was left with wonderful impressions during the telephone and electronic conversations held in connection with reviewing the monograph and the materials for the current competition. Ch. Assist. Prof. PhD Vladimir Todorov is an expert in modern technological methods and research techniques. There is a successful pedagogical activity with the students and graduates of TU-Gabrovo. The issued textbooks on "Metal Science and Heat Treatment" are modern and useful for the student audience and meet the requirements of the TU-Gabrovo rules. From the materials provided for the competition, it is obvious that the candidate is a good-willed colleague and knows how to work in a team.

#### **8. Conclusion**

**Bearing in mind the above, I propose Ch. Assist. Prof. Dr. Eng. Vladimir Petrov Todorov to be elected as an "associate professor" in professional direction 5.6 Materials and materials science, speciality - Materials science and technology of engineering materials.**

03.11.2024

Ruse

Jury member:

/signature/

/Prof. DSc Maria Nikolova/