REVIEW

regarding a competition announced by TU - Gabrovo,
to occupy an academic position "associate professor"
in the field of higher education 5. Technical sciences,
professional direction 5.6 Materials and materials science,
specialty "Materials science and technology of engineering materials"
promulgated in the Official Gazette, no. 54 of 25.06.2024,
with candidate Ch. Assistant Dr. Eng. Vladimir Petrov Todorov

Reviewer: Professor Jordan Todorov Maximov, DSc, PhD

Only one candidate participated in the competition: Ch. Assistant Professor Vladimir Petrov Todorov, born on 17.04.1981. He works at TU-Gabrovo, Department of "Materials Science and Mechanics of Materials", and holds the academic position of "chief assistant".

1. Evaluation of the scientific-research, scientific-applied and publication activity of the candidate after the procedure for PhD degree

According to this indicator, the candidate ch. assistant Vladimir Todorov participated in the competition with an asset that I have classified as follows, regardless of the author's view expressed in the relevant list:

1) Dissertation abstract on the topic "Influence of the carbide phase on the mechanical and operational characteristics of bainite cast irons" (2016) for obtaining the educational and scientific degree "doctor" – **1**. The dissertation is on the scientific specialty "Materials Science and Technology of Machine Building Materials";

2) Journal articles with an impact factor indexed by Web of Science and Scopus – **3** (7.2*, 7.4, 7.5);

The journals, the number of authors and the candidate's place among the authors are:

- Metals (2023): publication 7.2 (10 authors, VIII author),

* The numbering is according to the one made by the candidate in file "6. List of publications for participation in the contest.pdf"

▪ Materials (2022): publication 7.4 (7 authors, VI author),

▪ Processes (2021): publication 7.5 (5 authors, III author);

3) Articles in refereed publications without an impact factor – **3**;

The journals, the number of authors and the candidate's place among the authors are:

▪ Journal of Physics: Conference Series: publication 7.1 (2023) (7 authors, VII author), publication 7.3 (2022) (11 authors, VIII author),

▪ Bulgarian Chemical Communications (2022): publication 7.6 (10 authors, VIII author);

4) Articles in non-refereed journals in Bulgaria – **7;**

The journals, the number of authors and the candidate's place among the authors are:

▪ Journal of the Technical University of Gabrovo: publication 8.1 (2024) (1 author, I author), publication 8.5 (2023) (8 authors, VI author), publication 8.6 (2022) (2 authors, I author),

▪ International Journal for Science, Technics and Innovations for the Industry: publication 8.7 (2017) (3 authors, I author), publication 8.9 (2008) (4 authors, IV author), publication 8.15 (2010) (4 authors, IV author), publication 8.16 (2009) (3 authors, III author),

5) Reports at scientific conferences abroad – **3**: 8.13 (2008) (3 authors, III author), 8.14 (2008) (3 authors, III author), 8.18 (2009) (4 authors, IV author);

6) Reports of scientific conferences in Bulgaria – **9**: 8.2 (2023) (1 author, I author), 8.3 (2023) (1 author, I author); 8.4 (2023) (1 author, I author), 8.8 (2013) (3 authors, III author), 8.10 (2007) (2 authors, II author), 8.11 (2011) (2 authors, II author), 8.12 (2010) (2 authors, II author), 8.17 (2010) (3 authors, III author), 8.19 (2007) (3 authors, III author).

7) Monograph – **1** от 2024 г.

With the exception of the author's abstract, which has already been reviewed, I agree to review all works (26 in number), since they undoubtedly relate to the scientific specialty of the competition. The statistics show the following:

∗ Four of the publications are self-published (ie, no co-authors); they are of group Г.8, according to the minimum national requirements – Appendix 1 to Article 1a, Paragraph 1 of the Regulations for the Implementation of the Law on the Development of the Academic Staff;

∗ In two of the publications (group Г8), the candidate is the first author; in three publications he is the second author; in seven publications he is the third author; in

three publications he is the fourth author, and in the remaining seven he is in a lower position;

∗ In none of the publications abroad, the candidate is the first author;

∗ The publications were made in the period 2007 – 2024; for these 18 years, 26 publications were made, i.e., an average of 1.44 publications per year.

∗ For the last four years, the candidate has made 12 publications, four of which are independent, and in one he is the first author.

The statistical data illustrate the scientific growth of the candidate and show that he is forming as a scientific worker.

The results of the research work of Dr. Vladimir Todorov can be summarized in five main groups as follows:

A. Improvement of the mechanical properties and operational behavior of iron-aluminum bronze with β-transformation;

B. Electron beam treatment of dissimilar metals and alloys;

C. Study of the photopolymerization process of dental composites;

D. Study of the structure, mechanical characteristics and operational behavior of carbide-bainite spheroidal cast irons;

E. Improvement of the operational behavior and mechanical properties of medium carbon low alloy steels by heat treatment processes.

The list of citations of his works presented by the candidate (only in the scientific specialty of the competition) showed a total of 42 citations in indexed journals, of which 39 are the citations of publication 7.5. The other cited publications of the author are 7.2, 7.3 and 7.4.

Dr. Vladimir Todorov has submitted a certificate of participation as a researcher in six scientific research projects financed by the National Research Fund and seven scientific research projects at TU-Gabrovo (financed by the State Budget for the activities inherent to the Higher Schools).

Based on all of the above, it can be concluded that the candidate appears primarily as a researcher, with a marked affinity for metallurgy and heat treatment of metals.

2. Evaluation of the educational activity and qualification of the candidate

Ch. Assistant Professor Vladimir Todorov is the co-author of two textbooks: 1) Metallurgy and heat treatment, Part I: Metallurgy and 2) Metallurgy and heat treatment, Part II: Heat treatment of metals. The first of them was issued in 2024, and the second - in 2022.

From the presented reference from Ch. assistant V. Todorov, it can be seen that he gave lectures in six disciplines: 1) Materials science, 2) Materials science and engineering materials technology, 3) Metal casting, 4) Heat treatment of metals, 5) Resource-saving technologies in material processing, and 6) Materials technology and materials science. Ch. Associate Professor Todorov led exercises in the same disciplines, as well as in the discipline Non-Metallic Materials.

From the reference submitted by the candidate, it can be seen that he is actively involved in modernizing the material and technical base of the department. The candidate has completed the following: 1) Design and manufacture of a stand for accelerated wear during dry friction; 2) Modernization of optical metallographic microscope "Neophot 32"; 3) Modernization of heat treatment furnace; and 4) Renovation of Brinell and Vickers hardness tester.

Based on the above, I firmly believe that Ch. Assistant Dr. Vladimir Todorov has the necessary pedagogical training and qualification to hold the academic position of "Associate Professor" at TU Gabrovo.

3. Meeting the minimum requirements for holding the academic position of "associate professor" set out in the 2019 LDASRB

Ch. Assistant Professor Dr. Vladimir Todorov participated in the competition (group B, indicator 3) with a habilitation thesis (monograph) on the topic: "Improving the mechanical characteristics and operational behavior of iron-aluminum bronze with beta-transformation". The 116-page monograph explores the possibilities of various heat treatments and cold surface plastic deformation (SPD), as well as a combination thereof, to improve the mechanical properties and service behavior of iron-aluminum beta-transformation bronzes. The contributions made in the monograph are significant, and the results obtained are fully applicable in practice.

According to groups of indicators Г and Д, the asset of ch. Assistant Professor V. Todorov exceeds the minimum national requirements. According to indicator Д (citability), the asset of the candidate is 420 items against the required 50 items. It should be noted that these citations are only in indexed journals from the two main databases.

4. Main scientific-applied, applied contributions and teaching-methodical contributions

Contributions to the works of Ch. Assistant V. Todorov for significant and sufficient.

Regardless of the author's view, the accepted by my contributions are summarized and classified as follows:

1) ***Scientific applied contributions***

A. Creation of new classifications, methods, constructions, algorithms, etc.

• Classification of iron-aluminum bronze with β-transformation in the delivery state (obtained by hot plastic deformation) and after different heat treatment regimes, based on nine criteria with equal relative weight (B.3, Г.7.4).

B. Obtaining and proving new facts

• Effectiveness of various heat treatments and SPDs, as well as their combination, to improve the mechanical properties, surface integrity and service behavior of β-transformed iron-aluminum bronzes obtained by hot plastic deformation and by the centrifugal casting method (B.3, 7.4).

• Dependences of temperature and annealing time on the microstructure evolution and mechanical properties of iron-aluminum bronze with β-transformation obtained by the centrifugal casting method (B.3, Г.8.2, Г.8.3).

• Correlations between electron beam welding process parameters and the microstructure and physico-mechanical properties of welded dissimilar joints (Г.7.1, Г.7.2, Г.7.3, Г.7.6, Г.8.5).

• Correlations between the parameters of the photopolymerization process of dental composites and their hardness (Г.7.5).

• Optimum values of the governing factors of this process for different types of dental composites (Г.7.5).

• Correlations between the amount of carbide phase and the base metal structure, mechanical properties and wear resistance of bainitic cast irons (Г.8.7, Г.8.9, Г.8.11, Г.8.12, Г.8.17).

• Correlations between the amount of alloying elements Mo and Sn and the structure and mechanical properties of spheroidal graphite cast iron (Г.8.4, Г.8.10).

2) Applied Contributions

• Database of mechanical properties and operational behavior of iron-aluminum bronze with β-transformation after various types of heat treatments (Г.7.4).

• Database of heat treatment parameters for β-transformed iron-aluminum bronze specimens produced by hot plastic deformation providing maximum fatigue life, minimum mass wear, maximum impact toughness and maximum static strength (B.3, Г.7.4).

3) ***Teaching and methodical contributions***

• I accept the applicant's claims for educational and methodological contributions (2 textbooks).

5. Significance of contributions to science and practice

The results of the scientific-research and teaching-methodical activities of Ch. Assistant Dr. Vladimir Todorov have an applied orientation and ultimately aim to serve engineering practice and the education of students.

6. Notes and recommendations

I have direct observations and impressions about Ch. Assistant Professor Vladimir Todorov from our joint scientific and educational activity. He performs all tasks accurately, qualitatively and on time. He is fair and responsive with his colleagues. I would recommend to him more diligence and devoted time in the so-called departmental work, which must also be done.

7. Conclusion

Based on all of the above, I propose Ch. Assistant Professor, Dr. Eng. Vladimir Petrov Todorov to take the academic position of "Associate Professor" at the Technical University of Gabrovo, in the field of higher education 5. Technical sciences, in the professional direction 5.6 Materials and materials science, specialty "Materials science and technology of engineering materials".

13.10.2024 Reviewer: /signature/

Gabrovo Professor Jordan Maximov, DSc, PhD