

OPINION

On the competition for the academic position of "Associate Professor" in the field of Technical Sciences, professional area 5.6: Materials Science, in the specialty of "Materials Science and Engineering for Mechanical Engineering Materials," as announced in the State Gazette, Issue No. 54, dated June 25, 2024, with the sole candidate: Senior Assistant Dr. Eng. Vladimir Petrov Todorov. Committee Member: Assoc. Prof. Dr. Eng. Yaroslav Borisov Argirov, appointed by Rector's Order No. 3-01-379/04.10.2024 of TU-Gabrovo

1. General Overview of the Candidate's Research and Applied Research Activities

Senior Assistant Dr. Eng. Vladimir Petrov Todorov completed his higher education at the Technical University of Gabrovo, earning a Bachelor's degree in 2004 and a Master's degree in 2006, both in the specialty of "Materials Science and Engineering." In 2016, he defended his doctoral thesis titled: *"Influence of the Carbide Phase on the Mechanical and Performance Properties of Bainitic Cast Irons."* His professional career spans the mechanical engineering sector, where he worked as a technologist at "Metallic BICIPI" AD (2007–2014). In 2008, he was appointed Assistant in the Department of "Mechanical Engineering and Technologies," and in 2016, he was promoted to Senior Assistant at TU-Gabrovo, where he continues to work.

The following works have been submitted for the Associate Professor competition:

1.1 For Criterion B.3: A monograph titled: *"Enhancement of Mechanical Characteristics and Operational Behavior of Iron-Aluminum Bronze with β -Transformation."*

1.2 For Criterion G.7: Six scientific articles indexed in globally recognized scientific databases (three in Scopus and three in Web of Science).

1.3 For Criterion G.8: Nineteen scientific publications in non-indexed journals with peer review or edited collective volumes, four of which are single-author works.

1.4 For Criterion D.12: Forty-two citations in publications (excluding self-citations), with one scientific publication receiving 17 citations indexed in Web of Science with an Impact Factor (IF).

1.5 For Criterion E.24: Two educational resources were published, meeting the minimum requirements set by TU-Gabrovo for the position of Associate Professor.

For evaluation purposes, I consider one monograph and 25 academic works, in which the candidate's contribution is as follows:

- **First author** in seven works, including four single-author publications.
- **Second author** in four works.
- **Third author or later** in 14 works.

All publications align with the competition's topic, with 11 in Bulgarian and 14 in English.

Applicant, Dr. Eng. Vladimir Petrov Todorov has participated in nine international scientific conferences and has contributed to six national research projects funded by the National Science Fund, as well as ten research projects funded by the University's Science Fund. A significant part of these research projects aligns closely with his professional specialization.

Conclusion

Senior Assistant Dr. Eng. Vladimir Petrov Todorov meets all procedural requirements outlined in the Law on the Development of the Academic Staff in the Republic of Bulgaria, the associated Regulations, and the Regulations for the conditions and procedures for acquiring academic degrees and positions at the Technical University of Gabrovo for the position of Associate Professor, with some criteria in Group D being exceeded.

2. Evaluation of the Candidate's Pedagogical Expertise and Teaching Activities

Senior Assistant Dr. Eng. Vladimir Petrov Todorov delivers lectures to Bachelor's and Master's students at TU-Gabrovo in the following subjects:

- 2.1.1. Materials Science;
- 2.1.2. Materials Science and Engineering for Mechanical Engineering Materials;
- 2.1.3. Materials Casting;
- 2.1.4. Heat Treatment of Metals;
- 2.1.5. Resource-Saving Technologies in Material Processing;
- 2.1.6. Technology of Materials and Materials Science.

He also conducts seminars and laboratory exercises for Bachelor's and Master's students at TU-Gabrovo in the following subjects:

- 2.2.1. Materials Science;
- 2.2.2. Materials Science and Engineering for Mechanical Engineering Materials;
- 2.2.3. Materials Casting;
- 2.2.4. Heat Treatment of Metals;
- 2.2.5. Resource-Saving Technologies in Material Processing;
- 2.2.6. Technology of Materials and Materials Science;
- 2.2.7. Non-Metallic Materials.

In addition to teaching, Dr. Eng. Vladimir Petrov Todorov has been involved in the maintenance and modernization of TU-Gabrovo's laboratory facilities, specifically in:

- Designing and building a testing stand for accelerated wear under dry friction conditions.
- Upgrading an optical metallographic microscope "Neophot 32" by integrating a digital camera.
- Modernizing a heat treatment furnace by replacing the thermocouple and installing a temperature control and recording system, as well as replacing faulty heating elements.
- Renovating hardness testers for Brinell and Vickers hardness measurements.

Conclusion

I assess the candidate's pedagogical qualification as highly commendable, aligning excellently with the academic requirements for the position of Associate Professor.

3.1. Key Scientific and Applied Research Contributions

In the 25 scientific works submitted by the candidate, Dr. Eng. Vladimir Petrov Todorov's contributions can be categorized into the following thematic areas:

Thematic Area 3.1.1: Enhancement of mechanical properties and operational behavior of iron-aluminum bronze with β -transformation. This includes a monographic work (Criterion B.3) and related scientific articles (Criteria G.7.4, G.8.2, G.8.3).

Thematic Area 3.1.2: Electron beam processing of heterogeneous metals and alloys, represented in scientific articles (Criteria G.7.1, G.7.2, G.7.3, G.7.6, G.8.5).

Thematic Area 3.1.3: Study of dental composites subjected to photopolymerization (Criterion G.7.5).

Thematic Area 3.1.4: Investigation of the structure, mechanical characteristics, and performance of carbide-bainitic ductile cast irons (Criteria G.8.4, G.8.7, G.8.9, G.8.11, G.8.12, G.8.17).

Thematic Area 3.1.5: Improvement of operational behavior and mechanical properties of medium-carbon low-alloy steels through heat treatment processes (Criteria G.8.1, G.8.6).

3.2. Applied Contributions

Thematic Area 3.2.1: Enhancement of mechanical properties and operational behavior of iron-aluminum bronze with β -transformation (Criteria B.3, G.7.4, G.8.2, G.8.3).

Thematic Area 3.2.2: Study of dental composites subjected to photopolymerization (Criteria G.7.5).

Thematic Area 3.2.3: Improvement of operational behavior and mechanical properties of medium-carbon low-alloy steels through heat treatment processes (Criteria G.8.1, G.8.15).

Thematic Area 3.2.4: Investigation of the structure, mechanical properties, and operational performance of carbide-bainitic ductile cast irons (Criteria G.8.8, G.8.13, G.8.14, G.8.16, G.8.18, G.8.19).

The candidate's contributions can be grouped as follows:

- **Scientific and Applied Research Contributions:** Five thematic areas, including the monographic work in the first area.
- **Applied Contributions:** Four thematic areas.

These contributions are substantial, including both scientific-applied and applied research, some of which were independently developed by the candidate or achieved through his critical

involvement. The monographic work is the candidate's sole work. The citations of these publications reflect the candidate's recognition within the scientific community.

4. Significance of the Contributions to Science and Practice

The substantial number of scientific, scientific-applied, and applied contributions from Senior Assistant Dr. Eng. Vladimir Petrov Todorov enrich theoretical knowledge, educational materials, and practical applications in the field relevant to this competition. Given that Dr. Todorov has authored or co-authored 25 works, including six published in international scientific conferences and journals indexed in well-known databases like Scopus, he demonstrates a high level of scientific and technical expertise. Notably, his independent monographic work on phase transformations in iron-aluminum bronze under thermal treatment, which significantly impacts its mechanical properties, exemplifies his innovative research.

The 42 citations of his works further attest to the candidate's recognition in both national and international scientific circles. Additionally, Dr. Todorov has met and exceeded the quantitative requirements for the academic rank of Associate Professor, showcasing his qualifications as a highly skilled specialist, respected researcher, and dedicated educator in materials science and thermal processing of materials within the scientific community in Bulgaria and beyond.

5. Critical Remarks and Recommendations

I have no critical remarks regarding the scientific works and activities of the candidate. Dr. Todorov has exceeded the necessary requirements for the academic position of Associate Professor.

Conclusion

Although I do not personally know the candidate, based on the submitted documents, materials, and scientific works, as well as the significance and applied research contributions within them, I conclude that Senior Assistant Dr. Eng. Vladimir Petrov Todorov fully meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB), its implementation regulations, and the regulations of the Technical University of Gabrovo for academic staff development for the position of "Associate Professor." Therefore, I give my positive assessment and recommend that the esteemed Scientific Jury support the candidacy of Senior Assistant Dr. Eng. Vladimir Petrov Todorov for the academic position of "Associate Professor" in Higher Education Area 5. Technical Sciences, Professional Field 5.6. Materials Science and Specialty "Materials Science and Technology of Mechanical Engineering Materials."

04.11.2024

Member of the Scientific Jury: /signature/

City of Varna

Assoc. Prof. Dr. Eng. Y. Argirov