REVIEW

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concerning: a competition for the academic position of "Professor" in Higher Education Area 5. Technical Sciences, Professional Field 5.7. Architecture, Civil Engineering and Geodesy, for the needs of the Department of Building Construction and Structures at the Faculty of Architecture of Varna Free University "Chernorizets Hrabar", announced in State Gazette No. 69 of 31 July 2026

Candidate: Assoc. Prof. Rositsa Veselinova Petkova-Slipets, PhD, Eng.

1. General Remarks on the Procedure and Candidate Profile

This review has been prepared in accordance with the Act on the Development of the Academic Staff in the Republic of Bulgaria (ADASRB), the Regulations for its Implementation, and Ordinance No. 3 on the Academic Staff of Varna Free University "Chernorizets Hrabar". It is based on the candidate's submitted statement of compliance with the minimum national requirements, reports on scientific contributions, citations and research activity, summaries of the works, the habilitation thesis, and the textbooks. The documentation is complete and meticulously organized; I have identified no procedural violations. I have no joint publications with the candidate and no conflict of interest within the meaning of the ADASRB.

Assoc. Prof. Petkova-Slipets is an established lecturer and researcher with a clearly defined and consistently developed profile in materials science and construction materials. Her research encompasses structure formation and phase stability in metallic and non-metallic materials, novel construction and thermal-insulation materials, energy efficiency, destructive and non-destructive testing methods, special metallography, and electron microscopy. These areas are united by a single methodological axis: the "composition – technology – structure – properties – service performance" chain. This axis gives the candidate's scholarly work internal coherence and makes it directly relevant to the subject of the competition and to the profile of the department for whose needs the position was announced.

2. Compliance with the Minimum National Requirements

According to the submitted statement pursuant to Article 2b(2) and (3) of the ADASRB and Table 1 of the Regulations for its Implementation for Area 5. Technical Sciences, the candidate's results are as follows:

Indicator group	Minimum	Candidate	Ratio
A — doctoral dissertation	50	50	1.00
B — habilitation thesis	100	100	1.00
C — scientific publications	200	267.99	1.34
D — citations	100	658	6.58
E — academic and research activity	150	475	3.17
Total	**600**	**1,550.99**	**2.58**

Against the required overall minimum of 600 points, the candidate reports 1,550.99 points, approximately two and a half times the threshold, with every indicator group satisfied. Groups A and B, which by their nature contain fixed indicators, are fully met, while the surplus is concentrated in Groups D and E. This also has qualitative significance: the margin derives not from publication volume, but from the impact of the publications and from the candidate's academic, project-related, and leadership activities. Having examined the supporting documents, I accept the declared values and find that the evidence presented does not duplicate evidence used for acquiring the educational and scientific degree of "Doctor" or for appointment to the academic position of "Associate Professor" (Article 29(1)(3) of the ADASRB).

3. Scientific Output and Habilitation Thesis

The materials submitted for the competition comprise a habilitation monograph, 23 scientific articles, and two university textbooks. Twelve of the articles appear in Scopus-indexed publications, including journals ranked in quartiles Q1, Q2, and Q3. The body of work demonstrates sustained thematic continuity while also expanding consistently toward current issues in energy-efficient and sustainable construction, including lightweight concretes, environmentally friendly composites, syntactic foams, and the performance of insulation materials.

The monograph "Structure of Materials: Hierarchical Levels, Research Methods, and Relationship to Properties" (Varna Free University "Chernorizets Hrabar", 2026, ISBN 978-954-715-818-4) occupies a central place. The work is organized into five chapters, draws on a bibliography of 259 sources, and systematically examines the macro-, micro-, nano-, and atomic levels of material structure together with the methods used to investigate them.

The defining merit of the monograph is that it takes structural analysis beyond its traditionally descriptive role and establishes it as a means of engineering interpretation of the causal relationship between a material's technological history, its structure, and its expected service performance. Microscopic, diffraction, and spectroscopic methods are presented not as alternatives, but as mutually complementary tools, each illuminating a particular structural level. The work thereby fills a clear gap in Bulgarian-language literature and has independent value both as a scientific study and as a methodological guide. In my assessment, it fully meets the requirements for a habilitation thesis for the academic position of "Professor".

4. Principal Scientific and Applied Scientific Contributions

The candidate has systematized her contributions into three categories: scientific, applied scientific, and applied. I accept this classification and highlight four contributions which, in my view, define her scholarly profile.

4.1. Integrative "Structure – Properties" Methodological Framework

A multilevel approach has been formulated in which a material is examined hierarchically, from the atomic to the macroscopic level, while results from different methods are interpreted jointly. The methodological value of this approach lies in linking structural analysis directly to engineering diagnostics and to prediction of the material's behavior within a structure.

4.2. Relationship between Structure and the Thermophysical Properties of Alternative Materials

A substantial thematic group comprises studies of thermal conductivity, heat capacity, thermal diffusivity, and thermal effusivity in syntactic foams; composites based on clay, sand, straw, and rice husks; polyester nonwoven materials; asphalt concretes; and lightweight concretes. A convincing example is provided by composites containing grey marl, sand, and rice husks, for which changes in thermophysical indicators relative to a reference specimen were quantitatively established. The results provide an evidence base for the use of such materials in energy-efficient building envelopes.

4.3. Methodological Contribution to Thermophysical Measurements

I regard the development and application of the modified transient plane source (MTPS) method to bitumens, asphalt concretes, syntactic foams, and thermal-insulation coatings as the most original methodological element of the candidature. This includes the methodology for thin coatings less than 1 mm thick and its combination with infrared thermography. The work extends the method to objects for which standard approaches encounter substantial limitations.

4.4. Applied Results and Engineering Orientation

The use of waste natural products as additives in construction composites has been substantiated, with specific recommendations concerning their optimal content. Simulation modelling of the thermal behavior of walls and double-skin façades has been developed. Comparative engineering data for lightweight concretes have been obtained, and laboratory infrastructure for structural analysis and thermophysical and mechanical testing has been developed to serve both research and teaching.

The candidate's personal contribution to co-authored publications is substantial and is accurately reflected in the statement of contributions. I am not aware of any evidence of plagiarism in the submitted works.

5. Impact and Scientific Recognition

The statement reports 87 citations, of which 60 are in publications indexed in Scopus and Web of Science, including 33 in Q1 and Q2 journals. The following h-index values are reported: 4 in Scopus, 3 in Web of Science, and 5 in Google Scholar and ResearchGate. For an applied field such as construction materials, where the citation cycle is slower and part of the audience is national, this represents a convincing level of impact. More importantly, the impact is recorded predominantly in indexed international publications, demonstrating that the candidate's results have entered contemporary scientific discourse.

The candidate's recognition is further confirmed by her participation on the international editorial board of the journal Civil and Environmental Engineering and on the editorial board of the e-Journal of Varna Free University "Chernorizets Hrabar", as well as in scientific committees of conferences and in national and international scientific forums.

6. Teaching, Project Activity, and Research Supervision

In a competition for a professorship, the ability to transform scientific knowledge into teaching content and into the training of the next generation of specialists is of decisive importance. In this respect, the candidature is unquestionably strong. The two editions of the university textbook "Construction Materials" (2009 and 2026) are intended for students in Architecture, Building Construction and Structures, Water Supply and Sewerage, and Fire and Emergency Safety. The interval between the editions attests to long-standing and consistent work to update the teaching content of a discipline directly related to the competition.

The candidate has supervised five doctoral students, one of whom, Ivan Krasimirov Enimanev, was awarded the educational and scientific degree of "Doctor" on 16 February 2024. This result is also included in Group E of the scientometric statement. Her project activity encompasses numerous projects in which she participated as an expert, researcher, or senior researcher. The candidate coordinated two national projects in the fields of technology transfer and modernization of higher education, attracting external funding. Taken together, these achievements demonstrate that Assoc. Prof. Petkova-Slipets already performs the functions inherent in the academic position of "Professor": leading a research team, developing a laboratory environment, and training researchers.

7. Recommendations

I have no critical remarks that would call the assessment of the candidature into question. My recommendations should be understood as prospects for building upon the achievements already attained.

First, the integrated results, including structural data, thermophysical measurements, and monitoring of service performance, should be published jointly in high-visibility international journals, including through collaborative projects with foreign research centers. This would naturally broaden the international impact already achieved.

Second, the "structure – properties – service performance" line should be further developed toward predictive models by linking the experimental base more closely with numerical modelling, particularly with respect to the durability of alternative materials.

Third, legal protection and transfer into practice should be pursued for the most mature results, namely the composites incorporating waste natural additives and the methodology for thin coatings, with the assistance of the university's technology-transfer structures. A sustainable doctoral school should also be developed around the laboratory base.

8. Conclusion

The candidature of Assoc. Prof. Rositsa Veselinova Petkova-Slipets, PhD, Eng., combines a clearly defined and sustainable scientific profile, an independent habilitation thesis of methodological value, original scientific and applied scientific contributions to the thermophysics of construction materials, documented international impact, established teaching activity, successful research supervision, and active project work. The minimum national requirements are satisfied in all indicator groups with a substantial margin, and the scientific output is fully aligned with the subject of the competition.

Based on the foregoing, I consider that the candidate meets the requirements of the ADASRB, the Regulations for its Implementation, and Ordinance No. 3 on the Academic Staff of Varna Free University "Chernorizets Hrabar". I give an unequivocally positive assessment and recommend that the esteemed Scientific Jury propose to the Academic Council of Varna Free University "Chernorizets Hrabar" the election of Assoc. Prof. Rositsa Veselinova Petkova-Slipets, PhD, Eng., to the academic position of "Professor" in Higher Education Area 5. Technical Sciences, Professional Field 5.7. Architecture, Civil Engineering and Geodesy.



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