

## REVIEW

by Prof. Sevdalina Hristova Turmanova, PhD  
Member of the Academic Jury set to render a decision  
on the competition for filling the academic position of a Professor  
in the Professional Field **5.13**. General engineering according to the Classifier of the Areas of  
Higher Education and the Professional Fields  
(Scientific Specialty "Technology of Natural and Synthetic Fuels")  
announced in SG, issue 42/12.05.2023r

This Review is prepared in response to Order № RD- 181/27.06.2023r issued by the Rector of "Prof. Dr. As. Zlatarov" University -Burgas.

The Review is in compliance with Development of Academic Staff in the Republic of Bulgaria Act (DASRBA), the Regulations for the Application of the Development of Academic Staff in the Republic of Bulgaria Act, the Regulations of "Prof. Dr. Assen Zlatarov" University – Burgas, for applying the Act aforementioned.

### 1. Professional development

Associate Professor Dr. Dobromir Yordanov got his master's degree in "Chemical Technologies" at the University "Prof. Dr. As. Zlatarov"- Burgas in 1997, and later in 2004 successfully defended a thesis, which granted him the scientific and scientific degree "doctor". The candidate's academic career began in 2002 as an assistant, successively occupying the position of chief assistant in 2004, and since 2011 he has held the position of associate professor at the Faculty of Social Sciences of the University "Prof. Dr. As. Zlatarov"-Burgas. Associate Professor Yordanov has more than 21 years of academic and teaching experience in the field of education, as a leading lecturer in academic disciplines related to the processes and technology of oil and gas, alternative energy sources, quality control and management in organizations. He participated in the development of 14 study programs for the Bachelor's and Master's programs.

### 2. Assessment of the scientific and research accomplishments

The documents presented by Associate Professor Dr. Dobromir Yordanov relation to the announced competition define him as a researcher with clearly expressed scientific orientations in the professional direction and the scientific specialty of the competition procedure.

He participated in the competition with 76 scientific publications, 42 of which were published in the last 5 years. His publication activity is trending upwards. These publications do not repeat the publications presented for the acquisition of the educational and scientific degree "doctor" and the position "associate professor". For participation in the competition, Associate

Professor Yordanov presents a habilitation thesis co-authored on the topic *"The synergy between ebullated bed vacuum residue hydrocracking and fluid catalytic cracking processes in modern refining - commercial experience"*, BAS publishing house. It can be seen from the scientific production of Associate Professor Dobromir Yordanov presented in the competition that he exceeds the minimum requirements, as the total number of points in the groups of indicators, mandatory for holding the academic position "professor" is 1555, with the minimum required 1150 points. The requirement according to indicator A(1) for having a doctor's degree is fulfilled and carries 50 points. In total, according to indicator B (3-4), the candidate presents a habilitation thesis - monograph *"The synergy between ebullated bed vacuum residue hydrocracking and fluid catalytic cracking processes in modern refining –commercial experience"* ISBN 978-619-245-234-6, and 10 scientific publications, which bring him a total of 210 points. Group D(5-11) includes various indicators for which the participant in the competition has presented scientific production in D7 and D8 respectively - 54 and 22, or a total of 76 scientific publications in specialized journals such as *Fuel, Industrial Engineering Chemistry Research, Petrooleum Science and Technology, Chem. Eng. Technol, Energies, Resources, Processes, Applied Sciences, Fuel Processing Technology*, which are among the top two quartiles in the world-renowned scientific information databases Scopus and Web of Science.

The sum of points for indicators of group D (5-11) is 535, with a mandatory minimum of 500, and for indicator D (12-15) the candidate has 500 points, with a required minimum of 200. According to indicators of group E (16-28), the candidate for the position of "professor" collects 260 points, and has presented a list of 21 participations in research and applied projects, all of which have been successfully completed. Of these, he is the leader of 3 national projects and is a member of the scientific team of 7 others, and he also led 3 intra-university projects and was a member of the working team of 8 others. Associate Professor Yordanov participated in Project BG05M2OP001-2.002-0001 "Student internships - Phase 1", 2017 and Project BG05M2OP001-2.013-0001 "Student internships - Phase 2", 2020, and also as a leading expert on educational activities for development of new interdisciplinary joint educational programs in direction 5.10 Chemical technologies under Project BG05M2OP001-2.016-0013, "Modernization, digitalization and internationalization of training at the University of Chemical Technology and Metallurgy", 2021. The projects have both national and European funding. A paper for co-supervision of three defended doctoral students and a teaching aid - Notes on "Quality Management" authored by the candidate in the current competition are presented. A list certifying the leadership of 26 graduates is presented. The scientific works of the only candidate in the competition - Associate Professor Dobromir Yordanov, are classified in the world scientific space, with the *h*-index 8. The candidate has a high publication activity, clearly visible in *Scopus* AU-ID 23991890100 and *Web of Science* Researcher ID R-8997-2016, 71 and 44 publications respectively. A list of 50 citations is presented, *h*-index = 8. Associate Professor Yordanov participates in joint research with scientific teams of world-renowned experts from "Nalko", "Axens", "Grace", "Shell Catalyst Technologies", "Western Research Institute USA", "University of Wyoming USA", BAS and HTMU- Sofia. The only candidate Associate Professor Dobromir Yordanov, meets the requirements, according to the

Law on the Development of the Academic Staff in the Republic of Bulgaria, the Regulations for its Implementation and the Regulations for the Terms and Conditions for Acquiring Scientific Degrees and Holding Academic Positions at the University "Prof. Dr. As. Zlatarov"- Burgas and is eligible to participate in this competition.

### **3. Main contributions, analysis and evaluation of the candidate's scientific and scientific-applied contributions and relevance of the topic**

The personal research contributions of the candidate for associate professor are formulated in the submitted document (number 17), and are in accordance with the professional field for which the competition was announced. They are in the field of oil, gas and heavy oil waste chemistry and technology, alternative energy sources and quality management of petroleum industry laboratories and are of a fundamental-applied nature. Scientific publications clearly show consistency in a current and problematic interdisciplinary field, with the application of chemical and instrumental methods to solve problems of a different nature, having a fundamental and at the same time real applied nature in the chemical industry. The contribution of the candidate becomes clear from the publications with which he participates in the current competition. The main scientific contributions of the well-planned and targeted scientific research on the above-mentioned subject, enriched with new methods and performed at a high methodological level, can be summarized with contributions in three important directions in the works presented:

*Contributions related to the chemistry and technology of oil, gas and heavy oil wastes. The results are summarized in 50 scientific publications.*

Through consistent systematic research, a selection of suitable crude oil was made for processing at "LUKOIL Neftochim Burgas", with an effect of the selection amounting to 65 million USD in the time interval of 5 years. The valuable scientific results of this in-depth study are presented to the world scientific community in the prestigious journal of the American Chemical Society ACS Omega 2020 (No. 36 in G7 Appendix 17). A developed method is the recycling of unconverted vacuum residue to distillate tar raw material, leading to a pronounced increase in the conversion of direct distillate tar by 2%. This research by itself led to an annual impact of around USD 15 million. The results of the author's research were published in the International Journal of Oil, Gas and Coal Technology. It was found that the feed of catalytic cracking sludge to the direct distillate tar allowed a 3% increase in tar conversion. The latter leads to an annual effect of about 22 million USD. The results of the author's research have been published in Petroleum and Coal Processes. These studies, reported in the scientific literature, clearly demonstrate the valuable applicability of Assoc. Prof. Yordanov's systematic and thorough research in the oil refining industry.

*Contributions related to obtaining and applying alternative energy sources. The results were published in 17 scientific papers.*

The main scientific contributions in this field refer to the creation of alternative sources of energy - biodiesel, bioethanol and solid biofuels. Suitable conditions have been found for obtaining second and third generation biodiesel by utilizing coffee grounds. The extracted oil fraction by treating the waste mass with microwaves is esterified with low molecular alcohol to the final product - biodiesel. Bioethanol has also been obtained from coffee grounds, using the latter as a nutrient medium for microorganisms. Waste biomass, coffee grounds and waste glycerol have been used to produce solid biofuels. A reasonable conclusion was made that the technical characteristics of the synthesized biofuels are suitable for use in pellet combustion plants. I consider as an important scientific contribution of the candidate the creation of a model predicting with good probability the maximum storage period of diesel fuel, after which the "Distillation characteristics" indicator exceeds the set value of 364°C. It has been proven that the mixture of diesel fuel with a composition of 6% biocomponent (1% biodiesel from coffee grounds and 5% biodiesel from rapeseed oil) can be stored while maintaining operational characteristics for up to 280 days in the temperature range 15-25°C.

*Contributions dedicated to improving the quality management activities of petroleum industry laboratories as well as other conformity assessment bodies. The results are summarized in 8 scientific publications.*

Part of the research in the scientific production presented by the candidate Assoc. Professor Yordanov is related to the creation and implementation of a new algorithm for determining and evaluating the calibration and recalibration interval of technical instruments used in testing and calibration laboratories. A sequence of tests on operating load, stability of the technical instrument during the calibration interval and uncertainty factor of the additional technical instrument to the main one, resulted in the inferred dependencies. For the first time, two original equations describing the calculation procedure for calibration and recalibration interval are proposed. The habilitation work of the candidate Assoc. Yordanov describes the research of the hydrocracking of tar and catalytic cracking of vacuum gas oil and is an original contribution to the chemistry and technology of their industrial application in modern refining. Long-term systematic self-development, accumulated knowledge and experience make the candidate's acquisition of the status of professor a logical and natural next stage in professional development. My arguments are supported by the promising scientific topics, a significant volume and quality of scientific production, which has found an echo in the literary space, and the significant scientific contributions of Associate Professor Yordanov.

The only candidate Associate Professor Dobromir Yordanov is an expert at the Executive Agency "Bulgarian Accreditation Service" in the field "Accreditation of bodies for control and certification of products", he is a member of the Board of Directors (2020-2021) and of Technical Committee 67 "Petroleum products and lubricants" of the Bulgarian Institute for Standardization. He has organizational and management experience as the head of the Department of Industrial Technologies and Management and vice dean of the Faculty of Social Sciences from 2020 to now. Currently Assoc. Professor Yordanov chairs the Academic and Methodological Council and the

Quality Commission at the Faculty of Social Sciences of the University "Prof. Dr. As. Zlatarov" - Burgas. He is a member of the Union of Chemists in Bulgaria, a reviewer in prestigious specialized journals and participates in scientific juries for the awarding of scientific degrees, a member of the Faculty and Academic Councils of the University "Prof. Dr. As. Zlatarov"-Burgas.

#### **4. Opinions, notes and recommendations**

I have no objections regarding the design and presentation of the contest materials. They are prepared according to the requirements of the law and the regulations for its implementation without technical omissions. All required documents are extremely precisely arranged and structured, which is a necessary condition for good readability and analysis. The prepared detailed author reference for the scientific contributions does not differentiate between the scientific contributions according to indicators B and D, which I do not find a shortcoming, but the reference would have gained if a clear vision for future scientific research had been presented. I imagine that they will be a natural continuation of previous work in current and interesting areas, both fundamental and applied, in the field of petrochemicals. I have no critical comments on the publications submitted for participation in the contest. My impressions of the professional qualities of Associate Professor Dobromir Yordanov are excellent.

I am convinced of his personal contribution to the obtained scientific results in the relevant publications and the development of the subject on which he works.

#### **5. Conclusion**

The submitted materials for the competition and Dr. Yordanov's contributions show that his scientometric indicators meet and exceed the requirements for occupying the academic position of "professor", defined in the Law on the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its Implementation. The analysis of the significance of the scientific production and the reference for the relevant scientific and scientific-applied contributions are a reasonable premise for me to give my convinced positive assessment and to recommend to the Scientific Jury to propose to the Faculty Council of the Faculty of Social Sciences to elect Associate Professor Dobromir Yordanov to the academic position "professor" in the professional field 5.13. General engineering, scientific specialty "Technology of natural and synthetic fuels".

**Date: 17.09.23**

**Reviewer:**

**Prof. Sevdalina**

**Member of the Academic Jury**