REVIEW

by Prof. Irena Georgieva Markovska,
University "Prof. Dr. Asen Zlatarov", Burgas
member of the scientific jury according to the order of rector №181/27.06.2023

of the materials submitted for participation in the competition for occupying the academic position of "professor", in the field of higher education 5. Technical sciences, professional direction 5.13. General engineering, scientific specialty 02.10.23 "Technology of natural and synthetic fuels", University "Prof. Dr. Asen Zlatarov" - Burgas, announced in the State Gazette, no. 42 / 12.05.2023, in which the only candidate participated is an associate professor Dobromir Ivanov Yordanov , Ph.D

1. Brief biographical data

Assoc. prof. Dobromir Yordanov graduated his Master's degree in 1999 in the specialty "Chemical Technologies", with the professional qualification of engineer-chemist at the University "Prof. Dr. Asen Zlatarov". During the period 1999-2004, he was a doctoral student at the same university. In 2004 he successfully defended his doctorate at the Higher Attestation Commission and received a doctor's degree, in the field of higher education 5. Technical sciences, scientific specialty 02.10.23 "Technology of natural and synthetic fuels". From 2002 to 2004 he worked as an assistant at Prof. Dr. Asen Zlatarov University, from 2004 to 2011 he was the chief assistant at the same university. In 2011 he received the scientific title of "Associate Professor" at HAC in the professional field of Chemical Technologies, scientific specialty "Technology of Natural and Synthetic Fuels" and from March 2011 until now he has a employment contract as an Associate Professor in the Department of "Industrial Technologies and Management" in Faculty of Social Sciences.

Since 2020, he has been a deputy dean of the Faculty of Social Sciences and head of the "Industrial Technologies and Management" department.

2. General description of the presented materials

The scientific research in the works of assoc. prof. Yordanov, submitted for the acquisition of the academic position of "professor" are for the most part in the field of scientific direction, resp. scientific specialty "Technology of natural and synthetic fuels", for which the competition has been announced. The total number of points collected by assoc. prof. Yordanov for fulfilling the minimum national requirements according to the Regulations for the conditions and procedures for acquiring scientific degrees and holding academic positions at the University "Prof. Dr. Asen Zlatarov" - Burgas are 1557 points with the required a minimum of 1150 points.

72 candidate's publications are found in the SCOPUS database and his SCOPUS H-factor is 8 without self-citation.

Associate professor Dobromir Ivanov Yordanov participated in the competition with 87 papers, of which:

In group B (212 points):

Group B3 - Habilitation thesis – monograph "The synergy between ebullated bed vacuum residue hydrocracking and fluid catalytic cracking processes in modern refining – commercial experience", BAS Publishing House, Sofia, 2022. Written by Dicho Stratiev, Ivelina Shishkova, Rosen Dinkov, Dimitar Dobrev, Georgi Argirov, Dobromir Yordanov

Group B4 – 10 scientific publications that are referenced and indexed in world-renowned databases of scientific information.

In group G7 – 54 scientific publications that are referenced and indexed in world-famous databases with scientific information (Scopus, Web of Science)

In group G8 – 22 scientific publications in non-refereed journals

3. Citations

A list of citation of assoc. prof. Dobromir Yordanov publications is presented. A 50 citations have been observed, on 6 scientific papers in the world-renowned scientific information database Scopus, as follows:

1. Investigation of Relationships between Petroleum Properties and Their Impact on Crude Oil Compatibility. Stratiev, D., Shishkova, I., Nedelchev, A., Kirilov, K., Nikolaychuk, E., Ivanov, A., Sharafutdinov, I., Veli, A., Mitkova, M., Tsaneva, T., Petkova, N., Sharpe, R., **Yordanov, D.**, Belchev, Z., Nenov, S., Rudnev, N., Atanassova, V., Sotirova, E., Sotirov, S. & Atanassov, K. Energy and Fuels, 2015, vol. 29, no. 12, pp. 7836-7854. – **21 citations;**

2. Multi-criteria optimization process of the oil extraction from spent coffee ground by various solvents. **D. Yordanov**, Z. Mustafa, R. Milina, Z. Tsonev, 2016, Oxidation Communications, 39, 2, pp. 1478-1487. – **5 citations;**

3. A new approach for production of coffee oil from waste coffee residue as a feedstock for biodiesel. **D. I. Yordanov**, Z. B. Tsonev, T. V. Palichev, Z. A. Mustafa, 2013, Petroleum and coal, 55, 2, pp. 74-81. - **5 цитата**

4. Commercial Investigation of the Ebullated-Bed Vacuum Residue Hydrocracking in the Conversion Range of 55−93%. D. Stratiev, S. Nenov, I. Shishkova, B. Georgiev, G. Argirov, R. Dinkov, **D. Yordanov**, V. Atanassova, P. Vassilev, K. Atanassov, 2020, ACS Omega, 5, pp. 33290-33304. – **8 citations;**

5. Impact of oil compatibility on quality of produced fuel oil during start-up operations of the new residue ebullated bed H-Oil hydrocracking unit in the LUKOIL Neftohim Burgas refinery. Stratiev, D., Shishkova, I., Nedelchev, A., Nikolaychuk, E., Sharafutdinov, I., Nikolova, R., Mitkova, M., **Yordanov, D.**, Belchev, Z. & Rudnev, N. Fuel Processing Technology, 2016, vol. 143, pp. 213-218. - **10 citations;**

6. Gas Chromatography Analysis of Biodiesel Blends. Zilya Mustafa, **Dobromir Yordanov**, Rumyana Milina, 2016, Oxidation Communications, 39, 4-II, pp. 3324-3335. – **1 citation.**

4. General characteristics of the applicant's activity

4.1. Educational and pedagogical activity (work with students and doctoral students)

Assoc. prof. Dobromir Yordanov demonstrates active pedagogical activity. He has 21 years of academic and teaching experience in the field of education and he is a leading lecturer in disciplines related to oil and gas processes and technology, alternative energy sources, quality control and management in organizations. He is lecturer of 13 academic disciplines for students from Bachelor's degree and Master's degree.

He is the academic supervisor of 26 graduates who have successfully defended their Master's thesis (from specialty Oil and Gas Technology and Industrial Management mamnly). Assoc. prof. Yordanov is the co-supervisor of 3 PhD students who successfully defended their PhD thesis in the doctoral program 02.10.23 "Technology of natural and synthetic fuels" - Zilya Mustafa, Ivan Petrov and Vasil Yankov.

He is the author of 15 study programs, of which 7 study programs for Bachelor's degree and 8 study programs for Master's degree.

In conclusion, it can be summarized that the candidate is a teacher with extensive experience in a wide range of disciplines in the field of technical sciences.

4.2. Applicant's administrative experience

Assoc. prof. Yordanov has significant administrative experience in organizational and management structures, such as:

- Deputy Dean of the Faculty of Social Sciences at the University "Prof. Dr. Asen Zlatarov"-Burgas from 2020.
- Head of the "Industrial Technologies and Management" department since 2020.
- Chairman of the Faculty Committee on Quality in the Faculty of Social Sciences from 2020.
- Chairman of the Teaching and Methodological Council at the Faculty of Social Sciences from 2020.
- Member of the University Committee on Quality at the University "Prof. Dr. Asen Zlatarov"-Burgas.
- Member of the Faculty Council of the Faculty of Social Sciences at the University "Prof. Dr. Asen Zlatarov"-Burgas from 2020.
- Member of the Academic Council at the University "Prof. Dr. Asen Zlatarov"-Burgas from 2021.
- Expert at the Executive Agency "Bulgarian Accreditation Service" - city Sofia since 2008
- Member of the Management Board of the Bulgarian Institute for Standardization - city Sofia, 2020-2021
- Member of Technical Committee 67 "Petroleum products and lubricants" at the Bulgarian Institute for Standardization - city Sofia.

4.3. Project activity of the candidate

It can be noted that Associate Professor Yordanov participated in 10 national contracts and 11 intra-university projects, being the head of 3 national contracts, member of the scientific team of 7 national contracts, head of 3 intra-university projects and a member of the scientific team of 8 intra-university projects. In addition, he participates as an expert in the project BG05M2OP001-2.016-0013, "Modernization, digitalization and internationalization of education at the University of Chemical Technology and Metallurgy", and also as an academic mentor in the Student Practices project - Phase 1 and Phase 2.

5.4. Scientific and scientific - applied activity. Scientific and scientific-applied contributions

Undoubtedly, many contributions can be formulated as a result of the works presented, but in my opinion they can be summarized and united in three directions. The scientific and scientific-applied activity of the candidate is in the following three main directions:

1. Investigations on the chemistry and technology of oil, gas and heavy oil residues. This is a priority topic for the candidate with over 50 scientific publications written together with specialists from LUKOIL Neftohim Burgas AD.
2. Production of biofuels from waste products
3. Improvement of quality management activity in petroleum industry laboratories as well as in other conformity assessment bodies

The scientific and scientific-applied contributions in the works of assoc. prof. Yordanov refer to the main topics on which his works:

4.4.1. Investigations on the chemistry and technology of oil, gas and heavy oil residues

- the selection of suitable oil raw materials for processing at LUKOIL Neftohim Burgas AD was proposed, and the effect of the selection of suitable oil raw materials for processing amounted to about 62 million USD for a period of five years.
- the causes are diagnosed for the increased contamination in industrial hydrocracking with vacuum residue
- recycling of unconverted vacuum residue to direct distillate tar feedstock has been shown to increase the conversion of direct distillate tar by 2% (annual effect of about 15 million USD).
- it has been proven that feeding sludge from catalytic cracking to the direct distillate tar allows to increase the tar conversion by 3% (annual effect of about 22 million USD/year).
- eight empirical correlations known in the literature and four empirical correlations developed by a Bulgarian team were applied to predict the viscosity of 165 crude oils with a variation of viscosity, density and molecular weight in the range 0.54 - 24135 cP; 0.746 –1.016 g/cm3; 117–579 g/mol. It has been proven that the best and most accurate model predicting viscosity is newly developed by the Bulgarian team.

4.4.2. Production of biofuels from waste products

- The possibilities for the utilization of waste products - waste biomass, coffee grounds and waste glycerol for the production of biofuels - have been studied. As a result, solid biofuels have been developed that have suitable technical characteristics for use in pellet combustion plants.

- By applying the gradual approximation method, a model has been created that predicts with good probability the maximum storage period in days of diesel fuel, after which the indicator "Distillation characteristics" will exceed the set maximum value of 364°C. Biodiesel / diesel mixtures are obtained, containing 6% (v/v) biocomponent - 1% (v/v) coffee biodiesel and 5% (v/v) rapeseed biodiesel It has been shown that the fuel can be stored without loss of performance to the 280th day under the specified conditions (from 15°C to 25°C).
- Second and third generation alternative energy sources (biodiesel and bioethanol) have been developed by using waste from the food industry (coffee grounds), extraction of the oil fraction with microwave irradiation and subsequent esterification with low molecular weight alcohols into biodiesel, as well as using coffee grounds as a nutrient medium for bioethanol producing microorganisms.

4.4.3. Improvement of quality management activity in petroleum industry laboratories as well as in other conformity assessment bodies

- A new algorithm was created and applied for determining and evaluating the calibration and recalibration interval of technical means used in testing and calibration laboratories. On the basis of the three main factors - operating load, stability of the technical means during the calibration interval and the uncertainty factor from the additional technical means to the main one, two equations were derived that describe the calculation procedure for the calibration and recalibration interval.
- A modified method of calculating the extended uncertainty from testing by various standardized methods was developed and applied, based on the "top-down" approach with a part for determining systematic laboratory deviations, allowing to establish the cause of deviations above those required by regulatory documents.
- A procedure was developed and implemented to estimate the uncertainty budget from the tests, as a result of which only one measurement is needed in the calculation of the expanded uncertainty of the result for the given indicator. The procedure is suitable for all conformity assessment bodies - testing laboratories and control bodies.

5. Critical notes

It is noteworthy that the majority of the works are the result of the work of a rather large scientific team - there are many articles with more than 10 authors, and some with 15 authors. I would like to recommend that assoc. prof. Yordanov to publish independent articles, preferably overviews based on the serious scientific experience he has already accumulated.

Personal impressions

I have had the pleasure of knowing associate professor Dobromir Yordanov for many years, and my personal opinion is that associate professor Yordanov is a responsible and erudite colleague.

Conclusion:

Bearing in mind the above mentioned, I confidently propose to the respected Faculty Council of the Faculty of Social Sciences to elect associate professor Dobromir Ivanov Yordanov, Ph.D, for occupying the academic position "professor" in the field of higher education 5. Technical sciences, professional direction 5.13. General engineering, scientific specialty 02.10.23 "Technology of natural and synthetic fuels".

22nd August 2023

Jury member
/prof. I. Markov