REVIEW

In a competition for occupying the academic position "Associate Professor"

By Scientific area 4.2. Chemical science (Unit operations in chemical and biochemical industry), announced in the State newspaper issue 37 from 07.05.2021,

With candidate Dr. Eng. Dimitar Nikolaev Kolev

Reviewer: Prof. Dr. Eng. Evgeni Borislavov Simeonov

1.Short biographical data and characteristics of the candidate scientific interests.

Dr. eng .Dimitar Nikolaev Kolev was born in 1966. He graduated from HMEI "Lenin" Sofia, mechanical engineer – (master degree), Specialty "Heat and Mass transfer Technique. He has defended the scientific degree "doctor", specialty 02.10.09 "Unit operations in chemical and biochemical industry" in 2005 in "Institute of Chemical engineering", BAS, as a Phd student of self-training. The thesis of his dissertation is "Increasing the possibility of using systems with contact economizers". He speaks English and Russian. Computer skills – Auto CAD, Microsoft WORD, EXCEL.

2.General characteristic of the candidate research and scientifically applied activity.

The areas in which Dr. Kolev works are: hydrodynamic investigations of new layers packing beds and redistribution irrigation devices, defining the effective wet surface of random packing; investigating a new type of packing and dependencies for calculating its height; a new type of lamellar heat-exchanger for utilization of the heat of flue gases, obtained by burning of natural gas has been patented, a new technology for utilization of the waste heat of flue gases from drier installations has been presented; thermodynamic investigation of a new type highly effective gas turbine; some possibilities for significant increase of energy efficiency by production of heat and electrical energy and decreasing the cost of the central heating have been investigated; a new technology for cleaning the flue gases from SO2 has been presented.

Dimitar Kolev participates in 2 contracts with "Scientific investigations" fund. He has 5 implementations, as well as 2 implemented patents.

Dr. Kolev has 28 years work experience in the field of managing projects, firms, teams, evaluating projects and choosing suitable terrains for building enterprises, he has also been a part-time lecturer at University of Mining and Geology "St. Ivan Rilski" on fuel technology, gas supply and heat supply, gas equipment, heat engineering and heat energy, heat transfer and mass transfer processes and equipment. He is the winner of Evrika prize as a young inventor for 2005. He is a member of: The Union of Chemists in Bulgaria, The Union of Inventors in Bulgaria, A member of The Management Board of the Union from 2010 to 2019.

3. Evaluation of the presented materials.

The candidate has the following scientometric indicators: in total have been presented (by competition and those for acquiring Phd) – 21 articles, 14 patents, 16 articles with complete text in collections, 23 poster messages and 5 implementations. Those which have been reviewed for the competition for docent are: 18 scientific publications, from which with impact factor (IF) and impact ranking (SJR) are 12, 10 patents, 9 articles with complete text in proceedings of conferences, participation in 17 poster messages and 5 implementations. The results of the scientific investigations of Dr. Kolev have been published in renowned foreign journals such as: Applied Thermal Engineering 2 issues, Chemical Engineering and Processing: Process Intensification 3 issues, as well as in Bulgarian renowned journals such as: Bulgarian Chemical Communications, Reports ABS, Journal of Chemical Technology and Metallurgy. What makes an impression is the successful implementation of the obtained results into practice i.e. the defended 10 patents (in our country and abroad) and the participation in 5 implementations. The personal contribution of the candidate in 6 publications is in the first place, in 5 in the second and in the rest at a later place in order. The common impact factor is 7,22, without the articles for acquiring PHD – 6.26. The rating of Dr. Kolev defined in accordance with the methodology for evaluation of scientists in The Institute of Chemical Engineering – BAS is 50,465, above the required minimum of 46 points.

Meeting the requirements for acquiring the academic position of "Docent" in The Institute of Chemical Engineering – BAS:

№	Criterion, regulatory document	IChE - ABS	Candidate
1	Educational and scientific degree "doctor", LDAS	Yes	Yes
2	Work experience as "associate professor"(LDAS-B.III b&g)	2 years	Yes
3	The number of publications after acquiring Phd	15	18
4	Total number of publications	20	21
5	Number of publications in referenced journals	15	15
6	Number of publications in ISI Impact Factor journals	5	5(+1from diss.)
7	Total number of noticed citations of all works	20	62
8	Individual rating according to the methodology of the IChE -ABS	46	50,465

4.Main scientific and scientifically applied contributions.

The sole candidate in the competition, Dr. eng. D. Kolev has presented all the materials in the necessary type and volume, in accordance with the Law for Development of the Academic Staff and the Regulations for its application. In accordance with the Law, the candidate must have a published monograph or equivalent publications. A list of 18 scientific works has been presented, from which 6 (124 p.) are equivalent to a habilitation work, 6 are (87 p.) publications in journals and are referenced and indexed in renowned international database with scientific information (Web of Science & Scopus), beyond the habilitation work.

Patents (10 p.) or a useful model, for which a security document has been issued in due course – 250 p. He has participated in two research projects and in 5 implementations. The scientific production of Dr. eng. Dimitar Kolev is up to date, his personal contribution is indisputable as is his realized practical application of a big part of it. The scientific production of the candidate can be synthetized in:

- Hydrodynamic investigations of new layers packing beds and redistribution irrigation devices, including: creating a method for defining the liquid phase distribution over the cross-section of the packed column through computer measurement of time and volume, defining the effective wet surface of random packing as an equation has been found for calculating it; investigating a packing with inclined capillary grooves and obtaining dependancies for calculating its height, based on experiments; the hydraulic resistence of the new redistribution packing has been

defined and a new computer program has been developed for calculating the height of the redistribution layer at a certain distance between the dew points of the irrigation equipment [I.1, I.5, I.6, I.7, I.9,I.10, I.12, II.1].

- A new type of lamella heat exchanger for utilization of the heat of flue gases obtained by burning of natural gas is patented. It has been shown that this technical decision is very good from economic point of view [II.2, I.4].
- A new technology for utilization of the waste heat of flue gases from drier installations has been presented as a new possibility for decreasing the fuel consumption is investigated and at the same time utilizing the waste heat of flue gases [I.2].
- Thermodynamic investigation of a new type highly effective gas turbine operating partially with isothermal expansion, aiming at increasing its efficiency [II.5, I.8].
- Some possibilities for considerable increase of the energy efficiency when producing heat and electrical energy and decreasing the central heating cost have been investigated [I.13, I.14, I.15].
- A new technology for purifying flue gases from have been presented. The technical and economic effect of the used regeneration method has been shown [I.11, I.16].
- A new method and installation for obtaining briquettes from charcoals from small wood particles or vegetable waste have been suggested [II.4]; A wasteless method and installation for pyrolysis of car tires [II.6]; a method and installation for processing household waste through burning, with possibilities for purifying flue gases as well as using the heat for district heating aims [II.10].

6. **Reflection of the scientific publications in the Bulgarian and foreign literature.**

The relevance of the scientific production and patents is illustrated with more than 90 number of citations.

7. Critical notes and recommendations.

No significant critical notes. I would recommend to the candidate to be more active in his teaching activity.

8. The reviewer personal impressions of the candidate.

I do not know Dr. Kolev in person but from the presented materials in the competition for "Associate Professor" I can say he is an accomplished expert in the field of chemical engineering in terms of his scientific production and his expert activity for practical implementation of the obtained results, as well.

CONCLUSION

From the presented materials and results and as far as my opinion is concerned Dr. Dimitar Kolev meets all the quantity indicators in accordance with the Regulations for Acquiring Academic positions and occupying academic positions in the Institute of Chemical engineering – BAS as well as with the Law for Development of the Academic Staff.

All this gives me the confidence to give a **positive** evaluation to the sole candidate in the competition. I suggest to the members of the Scientific jury to choose Dr. eng. Dimitar Nikolav Kolev for "Associate Professor" in the field of higher education 4.2 Chemical sciences (Unit operations in chemical and biochemical industry).

23 August 2021

Reviewer:

/Prof. Dr. Eng. E. Simeonov/