

## SCIENTIFIC OPINION

Subject: Evaluation of documents of a candidate, a participant in a competition for the academic position "Associate Professor" at IChE-BAS, specialty "Processes and devices in chemical and biochemical technology", professional direction 4.2. Chemical sciences, announced in SG no. 96 of 02.12.2022, with candidate Assistant Professor Petya Georgieva Popova-Krumova, Ph.D

The opinion was prepared by: Prof. DSc. Kaloyan Kirilov Petrov

The candidate Assistant Professor Petya Popova-Krumova was born in 1975 in Burgas and graduated with a Master's degree in engineering chemistry at the University "Prof. Dr. Asen Zlatarov" - Burgas in 2004. Since 2004, she has been working at the Institute of Chemical Engineering - BAS (IChE-BAS), obtaining the educational and scientific degree "Doctor" in 2011, and since 2011 she has been in the position of "Assistant Professor" in the Institute.

During this time, the candidate found realization of his scientific interests in the field of modeling various processes in chemical engineering, participating in more than 10 externally funded projects, two of which Petya Popova-Krumova was the head of. Of the listed projects, 4 were financed by the Ministry of Education and Science (one of which the candidate is the head of - in the Competition "Young Scientists - 2011"), 4 were financed through inter-academic cooperation between BAS and universities in Israel, one - financed under "Human resources development operational program 2007-2013" and one financed by the Ministry of Education and Science under the "Competition for projects under bilateral cooperation programs". For the presentation of her developments "Absorption-adsorption apparatus and method for waste free decontamination of gases from sulfur dioxide" at the 10th national exhibition "Inventions, Transfer, Innovations" - ITI'2017, Petya Popova-Krumova was awarded a gold medal.

In the current competition, the candidate participated with 23 publications, printed in the period 2012 - 2022 (after acquisition of PhD degree). Of them - 9 are in journals

referenced in the world database Scopus, 3 are published patents and 2 - published utility models, which are also presented, showing the enhanced applied aspect of Petya Popova-Krumova's research. Outside the competition, 9 more full-text publications related to the acquisition of PhD degree were presented. 41 citations (excluding self-citations) of the candidate's publications are also presented.

Referred to the minimum requirements for "Assoc. Prof." in direction 4.2. Chemical sciences, the presented materials form points, either fully meeting the requirements for the relevant indicator (indicator „A“), or exceeding the relevant requirements - for indicator „B“, materials are presented for 113 items, with a requirement of 100 items, for indicator „I“ - 224 items, with a requirement 220 points and for indicator „II“ - 64 points, with a requirement of 60 points. The additional criteria of IChE-BAS for occupying the position of "Associate Professor" are fully met.

The main scientific contributions in the presented materials are the following: a new regularization method is proposed for solving incorrect parameter identification problems; developed a hierarchical approach for solving multi-parameter models, using polynomial approximations of experimental data necessary for parameter identification.

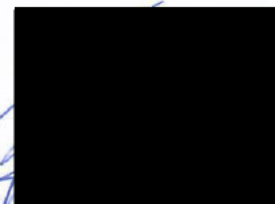
The essential scientific and applied contributions can be mentioned: a new approach for modeling the processes of interphase mass transfer by developing convective-diffusion and average-concentration models in industrial column apparatuses is proposed; a new mathematical model for a specific case of absorption-adsorption process in a bubble tray column apparatus, which is based on convective-diffusion type of models and average - concentration models. A total of three patents and two utility models have been published based on these contributions.

## CONCLUSION

In conclusion, the documents and materials presented by Assistant Professor Petya Popova-Krumova, Ph.D., meets all the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria, the Rules for the Implementation of the Law on the Development of the Academic Staff of the Bulgarian Academy of Sciences and the relevant Regulations of the Institute of Engineering Chemistry for the occupation of the academic position "Assoc. Prof.". After familiarizing myself with the materials and scientific works presented in the competition, analyzing their significance and the scientific, scientific-applied and applied contributions contained in them, I give my positive assessment and recommend the IEES Scientific Council to choose Assistant Professor Petya Popova-Krumova, Ph.D., for "Assoc. Prof." in professional direction 4.2. Chemical sciences,

scientific specialty "Processes and devices in chemical and biochemical technology", at the Institute of Chemical Engineering - BAS.

Prepared the opinion:



16.03.2023

(Prof. DSc. Kaloyan Kirilov Petrov)