

OPINION

on a competition for occupation of the academic position “Associate Professor” in the professional field 4.2. Chemical Science (Solid State Chemistry) for the needs of the Department of Applied Inorganic Chemistry, Faculty of Chemistry and Pharmacy, Sofia University, announced in State Gazette, issue 65/28.07.2023

by Assoc. Prof. Boriana Venelinova Donkova, PhD,
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In the announced competition for Associate Professor in the professional field 4.2. Chemical Sciences (Solid State Chemistry) the only candidate is Assistant Professor Veselina Toncheva Rangelova, PhD, member of the Department of Applied Inorganic Chemistry, Faculty of Chemistry and Pharmacy (FCP) at Sofia University (SU). The documents submitted by the applicant are in accordance with the Rules for the implementation of the Law on the Development of the Academic Staff in the Republic of Bulgaria (LDASRB) and the specific requirements for occupation of academic positions at the Faculty of Chemistry and Pharmacy, Sofia University.

Veselina Rangelova graduated from Faculty of Chemistry and Pharmacy in 1996 as a Master in Chemistry. In 2003 she defended her PhD thesis on the topic „Amorphous and nanocrystalline Mg - Ni alloys for hydrogen storage" (Group of indicators A - 50 points from 50). Since 2013 she has been assigned as an assistant professor at Department of Applied Inorganic Chemistry, FCP-SU.

The candidate has submitted as a habilitation thesis a monograph entitled "MOFs. Storage of gases in porous materials", published after peer review process by University Press "St. Kliment Ohridski". The monograph is 126 pages long, it is based on 282 literature sources and meets the requirements of LDASRB (Indicators Group B-100p./100). The development of suitable materials for hydrogen storage and their investigation is an area in which the candidate has been working since her PhD student's period. In the monograph the recent advances in the field of hydrogen and CO₂ sorption on metal-organic frameworks are discussed - methods for

materials design, for characterization of their efficiency, factors affecting performance characteristics, advantages of MOFs over other types of porous materials. Existing problems are pointed out and directions for improving the sorption characteristics of MOFs are outlined.

To the group of indicators Γ , Dr. Rangelova has included 12 publications. Three of them are in journals with quartile Q1, four - in journals with quartile Q2, five - in journals with quartile Q3 (230 pts./220). The submitted "Author's report on the contributions of the scientific papers" includes two additional articles, published in peer-reviewed non-indexed journals. These 14 articles (Appendix 10b) can be summarized in the following two groups:

- Synthesis and characterization of amorphous and nanocrystalline materials, and testing their applicability for solid-phase hydrogen storage. The influence of additives (papers 6,7,13), their amount (paper 3), activation of alloys by heat treatment (paper 7) and mechanochemical synthesis (papers 8,9,13), methods of synthesis of MOFs and their composition (papers 10-12) on the morphology and microstructure of porous materials, their sorption/desorption characteristics in hydrogen gas phase and electrochemical hydriding is shown. The influence of composition on the glass forming ability of Zr-based alloys was investigated by comparing their thermal characteristics.

- Synthesis, characterization and testing of catalysts for NH_4ClO_4 decomposition (papers 1,2,5). Novel hierarchically structured $\beta\text{-Ni}(\text{OH})_2$, mesoporous $\text{CuO}/\text{Cu}(\text{OH})_2$ and $\text{g-C}_3\text{N}_4/\text{humans}$ composite were synthesized, which substantial decrease the high temperature decomposition step of NH_4ClO_4 (by 68, 96 and 80°C, respectively) and increase the total heat release.

Knowing the professional competence and qualification of Dr. Rangelovaq her contributions are in the field of synthesis of materials, their structural characterization, thermal analysis and study of hydriding/dehydriding properties (gas phase), estimation of thermodynamic and kinetic characteristics of materials. It would be to the candidate's advantage if these contributions were more clearly highlighted in the attached reference.

To the group of indicators Δ Dr. Rangelova has attached a list of 174 citations (348 pts./70). The latest scientometric reports (November 2023) shows 175 citations (excluding self-citation) in the Scopus database; the achieved Hirsch index (h) is 5.

In group of indicators \mathcal{K} , the candidate declares 155 points at required minimum of 70 points. She has been the leader of 3 internal university projects. From the mentioned 7 projects in

which Dr. Rangelova is a participant, I consider that the three educational projects should be excluded, which results in 140 points/70.

Dr. Rangelova's teaching activity includes lectures and practical exercises in Inorganic Chemical Technology for students of specialty Chemistry and Engineering Chemistry and Advanced Materials. She has also developed a new course "Water, Air and Soil Purification Technologies" for the MSc in Ecochemistry. She works successfully and fruitfully with undergraduate, graduate and PhD students, as evidenced by the three articles with their participation, as well as three defended diploma theses (2 in Master degree level and 1 in Bachelor).

It should also be noted that Dr. Rangelova is a co-author of a textbook and a training book in Chemistry and Environmental Protection 10 grade (compulsory preparation).

In conclusion, the analysis of the documents presented by Dr. Rangelova for participation in the competition shows that she fulfills the normative requirements for occupying the academic positions "Associate Professor" at the Faculty. That is why, I give my positive evaluation and I recommend Ass.Prof. Dr. Veselina Toncheva Rangelova to be appointed as "Associate Professor" (professional field 4.2. Chemical Sciences, specialty Solid State Chemistry) in the Department of Applied Inorganic Chemistry at the Faculty of Chemistry and Pharmacy, Sofia University "St. Kliment Ohridski".

19.11.2023

Signature:

/ Assoc. Prof. Borjana Donkova/