

## ATTITUDE OF REVIEWER

Assoc. Prof. Margarita Valentinova Gabrovska, PhD from IC-BAS, member of the Scientific Jury, selected by the Scientific Council of Institute of General and Inorganic Chemistry – BAS, Protocol No. 8/11.07.2023 and order No. RD-09-132, July 17, 2023.

With respect to the competition for occupying the academic position “Associate Professor” in the professional field 4.2 Chemical Sciences, scientific specialty Solid State Chemistry, published in “Newspaper of State”, issue 46 dated 26.05.2023

The only candidate, applying for the academic position “Associate Professor” in the competition, announced by the Institute of General and Inorganic Chemistry (IGIC) - BAS for the needs of the Laboratory “Electron spectroscopy of solid surfaces” is Assist. Prof. Alexander Svetoslavov Tsanev, PhD. All the documents, required and specified by the Regulations for the Conditions and Order of Appointing in Academic Positions in the IGIC-BAS have been duly submitted.

Dr. A. Tsanev's professional career at IONH-BAS began in 2004 with his appointment as a chemist in the Laboratory “Electron Spectroscopy of Solid Surfaces”. In 2017, he defended his PhD thesis entitled “Obtaining and characterization of mixed oxide films of Zr with rare earth elements Ce and Y for catalytic application” and obtained an educational and scientific degree “doctor” in the scientific specialty Chemistry of the solid state. Since 2019, he holds the academic position of Assist. Prof. The chronology of his professional development and occupied positions proves that he completely satisfies the requirements specified for occupying the academic position of Associate Professor.

Assist. Prof. A. Tsanev is a co-author of 29 scientific publications, of which 20 and one book chapter are submitted for participation in the current competition, included in indicators B and G, according to the Regulations for the conditions and procedures for acquiring scientific degrees and for holding academic positions. All scientific works from indicators B and G are published in scientific journals that are referenced and indexed in world-famous scientific information databases (WoS or Scopus) in the field of competition. Based on 8 articles, Indicator B - Habilitation work was formed as one publication falls into quartile Q1, two into Q2, two into Q3, two into Q4 and one is with SJR: 0.211), with a total number of points 129, with required 100 points. The Author Reference - Indicator G is built on the basis of 13 scientific works, distributed as follows, one article in Q1, seven in Q2, two in Q3 and two in publications with SJR- Scopus: 0.142 and 0.481) and one published book chapter, all of them covering indicator G with a total of 230 points out of the required 220. In the indicator group D - Citations in scientific publications, monographs, collective volumes and patents, the candidate presented 38 citations (76 points), noticed in the WoS and Scopus databases, which exceeds the required minimum of 60 points for indicator D. All citations are in prestigious international scientific journals, which supports the significance and relevance of the scientific developments with the participation of the head of Assist. Prof. A. Tsanev. The popularization of the obtained results is reflected in the presentation of 9 poster reports at international and national scientific forums, included in the materials for the current competition. The general h-index of the candidate is 5, which meets the specific requirements of the IGIC-BAS for the selection of an Associate Professor. Scientific-applied contribution represents the candidate's participation in the collectives of 3 scientific-research projects for the period of the competition.

The scientific researches included in the *Habilitation work section* are focused on studying the corrosion processes occurring in aluminum alloys, as well as the ways of their protection by applying the X-ray photoelectron spectroscopy (XPS) method: (i) the influence of preliminary alkaline activation and acid deoxidation of the surface of aluminum alloy Al1050 on the processes of immersion formation of protective films of cerium oxide on it was studied; (ii) the effect of cerium ions on the corrosion protection of anodized aluminum alloys covered with

conversion layers of cerium oxides/ hydroxides was established; (iii) the deposition of ceria was followed by XPS-depth profiles conversion layers on aluminum alloys and their corrosion protection; (iv) the formation processes of immersion-derived protective films of cerium oxide and subsequent anodization of the aluminum layers in aqueous solutions of orthophosphoric acid were analyzed and the effect of these processes on the corrosion behavior of aluminum alloy Al1050 was determined; (v) the role of deposition of phosphate coatings on ceria conversion layers was revealed; (vi) the influence of silver ions introduction on the surface properties of aluminum Al1050 alloys and the behavior of the alloy during long-term treatment in a model aggressive corrosion environment was investigated.

The results presented in the Habilitation work are original scientific contributions regarding the disclosure of the growth mechanism of the conversion anti-corrosion coatings and the corrosion processes of the resulting layers.

The presented *Author Reference* includes 12 scientific papers and one book chapter, combined by applying the XPS method, thematically grouped in 3 areas:

1. Electrochemical corrosion and processes occurring in electrolytes.
2. Processes of catalysis, photocatalysis and electrocatalysis.
3. Identification and proof of oxide phases resulting from chemical synthesis.

The detailed review of the summarized results by Assist. Prof. A. Tsanev, reflected in the Habilitation Thesis and the Author's Reference, outline the profile of his research activity related to the application of X-ray photoelectron spectroscopy, which in combination with scanning electron spectroscopy, X-ray diffraction, transmission electron microscopy, gas tests and other characterization methods help to determine the optimal process parameters in the development of new and efficient technologies for industrial production of a wide range of materials with different fields of application. The obtained results are up-to-date, important and of interest, both from a fundamental and from a scientific-applied point of view, and coincide with the specialty for which the competition was announced.

The scientific production presented by Assist. Prof. A. Tsanev for the occupation of the academic position "Associate Professor" in professional direction 4.2. Chemical Sciences, exceeds the national minimum requirements, those of the BAS and the additional requirements of the Regulations on the terms and conditions for acquiring scientific degrees and for holding academic positions at the IGIC-BAS.

The overall analysis of the scientific activity and scientific production of Assist. Prof. A. Tsanev in the field of the competition allows me to give his my positive opinion and confidently recommend to the honorable members of the Scientific Jury and the Scientific Council of IGIC-BAS-BAS to vote positively for the award of the academic position Associate Professor to Assist. Prof. Alexander Svetoslavov Tsanev, PhD in the professional field 4.2 Chemical sciences, scientific specialty Solid State Chemistry.

14.09.2023

Reviewer:

/Prof. Margarita Gabrovska, PhD/