STATEMENT

by Assoc. Prof. Dr. Vladimir Monov

Member of the Scientific Jury according to Order No. 87/30.04.2019

of the Director of IICT-BAS

ABOUT

dissertation thesis for receiving of educational and scientific degree "doctor"

Author of dissertation: mag. Eng. Bogomil Dimitrov Popov

Thesis theme: "High temperature processing of materials and alloys containing nano elements"

Field of higher education: 5. "Technical sciences"

Professional Field: 5.2. "Electronics, Electrical Engineering and Automation"

Supervisor: Prof. Dr. Eng. Dimitar Nedelchev Karastoyanov

The statement was prepared on the basis of the following documents which I received as a member of the Scientific Jury: 1) dissertation, 2) abstract of the dissertation, and 3) copies of the author's publications related to the dissertation.

Structure of the dissertation work

The dissertation has a volume of 127 pages and consists of Introduction, 4 chapters and Conclusion. The list of used literature contains 107 sources and the list of publications related to the dissertation consists of 10 publications. In the work, 9 scientific and applied contributions are formulated. A statement of originality of the results obtained is attached to the dissertation.

The abstract consists of 51 pages and essentially reflects the objectives, the results obtained and the main scientific and applied contributions in the dissertation.

General characteristic of the dissertation

The dissertation theme is in the field of high temperature technologies, the aim being to study high temperature processes for materials and alloys and to offer innovative technologies for obtaining new materials and alloys using nanoparticles. The aim and tasks under consideration are subject of an active scientific and applied research, which

undoubtedly determines the actual nature of the dissertation topics as well as the usefulness of the scientific and applied results obtained in the dissertation.

In Chapter 1 of the dissertation a review, analysis and systematization of methods and means for high temperature processing of materials containing nano elements is made. The experience and the achievements of our and foreign companies have been studied, so that the Ph.D. student has acquired in-depth knowledge about the achievements as well as the current problems in the field and the potential possibilities for their solution. Chapter 2 investigates high-temperature processes and associated equipment for producing composite materials. Chapter 3 proposes innovative technologies for high temperature carbide caking, production of hard-alloy materials and nano-containing tools. The experimental tests carried out in the Taman furnace and the resulting experimental samples are described and analyzed in detail in Chapter 4. Conclusions have been made and possibilities for improving the equipment in the Taman furnace and increasing the efficiency of the high-temperature processes are stated.

The list of dissertation publications consists of nine publications and one patent application. All of them correctly reflect the results obtained in the dissertation work. The publications are in specialized issues and proceedings of national and international conferences. The patent application has three co-authors and it is registered with the Patent Office of the Republic of Bulgaria.

Scientific and applied contributions of the dissertation work

In the dissertation and in the abstract, nine contributions of scientific and applied character are formulated. Of these, I accept and appreciate the following six:

- The structure, organization and composition of a high-temperature technological line based on a Taman furnace is proposed.
- Optimization of technological processes and regimes in the high temperature line using Taman furnace is performed.
- Innovative high-temperature technology has been developed to obtain tools with built-in diamond particles
- Innovative high-temperature technology has been developed for silicon carbide caking.
- Innovative high-temperature technology has been developed for caking of pine carbide.

- Experiments have been carried out to confirm the results of innovative high-temperature technologies developed.

The other three of the nine contributions generally refer to important results in the dissertation but they, however, have analytical and surveying character in essence.

A good attestation for the innovative character and the practical applicability of the results obtained in the dissertation is the patent application: "Method for obtaining silicon carbide coatings on iron powder metallurgical products".

Comments, recommendations and remarks

The dissertation has been developed in depth and represents a complete scientific research work. The author has systematically studied the problem and has offered original scientific and applied results and useful practical solutions. The results obtained are entirely in line with the dissertation goal: developing innovative technologies for obtaining new materials and alloys using nanoparticles.

To the copy of dissertation which I reviewed, I have the following remark of editing and technical nature.

- The list of literature used is not well-prepared and the requirements that bibliographic records must meet are not satisfied. This is particularly reffered to patent and corporate literature references.

My recommendation to the dissertant is to continue the research and publishing activities as well as to realize the innovative technologies developed by him.

CONCLUSION

I appreciate high the work done and the results obtained in the dissertation. The dissertation work complies with the requirements of the Law for academic growth, the Regulations for its implementation, as well as the specific conditions for acquiring academic degrees and for occupying academic positions in the IICT-BAS. On the basis of the above, I propose to the honorable Scientific Jury to give Bogomil Dimitrov Popov the Educational and scientific degree "doctor" in the field of higher education: 5. "Technical sciences", professional field: 5.2. "Electronics, Electrical and Automation".

Sofia,

03.06.2019 г.