REVIEW

of dissertation for acquiring educational and scientific "PhD" degree

Author: mag. eng. Bogomil Dimitrov Popov

Subject: „High-temperature treatment of materials and alloys that contain nanoelements "

Jury member: Prof. Dr. Eng. Dimcho Stoilkov Chakarski, TU-Sofia; "Automotisation of discrete production"

Division: 5.2 Electrical engineering,. Electronic and Automation;

Scientific Area: 02.21.07 "Automated systems for information processing and management";

1. Characteristics of the disertation and the additional materials

The dissertation has 126 pages main text. It is illustrated with a lot of images (93) and tables (6). It is structured in 4 chapters. The references are 107 topics, 11 of which are in Cyrillic, 94 in Latin and 2 are web-addresses.

IICT-BAS science union is taken a consideration for opening a procedure for public defense of the dissertation.

2. Accuracy of the problem

The dissertation topic for high-temperature treatment of materials and alloys containing nanoelements is very modern. It offers ground for improving the known practices with furnaces, which work with continue stability over 2000^{O}C with conditions of constant gas income and importing materials for synthesis or molds. .

3. Problem-understanding

The PhD sudent has deep understanding of the described problem. He has included 107 references, more of which are in latin. The observing chapter is analytical consisting examples of high-temperature treatment and application of micro and nano particles in materials and alloys. A claasification of the disperoxides with tribological application is made. The experience of local and foreign companies has been studied.

In addition the dissertation goal is formulated.

The goal of the disertation is: ***A high-temperature processes for creating materials and alloys to be researched and an innovative technologies to be applied for creating new materias and alloys using nanoelements.***

For compleating this goal the following main task are achieved:

- Analysis of common high-temperature processes for synthesis and sintering of metals;
- Developing structure, organisation and content of Taman's furnance technological line;
- Developing innovative technologies for production with high-temperature Tauman's furnance;
- Experimental work for proving the presented technologies and developing high-temperature instalations for treatment of materials and alloys.

In chapter 2 the technologies for creating composite materials are observed. An analysis of the existing high-temperature installations for hard-melted materials is carried out. A schematic solutions for high-temperature treatment of materials and alloys are presented.

In chapter 3 innovative technologies using an upgrated tauman's furnance are presented.

In chpter 4 an experimental work and results with the suggested methods are carried out

4. Approch and problem-solving

The student has used a realistic and methodological approach for acheiving dissertation's goal. Based on the refferences and own analyses and experiments he develops a methodological approach for solving the desired tasks and goal.

I evaluate author's approach and applied solutions as suitable for achieving the formulated tasks, wich is backed by the experimental results.

5. Assesment of the achieved results

The diisertaion has 126 pages of text including illustrations and refferences.

According to known scientific practices and papers, the student studies the problems and offer suitable solutions.

For solving the tasks a modern research tools are used such as analysis, synthesis, innovation, designing methods, optimisation etc.

Based on the dissertation work: analysis and developing of new technologies, evaluating and upgrading high-temperature installations, experimental results, which I accept as authentic and adequate for gain an educational scientific title doctor.

6. Main contributions

An existing science problem is formulated and solved using new means and by observing new areas and research methods and proven new facts.

Scientifically-applied contributions

- Analysis of common high-temperature process for synthesis and sintering of metals;
- Developing structure, organisation and content of Taman's furnance technological line;
- Optimisation of technologies for production with high-temperature Tauman's furnance;
- Developing of innovative technologies for creating diamond tools and for sintering of silicic carbid and borone carbid.
- Graphic presentation of the results from the experimental work and their analysis for future application

Applied conributions

- A practical realisation of the developed innovative technologies for production of diamond tools and sintering of silicic carbide and borone carbide is carried out
- The main results can be used in scientific researches of the Institute of information and communication technologies.

7. Dissertaion publications

The main results over the dissertation are published in 10 publications, one of which is entirely made by the author, and the rest are in co-authorship with his supervisor Prof. Dr. Dimitar Karastoyanov and colleagues from IICT-BAS. Two of the publications are presented in international conferences abroad.

8. Results in practice

The dissertation's results can be used in the engineering practice in the science researches of IICT and in the engineering practice of companies and organizations working with high-temperature processes and synthesis of metal sintering.

The main advantages of the dissertation of mag. Eng. Bogomil Popov are:

- A deep analysis and systematization of high-temperature processes for creating materials and alloys, of types of micro and nano-materials is carried out.
- A modern tools for creating the dissertation are used
- Modern innovative technologies are developed in creating diamond tools and in sintering of silicic carbide and boron carbide.

9. Personal impression

I don't know mag. Eng. Bogomil Popov personally. I definitely believe that he has the qualities needed; he has deep knowledge and has proven that he can carry out scientific researches separately or as part of a team.

10. Notes and advices over the dissertation

I have the following comments and advises, most of which are formal and doesn't apply to the main presentation:

10 tasks are formulated over the dissertation work. The first two are in addition in formulating the goal of the dissertation and I expel them.

Conclusions from the first chapter are missing, where the solved and unsolved problems in the field are specified.

Conclusions, which correspond with the contributions from the main chapters, are missing.

There are some terminological mistakes and foreign wording

I don't accept the first two contributions, since they result from the overview

Conclusion:

My overall evaluation of the dissertation work is positive. It is carried out well as volume and content. Enough scientific and scientifically-applied contributions are achieved.

The dissertation material fulfills the ***requirements of РАСРБ and the application manual, and the special requirements for gaining a PhD title in BAS are fulfilled.***

To the honorable jury I suggest ***to evaluate highly the dissertation work of mag. eng. Bogomil Dimitrov Popov, and award him with educational title " Doctor"*** *in Division: 5.2. Electronic, Electrical engineering and Automation, "Automated systems for information processing and management".*

Sofia, 30.05.2019 г.