

## STATEMENT

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”

**Discipline:** 5. Technical sciences

**Division:** 5.2. Electrical engineering, Electronic and Automation

**Scientific area:** Automated systems for information processing and management

**Scientific jury member:** Prof. Dr. Ivo Malakov, TU—Sofia Order. № 87/30.4.2019 г./ИКТ

The dissertation presented for my statement has 126 pages, divided in 4 chapters and conclusion. 107 references are quoted. Along with the dissertation 9 publications are done ( 1 in a journal, 6 in local conferences and 2 abroad) and a patent request is made. One of the publications is authors. There are no student quotations.

### **1. Accuracy of the problem solved in the dissertation in scientific and scientifically-applied matter**

The dissertation's topic is in prespective and interesting field of high-temperature treatment technologies of materials and alloys containing nanoelements. The presented approach improves materials and alloys characteristics, decrease the need for expensive components and metal parts. All this proves the dissertation's scientific and scientifivally-applied value..

### **2. Problem and literature understanding degree and authros interpretation over the material**

A broad overview of the modern methods, means and technologies for materials and alloys that contain nanoelements high-temperature treatment research has been made. The analysis shows that the author has made a wide and deep research the problems in this fieald. The task and the goals are presented corectly.

### **3. Congruence between the goal and tasks and the achieved results**

In the dissertation an approach for compleating the main goal has been developed conserning the high-temperature treatment of materials and alloys, containg nanoelements. By the described experimental work it can be concluded that the author has chosen and applied appropriate research methodology acording to the desired task and goals.

### **4. Characterization and evaluation of the dissertation**

The dissertation stands out with deep knowledge of the problems, the used approaches for research and development. A lot of experiments are presented, based on the desired results. There is a connection between the experimental results and the theoretical analysis.

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. The disertation's tasks are formulated after critical analysis and systematisation of methods and means for high-temperature treatment of materials and alloys, containing nanoelements.

Different analysies, researches and systematizations are made.

A strusture, organisation and content of Taman's furnance technological line is presented.

An innovative high-temperature technology is developed for creating diamond tools, sintering of silicic carbide, borone carbide, sintering and compressing of hard materials.

An experiments are carried out for confirming the results of the developed innovative technologies for high-temperature technologies.

I evaluate positive the results from the research and the experiments.

#### **5. Scientific and scientifically-applied contributions in the dissertation**

I accept author's contributions that are with scientific and scientifically-applied matter. Some additional consolidation and refinement can be made.

The presented scientific and scientifically-applied contributions can be added to the following groups: proving new significant sides of already examined scientific areas, problems, theories, hypothesis; discovering new classifications, methods, constructions, technologies and achieving solid factors, constructions and methods for enriching existing knowledge with practical application.

#### **6. Evaluating author's personal participation in contributions**

The dissertation and the contributions are personally made by the author.

#### **7. Assessment of the publications within the dissertation paper**

Along with the dissertation 9 publications are made, 1 of which is made only by the author. There are 2 publications presented abroad and 1 patent request in Bulgaria. The contributions has been popularized to the scientific community.

#### **8. Real use of the dissertaion's results**

The used methodologies, research and solutions can be applied in the high-temperature treatment technologies. They are a good start for widening the work over this field in the future.

#### **9. Notes, advices and comments**

The dissertation stands out with deep knowledge, desire to research a significant problem from different aspects and finding a working solution. The research field is modern and perspective.

My personal notes and recommendations are presented personally to the author and taken in consideration.

As a recommendation for the future I suggest that the student should make more publications in international prestigious journals and conferences.

### **CONCLUSION**

The author has made a deep overview and analysis of the presented problem and has offered solutions in modern and perspective field. **All requirements of ЗРАСРБ, the application manual, and the special requirements for gaining a PhD title in ICT-BAS are fulfilled**, based on the volume and the quality of the dissertation paper.

Based on that my evaluation is positive and I offer **mag. eng. Bogomil Dimitrov Popov** to be awarded with educational and scientific title "**docotor**" in discipline 5 — Technical sciences, division 5.2. — Electrical engineering, Electronic and Automation, scientific area — Automated systems for information processing and management.

**Sofia, 10 June 2019 г.**