OPINION

by **Prof. Lyubka Doukovska, PhD, DSc**
from the Institute of Information and Communication Technologies,
at the Bulgarian Academy of Sciences,
on the Thesis for awarding educational and scientific degree PhD,
under the Scientific Field 5. "Technical sciences",
the Professional Area 5.2. "Electrical engineering, Electronic and Automation",
the Scientific Specialty 02.21.07. "Automation, Information and Control Systems"

Author of the PhD Thesis: **Bogomil Dimitrov Popov**
PhD Thesis Title: **"High temperature processing of materials and alloys containing nano-elements"**

In accordance with Order No. 87 from 30.04.2019 of the Director of the Institute of Information and Communication Technologies, I have been appointed as a member of the Scientific Jury regarding the PhD thesis of **Bogomil Dimitrov Popov** for awarding the educational and scientific degree "Doctor of Philosophy" (PhD).

In order to form the final evaluation of the PhD thesis, the requirements of the *Development of Academic Staff Act in the Republic of Bulgaria* are implemented the specific requirements in the Act's Institutional Regulation shall be taken into consideration, where the respective norms are:

1. Pursuant to Art. 6 (3) of the *Development of Academic Staff Act in the Republic of Bulgaria*, PhD thesis should contain scientific or scientific-applied results, which represent an original contribution in science. The PhD thesis must indicate that the candidate has in-depth theoretical knowledge of the relevant specialty and ability for independent research.

2. According to Art. 27 (2) of the specific requirements in the Act's Institutional Regulation, PhD thesis should be presented in a form and volume corresponding to the specific requirements of the primary unit. The PhD thesis should contain: a cover page;

content; introduction; exhibition; conclusion - a summary of the results obtained with a declaration of originality; bibliography.

The PhD thesis consists of 127 pages. Its structure includes introduction, four chapters, conclusion, the PhD thesis scientific contributions, list of the publications based on the PhD thesis, a request for originality and a list of 107 cited sources.

The aim of the dissertation is to investigate high temperature processes for materials and alloys creation and to propose innovative technologies for obtaining new materials and alloys using nanoparticles

To accomplish the goal, the following tasks are set:

1. To review, analyze and systematize the types of high-temperature technologies and the means for their realization.

2. To review, analyze and systemize the material types in the micro- and nano-world.

3. To investigate known high temperature processes for the synthesis and sintering of metalloids.

4. To propose a structure, organization and composition of a high-temperature technological line based on a Taman furnace.

5. To develop innovative technologies using an updated high temperature furnace.

6. To conduct experiments in order to improve the operation of the Taman furnace.

7. Conduct real experiments and deliver results for diamond tools creation. The results to be analyzed.

8. Conduct real experiments and show results for sintering of silicon carbide. The results to be analyzed.

9. Run real experiments and show results for sintering of boron carbide. The results to be analyzed.

10. Conduct real experiments and present results for high temperature sintering and pressing of solid materials. The results to be analyzed.

I find that the aim and the problems formulated reflect the topicality and significance of the presented dissertation work, as well as the possibility to apply the results obtained in the engineering practice.

The submitted list of publications contains nine articles and one patent application. All publications are with co-authors. The data presented in this way give me reason to

conclude that the study was done on its own and was provided with the necessary publicity. No data citations are provided.

I accept that the contributions so formulated could be considered to have scientific and common application. This separation would allow detailing the results obtained in accordance with the specificity of their significance. Such defined contributions can be defined as enriching the existing scientific field with new knowledge.

The PhD abstract has a volume of 53 pages. It faithfully reflects the essence and content of the PhD thesis, including the purpose, subject, object and tasks of PhD thesis research and the ways of their realization.

In order to form the final evaluation of the PhD thesis, the requirements of the *Development of Academic Staff Act in the Republic of Bulgaria* and its Implementation Rules are to be taken into account, according to which I have the following remarks and recommendations:

1. In the documents received as a member of the Scientific Jury, there is no evidence of the educational component of the PhD degree, such as examination reports, individual plans, etc.

2. The list of the references doesn't comply with the requirements for bibliography.

3. There are no directions for future work, based on the results of the PhD thesis.

4. Can the results obtained be applied and used in organizations and institutions and further developed in projects?

5. The PhD student should direct his efforts to increase his contributions to reputable international publications.

In conclusion, I accept that the requirements of the *Development of Academic Staff Act in the Republic of Bulgaria* and the specific requirements in the Act's Institutional Regulation are fulfilled. After my introduction to the dissertation thesis and its publications, an analysis of their significance and the contributions they make, I give my positive assessment and I recommend to the Honorable Jury to award the educational and scientific degree PhD to **Bogomil Dimitrov Popov** in the Scientific Specialty 02.21.07 "Automation, Information and Control Systems".

05.06.2019 Signature: .....

Sofia /Prof. Lyubka Doukovska, PhD, DSc/