Appendix 12a

REVIEW

of dissertation for the acquisition of:

educational and scientific degree " **doctor** "	**X**
scientific degree **"Doctor of Science"**	
	the true is indicated by the sign "X"

Author of the dissertation:

		Hristofor	Ivanov	Skandaliev	UCTM
academic position	scientific degree	name	middle name	last name	workplace

Topic of the dissertation:

OBTAINING AND CHARACTERISTICS OF ECOLOGICAL AND NON-TOXIC SOLID ROCKET PRODUCES

Scientific area:

5	Technical sciences
code	name

Professional area:

5.10	Chemical technologies
code	name

Scientific specialty:

Technology of natural and synthetic fuels

The review was written by:

professor	doctor	Nikolay	Iliev	Georgiev	UCTM
academic position	scientific degree	name	middle name	last name	workplace

1. Completion of the provided documents:

A) The dissertation and the competition documents are in full compliance with the Regulations.	4 points	**X**
B) The documents are complete but do not fully comply with the requirements of the Regulations.	2 points	
C) The documents are not completed in accordance with the requirements of the Regulations.	0 points	

		one of the answers given is marked with the sign "X"

Missing documents and violated standards must be described if response C is marked.

2. Meeting the minimum requirements under the Regulations:

A) The candidate meets the minimum requirements	20 points	**X**
B) The candidate doesn't meet the minimum requirements	0 points	
		one of the answers given is marked with the sign "X"

It must be filled in if answer B is marked. The publication activity of the candidate is analyzed. The response of the results achieved (quoted) is analyzed.

3. The relevance of the topic of the dissertation:

A) The topic is relevant and new (there are no known results on the topic by other authors)	8 points	
B) The topic is relevant and results from other authors are known	6 points	**X**
C) The topic is not relevant, but results from other authors are known	2 points	
D) The topic is not relevant and no results from other authors are known	1 point	
E) The topic does not correspond to the level of dissertation	0 points	
		one of the answers given is marked with the sign "X"

The production of environmentally frendly high-energy materials without the involvement of chlorine-containing compounds is a topical area that has been exploited extremely actively in recent years. A number of solutions to this problem have been proposed in the literature, however, the present work expands the field with useful new information.

4. Knowledge of the problems, subject of research in the dissertation:

A) The doctoral student knows in detail the achievements of other authors on the topic of the dissertation	8 points	

B) The doctoral student is partially familiar with the achieved results on the topic of the dissertation	4 points	**X**
C) The doctoral student has no prior knowledge of the status of the problems in the dissertation	0 points	
		one of the answers given is marked with the sign "X"

The evaluation must be substantiated if answer C is marked.
In the cited literature review lacks key information on the current state of the art in the field of green high-energy materials. Only the use of ammonium nitrate and ammonium dinitramide were commented as green alternatives. However, a very adequate conclusion was made at that time, despite the lack of information. From this pointr of view it can be concluded that the doctoral student probably understant literature beyond that indicated in the dissertation.

5. Type of research:

A) Theoretical	4 points	
B) Applied	4 points	
C) Theoretical with application elements	4 points	**X**
D) It does not correspond to the level of dissertation	0 points	
		one of the answers given is marked with the sign "X"

The level of research must be substantiated if answer D is marked.

6. Objectives of the research:

A) Realistic and of scientific and / or applied interest	8 points	**X**
B) Realistic, but not of scientific and / or applied interest	3 points	
C) Unattainable (unrealistic)	0 points	
		one of the answers given is marked with the sign "X"

Objectives must be specified. The type of the set objectives must be justified.
The goals of the dissertation are aimed at the creation of more environmentally friendly rocket fuels. Particular attention is paid to the balance between the use of cheap and accessible raw materials and achieving relatively good performance of the resulting fuel. The goals are interesting form the scientificpoint of view in terms of solving a global applied problem, such as the use of perchlorates in high-energy compositions.

7.Methods of research:

A) Adequate to research and set objectives	8 points	**X**
B) Partially appropriate, enabling part of the scientific objectives and / or applications to be achieved	4 points	
C) Inappropriate methods	0 points	
		one of the answers given is marked with the sign "X"

Methods must be specified. The type of methods used is justified.
The dissertation uses a combination of computational and laboratory research methods for the development and characterization of high-energy materials. The selected methods are adequate and include: calculations using the Propellant Evaluation Program PROPEP 3 software package, preparation and mixing of starting materials, study of physical parameters of the obtained fuels, thermal analysis, defect ballistic test, compatibility and corrosion, aging resistance, sensitivity tests, determination of environmental emissions and flight tests. As a remark, the lack of errors in the used measurements and the data on the reproduction of the obtained results can be indicated.

8. Contributions of the dissertation:

A) With lasting scientific and / or applied response, they form the basis for new research and applications	20 points	
B) They are of significant scientific and / or applied interest, complete and / or summarize previous research	16 points	
C) They are of scientific and / or applied interest	12 points	**X**
D) Lack of significant contributions	8 points	
E) Lack of contributions	0 points	
		one of the answers given is marked with the sign "X"

Contributions must be specified. The type of results achieved must be justified.
In the dissertation were obtained recipes for novel solid rocket fuels using alkaline (meta) periodates as oxidizers or fuels of the potassium nitrate/isomalt type have been developed. The characteristics of the obtained fuels have been studied, with which the dissertation enriches and expands the already accumulated data in the scientific field. The obtained fuels have been successfully tested in flight tests of experimental rocket models, thereby illustrating and applying the potential of the obtained results.

9. Evaluation of the compliance of the dissertation summary with the dissertation:

A) Full compliance	4 points	**X**
B) Compliance of the main parts	2 points	
C) Lack of compliance of the main parts	0 points	
		one of the answers given is marked with the sign "X"

The evaluation must be substantiated if answer C is marked.

10. Participation of the doctoral student in the achievement of the results of the dissertation:

A) The doctoral student has at least an equal participation	8 points	**X**
B) The doctoral student has secondary participation	5 points	
C) The participation of the doctoral student is unnoticeable	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the items B or C is marked.

11. Critical notes:

A) Lack of critical notes	8 points	
B) Critical notes of a technical nature	7 points	
C) Critical notes that would partially improve the results achieved	4 points	**X**
D) Significant critical notes	0 points	
		one of the answers given is marked with the sign "X"

Critical notes must be provided if one of the answers C or D is marked.
As a whole, three main remarks can be made to the dissertation. The first is related to the writing style. The logical connection between the individual passages is not fluoent, some conclusions are not supported by sufficient facts, and in addition, there are several statements that are not sufficiently correct from a scientific point of view. All this makes the analysis difficult when reading. The second remark is related to the literature review, which lacks sufficient information about the latest developments on green high-energy materials. In this situation, it is not clear how exactly the two compositions were selected and which problems they would solve. This is in particular weight to the choice of the composition in the caramel-type fuel. The last important remark to the dissertation is the lack of comparison of the results obtained with the solutions already known in the literature. This hindereds the assess the achieved results and contributions.

12. Conclusion

A) The evaluation of the dissertation is **POSITIVE**	This evaluation is assigned to a total number of at least 65 points	**X**

B) The evaluation of the dissertation is **NEGATIVE**	This evaluation is assigned to a total number below 65 points	
		one of the answers given is marked with the sign "X"

To be filled in at the request of the reviewer

	The review was written by:	
date		signature