

I. IDENTIFICATION DATA

Thesis title:	The experimental study of the CO₂ hydrates formation
Author's name:	Michał Mikołajczyk
Type of thesis :	bachelor
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department of Energy Engineering
Thesis reviewer:	Ing. Adam Huněk
Reviewer's department:	Department of Energy Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
I consider the assignment of this bachelor thesis challenging, because the topic of CO ₂ hydrates is demanding for fundamental understanding and the author had not come across it in his previous study. The thesis is then focused on modification of the experimental facility used for CO ₂ hydrate formation.	

Fulfilment of assignment	fulfilled
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
The thesis fulfills all tasks of the assignment.	

Methodology	correct
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
The author chose the correct approach.	

Technical level	B - very good.
<i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	
The thesis is at a good technical level and the author applied the acquired knowledge of CO ₂ hydrates in the practical section of the work. However, the thesis is missing some descriptions in the experimental section, namely detailed explanation and illustration of the experiment.	

Formal and language level, scope of thesis	B - very good.
<i>Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?</i>	
The formal and language level is mostly adequate. There are occasional typing errors, wrong link in the text to Figure 45 and the descriptions of tables should be written above them. The thesis, especially the research part, is sufficiently extensive and, except the description of the experiment, presented well.	

Selection of sources, citation correctness	B - very good.
<i>Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?</i>	
The selection of sources used by the author is very extensive and includes mainly articles, books as well as websites. The author uses mostly recent sources, which cover well the issue of CO ₂ hydrates and their possible use in energy engineering and other fields. However, the reference style is not uniform and for example in the case of the reference [18] the authors are completely missing. In some cases, citations in the research part are missing (for example in chapter 2.2.2 Structure II last three paragraphs). Despite these drawbacks, the research part along with the used references is above standard for a bachelor thesis.	

Additional commentary and evaluation (optional)

Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

Please insert your comments here.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

The assignment of this bachelor thesis is challenging, because the topic of CO₂ hydrates is demanding for fundamental understanding and the author had not come across it in his previous study. The theoretical part is very extensive and deals with basic CO₂ hydrate properties and its possible applications. The thesis is then focused on modification of the experimental facility used for CO₂ hydrate formation and subsequently the performance of the experiment. The thesis fulfills all the assigned tasks, and the author chose the correct approach.

The thesis is at a good technical level and the author applied the acquired knowledge of CO₂ hydrates in the practical section of the work. However, the thesis is missing some descriptions in the experimental section, namely detailed explanation and illustration of the experiment.

The formal and language level is mostly adequate. The selection of sources used by the author is very extensive and includes mainly articles, books as well as websites. The author uses mostly recent sources, which cover well the issue of CO₂ hydrates and their possible use in energy engineering and other fields.

There are some typing errors, incorrectly linked figure in the text and wrong descriptions of the tables. The reference style is not uniform and for example in the case of the reference [18] the authors are completely missing. In some cases, citations in the research part are missing (for example in chapter 2.2.2 Structure II last three paragraphs).

However, these mistakes do not reduce the overall very good quality of the thesis.

The grade that I award for the thesis is **B - very good**.

Questions for the presentation and defense of the thesis:

- 1) The practical part of the thesis starts with the camera selection for hydrate observation in the reactor. But how does the reactor work and what is the experimental procedure? Please, describe the experimental procedure and the experimental facility in more detail.*
- 2) The quality of the images of the hydrates in the reactor is significantly lower than the images of the melting ice (Figure 22-25). What is the reason for that? What are the main obstacles in utilization of such camera in the reactor and how would you eliminate them in future experiments?*
- 3) The CO₂ hydrate has many possible applications in energy engineering and other fields. What would be your focus if you decided to pursue this topic?*

Date: **26.1.2024**

Signature: