CTU
CZECH TECHNICAL UNIVERSITY IN PRAGUE

THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**The technology of Molten Salt Reactors and Energy-Well secondary loop material testing**
Author's name:	**Bc. Michal Cihlář**
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering
Department:	Department of Energy Engineering
Thesis reviewer:	Dr. Martin Straka
Reviewer's department:	ÚJV Řež, a.s.

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment — **challenging**

How demanding was the assigned project?

Both parts of the thesis, i.e. summarization of information about molten salt reactors, their history and present state of development as well as the experimental work itself, represent extensive amount of information. Therefore, the project can be definitely described as challenging and fully meets the requirements of master´s thesis.

Fulfilment of assignment — **fulfilled**

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.

All the goals defined in the thesis´ instructions were fulfilled and all the goals were achieved.

Methodology — **outstanding**

Comment on the correctness of the approach and/or the solution methods.

All the experimental methods used within the project were chosen properly and the assigned tasks were approached with the right methods.

Technical level — **A - excellent.**

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?

All the experimental work is well explained and correctly applied.

Formal and language level, scope of thesis — **A - excellent.**

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 really appreciate the decision to write the thesis in English. Moreover, the language level is very high, and its usage fully meets all the requirements of peer-reviewed papers. Typos are very rare, almost non-existing. The thesis is well organized as well, and the reading flow is smooth. The overall length of the thesis is also sufficient.

Selection of sources, citation correctness — **B - very good.**

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?

All the sources cited are well chosen and references usage meets the standards. The experimental work done by the student can be easily distinguished from that taken from the literature.

Additional commentary and evaluation (optional)

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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.
The quality of the thesis is definitely above standards. The data obtained are very useful and should be published as they will strengthen the knowledge base needed for proper choice of construction materials within the MSR projects. The student proved both his theoretical and experimental skills.

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

The quality of the thesis is definitely above standards. In the first part of his thesis, the student presents very well organized and extensive summary of molten salt reaction technology including the history and present-day status of its development in both academic and commercial sphere.

In the experimental part of the thesis, the solid amount of work was done. The results obtained are an important addition to our knowledge. Methods were well chosen, results are well evaluated and conclusions are convincing.

I have only few remarks and additional questions:

- *In general, corrosion mechanisms and corrosion chemistry are described well in Chapter 5. Nevertheless, I would also like to see at least basic summary of the most important works dealing with the corrosion of possible MSR structural materials in the molten fluorides. Even if there are no data for particular alloys focused on in this thesis in combination with NaF-NaBF4 salt, citations of US, French and Chinese papers on this topic with other fluoride melts and similar materials would be useful.*
- *As mentioned in the thesis, the purity of the salt plays an important role for the corrosion process. Was it tested for NaF and NaBF4, for example by ICP-MS? If so, what impurities and in which concentration were in the chemicals? If both of the chemicals were of commercial origin, was the analytical certificate available?*
- *Do you have any suggestions on chromium depletion mechanism?*

None of these remarks and questions change anything on my statement of very high quality of this work.

The grade that I award for the thesis is **A - excellent.**

Date: **18.8.2020** Signature: