

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Aliya Glagoleva

PhD Program: Materials Science and Engineering

Title of Thesis: Development of kW Scale Hydrogen Energy Storage System

Supervisor: Prof. Keith Stevenson

Co-advisor: Dr. Vasily Borzenko

Chair of PhD defense Jury: Prof. Alexei Buchachenko

Email: a.buchachenko@skoltech.ru


Date of Thesis Defense: 09 October 2018

Name of the Reviewer: Dr. Victor M. Zaichenko

I confirm the absence of any conflict of interest

(Alternatively, Reviewer can formulate a possible conflict)

Signature:



Date: 03-09-2018

The purpose of this report is to obtain an independent review from the members of PhD defense Jury before the thesis defense. The members of PhD defense Jury are asked to submit signed copy of the report at least 30 days prior the thesis defense. The Reviewers are asked to bring a copy of the completed report to the thesis defense and to discuss the contents of each report with each other before the thesis defense.

If the reviewers have any queries about the thesis which they wish to raise in advance, please contact the Chair of the Jury.

Reviewer's Report

Ph.D. thesis delivered by Glagoleva Aliya presents the development of hydrogen energy storage systems based on intermetallic alloys operating at low-pressure levels for the application in Far East settlements of Russia. The research is of high quality and includes experimental investigations of metal hydrides in low (200W) and medium (1kW) power systems integrated with PEM fuel cell as the core of the thesis (chapters 2, 4, 5). Additionally, the thesis is strengthened by methodological hardware-in-the-loop tests approach (chapter 3), economical estimation (chapter 6), and a very well structured literature review of the energy storage systems in general and hydrogen storage systems specifically (chapter 1) followed by a thought through comparison analysis of the technologies for the proposed concept.

The content of the dissertation fully relevant to its topic. The methods for experimental and methodological investigations are also relevant and described in the literature. The thesis is written in a good level of academic English with minor typos and mistakes.

The outcome of the research presents both a concept and a created system for metal hydride hydrogen storage utilizing waste heat of the fuel cell as well as air heated hydrogen storage reactor design and development. Current outcomes widen the application possibilities of the described technology and provide valuable input to the international studies in the same field. The results were published in highly ranked international peer-reviewed journals (including Q1 Int J of Hydrogen Energy in the first authorship) and must be considered as a contribution of great value.

The system created by Glagoleva Aliya providing experimental data can perform as a basis for experimental verification of current metal hydride kinetics models from the literature. An interesting next step might include choosing an existing model and comparing the outcomes of the model with experimental investigations. However, the candidate shall be awarded PhD degree regardless of the addition.

Additionally, minor mistakes and typos should be addressed before final submission.

Provisional Recommendation

☒ *I recommend that the candidate should defend the thesis by means of a formal thesis defense*

☐ *I recommend that the candidate should defend the thesis by means of a formal thesis defense only after appropriate changes would be introduced in candidate's thesis according to the recommendations of the present report*

☐ *The thesis is not acceptable and I recommend that the candidate be exempt from the formal thesis defense*