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Skolkovo Institute of Science and Technology

Jury Member Report – Doctor of Philosophy thesis.

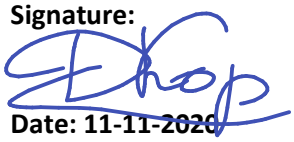
Name of Candidate: Anastasia Ivanova

PhD Program: Petroleum Engineering

Title of Thesis: Dynamic modelling and experimental evaluation of nanoparticles application in surfactant enhanced oil recovery

Supervisor: Associate Professor Alexey Cheremisin

Name of the Reviewer: Dmitry Koroteev

I confirm the absence of any conflict of interest	**Signature:**  **Date: 11-11-2020**

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

Anastasia Ivanova's PhD thesis covers an application of nanoparticles for surfactant-based enhanced oil recovery.

Anastasia's thesis is structured well and saturated with high-quality research data. The topic corresponds to the actual content. The methods used for experimentation at nanometer to centimeter scale (from FIB SEM to SCAL) are fully up-to-date. The outcome experimental data is excellent, scientifically rich and unique. Molecular dynamics modeling approaches are absolutely relevant as well.

The results are definitely on the top-notch of the overall international level in the area of nanoparticle-driven enhanced oil recovery. The outcome of the research could well be applied in practical reservoir engineering after development or adaptation of a proper upscaling routine. I am particularly impressed by the data on IFT dependence on concentration of the nanoparticles.

The publication record is solid and includes more than three publications in Q1 journals including Scientific Reports Nature.

There are some issues and questions to be addressed before and during the thesis defense.

1. There is quite a lot of typos in the text

2. Application of the results in the world of practical reservoir engineering is limited because the information about the possible upscaling workflows. Why so?

3. Nanoparticles considered in the thesis are rather expensive. They are especially expensive when we talk about oilfield scales. I would be good to have some discussion about the economic aspects of potential nano-driven EOR

Overall, I do recommend the thesis for the PhD defense. I believe that Anastasia deserves PhD title.

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*