Skoltech
Skolkovo Institute of Science and Technology

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Mikhail Bulavskiy

PhD Program: Materials Science and Engineering

Title of Thesis: Hybrid functional materials based on single-walled carbon nanotubes

Supervisor: Professor Albert Nasibulin
Co-supervisor: Assistant Professor Fedor Fedorov

Name of the Reviewer: Alexander Kvashnin

I confirm the absence of any conflict of interest (Alternatively, Reviewer can formulate a possible conflict)	**Date: 22-11-2023**

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

Reviewers report should contain the following items:

- Brief evaluation of the thesis quality and overall structure of the dissertation.
- The relevance of the topic of dissertation work to its actual content
- The relevance of the methods used in the dissertation
- The scientific significance of the results obtained and their compliance with the international level and current state of the art
- The relevance of the obtained results to applications (if applicable)
- The quality of publications

The summary of issues to be addressed before/during the thesis defense

Thesis by M. Bulavskiy is devoted to development of new method for highly efficient bilateral doping of SWCNT films for the nanotube caps' opening together with application of these materials as transparent conductive films.

The title of the thesis corresponds perfectly with its content, and the employed methods are fitting for this type of research.

The thesis has a logical and clear structure, including an introduction, a literature review of the current state in this research area, materials and methods section, and a detailed description of obtained results. The high level of research is evident throughout the thesis.

The main finding of the thesis is a new method for nanotube caps' opening leading to new applications of nanotubes. Developed method and conducted measurements show that such a hybrid material based on SWCNTs significantly improves functional properties of SWCNTs bringing them closer to the application in real devices.

Some minor issues, in some places along the text there are broken characters like 31±4Ω□-1, which should be fixed.

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*