

Jury Member Report – Doctor of Philosophy thesis.

Name of Candidate: Daniil Ilatovskii

PhD Program: Materials Science and Engineering

Title of Thesis: Rational design of single-walled carbon nanotube films for transparent electronics

Supervisor: Professor Albert Nasibulin

Co-supervisor: Assistant Professor Dmitry Krasnikov

Name of the Reviewer: Stanislav Evlashin

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

The thesis presents a modern topic on the study of the separation process of carbon nanotubes with different chiralities, as well as the modification of nanotubes using V_2O_5 . A photophoretic method of depositing SWCNTs was developed, and a large-scale study was carried out using AFM and Raman spectroscopy. A novel technique for modifying the structure of nanotubes using vanadium oxide was developed. All methods used are suitable for studying carbon nanotubes.

The importance of the results is indicated by the application of CNTs. The scientific publications published in high-ranking journals. The level and number of publications are more than enough for defense.

The dissertation consists of four chapters: an introduction, scientific background, methods, results and discussions. The methods provide a description of the experiments, as well as the analysis procedure. Chapter 4 begins with a theoretical description of photophoretic deposition processes, followed by the application results when the modification of CNTs with V_2O_5 is studied.

For me, there are a few points that require clarification.

1. How many experiments were carried out in electrophoretic deposition and AFM studies?
2. If temperature flow is the determining factor, then it would be a good idea to make estimates of the absorption of metal and semiconductor tubes. Since the absorption of such tubes will be different, this will also affect the deposition.
3. How many samples were analyzed in Table 1?
4. It is not clear why the positions of the points on graph 4.5 move so much.
5. When using a 6 W LED, what is the radiation intensity per nanotube stream, taking into account the chamber design?

In general, the dissertation is complete and can be defended.

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