

## Jury Member Report – Doctor of Philosophy thesis.

**Name of Candidate:** Artem Grebenko

**PhD Program:** Physics

**Title of Thesis:** Synthesis and charge transport investigation in low-dimensional carbon materials

**Supervisor:** Professor Albert Nasibulin

**Co-supervisor:** Dr. Dmitry Krasnikov

**Name of the Reviewer:** Nikolay A. Gippius

I confirm the absence of any conflict of interest

(Alternatively, Reviewer can formulate a possible conflict)

**Date: 08-06-2022**

*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**

Dissertation by Mr. Artem Grebenko is devoted to the synthesis of carbon nanomaterials, namely, graphene and single-walled carbon nanotubes, and subsequent investigation and modification of individual nanostructures and their films. These results are accurately and correctly presented. The dissertation contains clear figures and captures and its structure facilitates understanding of the reported material.

Presented results are relevant to the condensed matter physics and material science scope. Methods used to obtain reported results are modern and are directly related to the set tasks. They are presented with appropriate details in the text of dissertation.

The scientific results discussed in the thesis are already actively cited. More than that, the literature review is partially based on the invited review from Small, Wiley (with Artem as the first author), which also speaks in favor to the high level of performed research. One of the key studied material - graphene, does not require any additional comments regarding the significance of novel synthesis techniques and the investigation of its properties. Overall, investigation of the cutting-edge nanomaterials, their optoelectronic properties and design of novel techniques to modify such systems can be treated as highly important for modern science and industry.

The results underlying this dissertation are published in high-impact journals directly related to the field of research with Artem as the first author in 4 of them.

I recommend the acceptance of this thesis as is.

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

I see no essential issues to mention here. The minor comments are as follows:

- The abbreviation "AFML" in the title of Chapter 5 "AFML for SWCNT films" should be expanded to make it more clear for broad audience
- The caption to Figure 25 (page 70) is a copy of that of Figure 24 and should be made adequate.

#### 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*