

Jury Member Report – Doctor of Philosophy thesis

Name of Candidate: Alexey Tsapenko

PhD Program: Physics

Title of Thesis: Enhancing Optoelectronic Performance of Randomly Oriented Single-Walled Carbon Nanotube Films

Supervisors: Prof. Albert Nasibulin, Skoltech, Russia


Prof. Esko Kauppinen, Aalto, Finland

Chair of PhD defense Jury: Prof. Nikolay Gippius, Skoltech

Email: N.Gippius@skoltech.ru

Date of Thesis Defense: October 4, 2019

Name of the Reviewer:

<p>I confirm the absence of any conflict of interest</p> <p>(Alternatively, Reviewer can formulate a possible conflict)</p>	<p>Signature:</p>  <p>Date: 28-07-2019</p>
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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 the latest on August 13th. 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

Please write your statement / summary of issues to be addressed before the thesis defense here. 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

Single-walled carbon nanotubes in the form of films are a promising material for various optoelectronic and photonic applications, including actual flexible and stretchable, transparent and conductive electrodes. In this thesis, several novel approaches are introduced to enhance optoelectronic properties of the films by absorption doping technique. Thus the research topic of the PhD thesis of Alexey Tsapenko is relevant in the area of nanomaterial science.

The work is characterized by the use of modern scientific equipment sufficient to obtain reliable results on the study of the structural, electrical and optical properties of the studied materials based on single-walled carbon nanotubes.

The main part of the thesis (Chapter 4) consists of the sections which represent the main results obtained in author's publications.

The results obtained have a scientific significance and compliance with the international level and current state of the art. The fabricated films possess superior performance and satisfy most of the transparent conductive film requirements, which eventually can lead to completely free-form electrode designs as requested by numerous multi-functional applications.

The bibliography includes 73 papers, which are mostly from the last decade.

The results are presented in 5 publications in journals with high impact factor.

Alexey Tsapenko has made a very valuable and qualitative research carried out in the field of materials science.

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