

Jury Member Report – Doctor of Philosophy thesis.

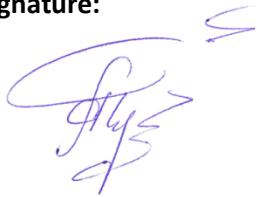
Name of Candidate: Oleg V. Lebedev

PhD Program: Materials Science and Engineering

Title of Thesis: Study of Deformational Behavior of Electrical Conductivity of Polymer Composites with Different Nanofiller Distribution Types

Supervisor: Professor Sergey Abaimov

Name of the Reviewer: Professor Albert G. Nasibulin

<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: 30.08.2020</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 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

The presented Doctoral Thesis “Study of Deformational Behavior of Electrical Conductivity of Polymer Composites with Different Nanofiller Distribution Types” by Oleg Lebedev is devoted to investigation of electrical conductivity under uniaxial deformation of polymer composites with different nanofiller distribution types. The work is aimed to provide models for the correlation of electrical properties and applied deformation, considering the structure of materials, and to verify the calculations experimentally.

Oleg Lebedev’s thesis studies practically very important task in the Materials Science to predict electrical conductance deformational response of the constructions or components made of the composite materials manufactured by different processing techniques with segregated structure made of different types of the filler using computationally efficient methods.

The thesis consists of six chapters set forth on 135 pages. The thesis describes main results published in three papers, however, structured as a bunch/collection of papers, but not as a single logic work, which dissertation should be. My comments related to the thesis structure:

- Chapters 3, 4 and 5 start with Introduction, followed by Materials and Methods, Results and discussion and Conclusion sections. This is the structure of a paper, but thesis should summarize these three papers. Introduction is given already in Chapter 1. Materials and Methods usually are gathered as separate chapter, where everything can be described at once. Conclusions are given at the end of dissertation. I would rename these section/change the structure of the thesis and start the chapter without Introduction section.
- Personal contribution is missing and can be added right after the list of thesis publications.
- Science is first of all people! My recommendations would be to properly acknowledge people who contributed to this work and papers published and made a basis for the thesis. Money and foundations are of course also important, and should be mentioned after the collaborators.
- The list of figures and tables (p.11-16) is not necessary, and can be easily cut off without harming the quality of the thesis. This is old style writing of theses, I would call this atavism.
- Formulas and equations are a part of sentences and should follow the punctuation rules: commas and full periods are missing.

Some additional and more specific comments to improve the thesis:

- p.66, 67: the problem with precision of numbers: “ $(-7\pm 0.2)\cdot 10^{-3}$ versus $(-7.2\pm 0.2)\cdot 10^{-3}$ ” and “ $5.21\cdot 10^{-3}$ versus $(-7.2\pm 0.2)\cdot 10^{-3}$ ”. Table 1: please check the precision of all numbers: how many digits after dots are defined?
- P.73: number and dimension should be separated: “20atm following by instant cooling in cold water to obtain strips of 1.2mm thickness, width of 12mm and length of 100mm.”

These are just examples, and these should be checked everywhere in the thesis.

The dissertation is based on three co-authored publications, in which Oleg contributed as the first author. The papers are published in various level journals, including Journal of Composite Materials (IF=0.92), International Journal of Engineering Science (IF=9.219), and Proceedings of the 36th International Conference of the Polymer Processing Society. The number and level of publications as well as the position of the PhD candidate in the co-author's list apparently show his sufficient contribution to the research field.

In general, the contribution of Oleg Lebedev to the field of computational science of composite materials is important and substantial. The dissertation is written in a very good scientific language. Oleg carried out most of the work, contributed to fundamental studies of the dissertation, and wrote the most part of the papers, which are the basis for his dissertation. He has sufficient number of scientific publications on the same as dissertation topic. Oleg Lebedev's dissertation is an original work possessing fundamental novelty and practical importance. I strongly recommend the author of the thesis for the PhD degree. The manuscript can be accepted for publication as a doctoral dissertation after minor changes and candidate should defend the thesis by means of a formal thesis defense.

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