

Jury Member Report – Doctor of Philosophy thesis.


Name of Candidate: Stepan Romanov

PhD Program: Physics

Title of Thesis: Single-walled carbon nanotubes as a source of ultrasound

Supervisor: Professor Albert Nasibulin

Name of the Reviewer: Sergey D. Shandakov

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| <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: 19-09-2020</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 thesis is well structured and meets the requirements for it. The author has made a very valuable and qualitative research carried out in the actual field of physics. However, the following remarks are available:

1. In the work there are misprints, which, however, do not interfere with understanding the meaning of the text: 1) Abbreviation “AC alternating current” is presented twice in the abbreviation list (p. 11); 2) There is a misprint in the caption of Fig. 1.8-2, instead of “read” you need to write “red”; 3) Invalid reference to Figure 1.5-8 at bottom of p. 50; 4) Reference numbers in fig. 1.10-3 and in the Bibliography do not correspond to each other; 5) Symbols Pm and Pp in description after formula 1.11-1 are reversed; 6) The text lacks a description of the definition of the quantities presented in Table 1.11-1; 7) There is no description of the quantity V in formula 1.11-3.

2. On page 76, the author writes “At temperatures below 1200 °C, the process of carbon solubility is fast enough to increase the number of defects. Whereas, at higher temperature (>1200 °C) the evaporation process dominates resulting in a lower level of defects.” At the same time, no explanation of the influence of carbon solubility and iron evaporation on the number of defects is given.

The comments made are secondary and do not diminish the significance of the results obtained by the author.

The thesis addresses important theoretical and experimental research to enhance the SWCNT based thermophones. The thesis is devoted to the actual direction of physics. The relevance of the topic of the thesis in question is beyond doubt.

The work is characterized by the use of modern scientific equipment sufficient to obtain reliable results on the study of the SWCNT films as a source of ultrasound.

The research demonstrates the highest sound pressure of thermophones made of SWCNT film in ultrasound region compared to all published materials for thermophone, due to uniqueness of the SWCNT films

The results are presented in 3 papers (including one submitted paper) published in journals with high impact factor.

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