Skoltech
Skolkovo Institute of Science and Technology

Jury Member Report – Doctor of Philosophy thesis / Pre-examination statement for Aalto University

Name of Candidate: Pramod Mulbagal Rajanna

PhD Program: Physics

Title of Thesis: Hybrid heterojunction solar cells using single-walled carbon nanotubes and amorphous silicon thin films

Supervisors: **Prof. Albert Nasibulin, Skoltech, Russia**

Prof. Peter Lund, Aalto University, Finland

Chair of PhD defense Jury: Prof. Nikolay Gippius, Skoltech ***Email:***N.Gippius@skoltech.ru

Date of Thesis Defense: May 7, 2020

Name of the Reviewer:

I confirm the absence of any conflict of interest (Alternatively, Reviewer can formulate a possible conflict)	**Signature:**  **Date: 31-03-2020**

The purpose of this report is to obtain an independent review from the members of PhD defense Jury / Pre-examiner before the thesis defense. The members of PhD defense Jury / pre-examiner are asked to submit signed copy of the report at the latest on April 21st . 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. The guidelines were provided to you in the examination request:

The thesis is a solid work on the application of SWCNT in the very important domain of photovoltaics. The growing energy consumption is one of the strongest challenges of our time that justifies the importance of the work in this direction. The thesis includes the introduction and four chapters where the review of this field is presented along with the description of the key experimental methods of the research. The last chapter consists of four section representing the main results obtained in four publications of the author.

The title of the thesis is relevant to the content of the thesis and its structure. The methods used in the thesis are described in Chapter 3 that is a good point to understand the the basics of all the experimental measurement techniques used.

The obtained results are important from both scientific and practical points of view as they from a good basis for further progress in the application of SWCNT in energy harvesting domain. Measurements of adhesion of the SWCNT films in different atmospheres reveals the important and useful technological aspects of inert atmosphere. The optical and electrical properties of the films have been addressed in next two publications and are summarized in the second section of chapter 4 together with the discussion of the properties of the hybrid solar cells fabrication and properties. These results are of clear practical importance.

The publications included in the thesis are of high quality and are visible on the international level.

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*