

# 博士学位論文 審査結果の要旨

## Abstract of review result

芝浦工業大学大学院 理工学研究科 博士（後期）課程

Doctoral thesis defense committee

博士学位論文審査委員会

Main examiner	
主査	Paolo MELE
Examiner	
審査委員	Hiromichi OHTA
Examiner	
審査委員	Naomichi SAKAI
Examiner	
審査委員	Izabela RZEZNICKA
Examiner	
審査委員	Muralidhar MIRYALA
Examiner	
審査委員	

氏名 Applicant's Name	Giovanna LATRONICO
論文題目 Thesis title	Growth and characterization of thermoelectric thin films for heat harvesting (熱収穫用を目的とした熱電薄膜の成長と特性化)
〔論文審査の要旨〕 Abstract of review	
<p>The Head of evaluation Committee, Paolo Mele, opened the zoom virtual room at 17:45 of February 8, 2022. After confirming that all the Committee members were present, it was clarified that there are no more issues in the work thesis, which was reviewed by all the members, since the candidate accomplished all the requested corrections, and the work has recognized as improved respect to the preliminary version. In addition, respect to the previous version one chapter was eliminated and another one was added.</p> <p>At 18:00 the candidate, Giovanna Latronico, was admitted to the virtual room and she presented her work in 1h, supported by powerpoint slides. The observers were also admitted at the same time.</p> <p>At 19:00 the Committee members started to give to the candidate their round of questions and comments as follows.</p> <ol style="list-style-type: none"><li>1) External committee member – Prof. Hiromichi Ohta (Hokkaido University) Several questions and comments have been proposed: “ZT calculation of thin film is approximate because electrical conductivity is in plane, but thermal conductivity is out of plane. What about using the output power result to calculate the in plane thermal conductivity?” “The mobility of skutterudite films is probably too high and must be checked again”; “Do you believe that ZnO has still a future as thermoelectric material?”.</li><li>2) Prof. Naomichi Sakai (College of Engineering and IGP) Several questions and comments have been proposed: “What is the ideal microstructure for ZT improvement?”; “There is any effect from the grain boundaries on the thermoelectric properties?”; “Which is the best kind of nanodefekt for the depression of thermal conductivity?”; “What could be the role of substrate on the thermoelectric properties? Control of thin film stress by changing the substrate is possible?”.</li></ol>	

3) Prof. Izabela Irena Rzeznicka – (College of Engineering and IGP)

Several questions and comments have been proposed: “Why Sm was chosen as filler?”; “Do you think it is the size or the mass of the filler what influences the thermal conductivity?”; “What is the mechanism of reducing the thermal conductivity by the filler?”; “Which frequency of vibration is more effective?”; “What is the advantage of using PLD for the films deposition?”; “The substrate was heated before deposition?”; “What is the influence of substrate`s roughness on the thin film properties?”; “How the composition of the bulk skutterudite was determined?”; “How did you choose the annealing temperature?”; “The solubility has no influence on the thin film stability?”; “The carrier concentration of skutterudites` films seems too high”.

4) Prof. Muralidhar Miryala (College of Engineering and IGP)

Several questions and comments have been proposed: “You had many collaborations. What was your contribution to the thesis?” “What is the possibility for the implementation of the device?”; “Is really PLD the cheapest technique? How good is it for the applications?”; “What about the possibility to use the spray pyrolysis?”; “What is the most difficult aspect to improve on the devices `properties?”.

The candidate, Giovanna Latronico, replied all the questions and acknowledged all the comments, demonstrating great level of understanding, quite good communication skills and high knowledge of the thermoelectric materials and phenomena.

After the candidate and public left, after a brief discussion the Committee members agreed that *Giovanna Latronico* passed the final evaluation, therefore she is qualified to receive the degree of Doctor of Engineering .

At 19:44 the Head of evaluation Committee declared closed the final evaluation meeting.

All the Committee members provided the meeting their evaluation sheets which are attached to this document. The final version of the thesis will be submitted in electronic and printed forms by the deadline.