

## H2020-ECSEL-2015-2-IA-two-stage GA N°692482

**EnSO**

### Work Package 7 Deliverable 7.8

## Material compilation for higher education

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Participants:



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## Abbreviations & glossary


## Document history

Date	Revision	Remarks
12.01.2018	0.1	First draft transmitted to review team
01.02.2018	1.1	New version taking into account comments from reviewer 2 - Franck DOSSEUL
06.02.2018	1.2	Update, Implementation of final comments from review team
06.02.2018	2.0	Formal approval by the review team and by the project coordinator. For submission to the H2020 portal

## Review team

Name	Partner
Ramon Jane	GNF
Franck Dosseul	ST Tours

## Coordinator's approval

Date	Name – STMicroelectronics Tours
06.02.2018	Franck Dosseul



# 1 Introduction

This document presents the compilation of material for higher education, as described in Task 7.1.3 “Contribute to higher education and scientific knowledge”.

## 2 Aim of deliverable

Among EnSO partners, universities and research institute are the main actors involved in higher education. One of the outcomes of EnSO project could be to contribute to prepare a new generation of highly educated experts, requested for further development of these innovative technologies.

Changing the syllabus of Master or Bachelor programs is a long process, targeting the certification as "Master" or "Bachelor". This target will be too difficult to obtain within EnSO, as it is far more long term than the duration of the project. Nevertheless, some seminars that could be included in such programs, which often include a module "Seminars for discovering research (or research and development...)". The idea is to sensitize students, and in the meantime teachers, to the importance of EnSO topics. Teachers may illustrate some concepts they present in their teaching with EnSO examples.

The main goal of this document is to prepare the next actions dedicated to higher education, in order to provide a specialized information and training on EnSO topics, in Ph.D, Master and even Bachelor Degrees. This document is then a "Material compilation about higher education programs within EnSO academic partners”.

## 3 Ongoing PhD projects

The survey sent to Academic Research Institutes members, about PhD students involved in EnSO project, led to the data listed in table 1.



Name of partner	Name of the PhD student	Type of funding	Industrial partner	Name of Directors	Dates of the position	Summary of the research project
Université de Lorraine (UL)	Soufiane El Oualid	EnSO	Mahle	Bertrand Lenoir, Francis Kosior	01/10/2016 (-30/09/2019)	The subject of this thesis aims at studying the conversion potential of thermoelectric generators and to predict their electrical performance. This exploratory study will be conducted using digital tools. The influence of many factors (temperature of hot and cold sides, properties of the materials, design of the generator, thermal coupling,...) on the electrical power output and on the thermomechanical properties will be examined in detail.
CEA, University of Paris Sud	ARBELTIER	EnSO and Tours 2015		Minea, Sabary	12/11/2014-10/11/2017	The research project aims at modelizing RF plasma under nitrogen atmosphere and interaction with surface of the substrate. This modelisation is very important to fully understand LiPON deposition mechanism with a rf sputtering process. LiPON is crucial in terms of battery performances (Internal resistance) and yield.  Spatial repartition of flux of particules (ions, electrons, atoms) is studied in order to better understand growth of LiPON layer during sputtering. Different models from 0D to 2D are studied.
CEA, INPG Grenoble	MORIN	EnSO and Tours 2015		Bouchet, Le Van Jodin	01/10/2015-30/09/2018	The research project aims at developing a new electrolyte with improved performances in terms of ionic conductivity compared to LiPON. New materials based on sulfur chemistry are studied. First deposition process is studied with extended physicochemical characterization. Then MIM (Metal/Isolant/Metal) structure are performed to measure electronic and ionic conductivity. Finally, integration in full batterie are done with specific attention on interface resistance.



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GREMAN, Univ. de Tours	Camille JUSTEAU	EnSO	PRAYON and University of Liège	D. Alquier, G. Poulin- Vittrant, K. Nadaud	01/11/2016  (-31/10/2019)	The research project aims at developing an innovative hydrothermal synthesis method of high quality ZnO NWs for non resonant mechanical energy harvesting and to evaluate the feasibility of technological process transfer to industry.
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**Table 1 Ongoing PhD projects linked to EnSO project and supervised by EnSO members**



## 4 Master or Bachelor programs

The survey sent to Academic Research Institutes members, about Master or Bachelor programs related to EnSO and offered by the different universities, led to the data listed on table 2.

University	Title of the Master	Disciplines in the scope of EnSO project (including standardization)	Name of the contact person	Weblink
Universitat Autònoma de Barcelona	Modelling of piezoelectric devices and design of a new flexoelectric alternative for energy harvesting	Energy harvesting, microelectronics, modelling	Gonzalo Murillo	
Universitat Autònoma de Barcelona	Inkjet printing para la integración de nanoestructuras piezoeléctricas y MEMS	Energy harvesting, microelectronics, modelling	Gonzalo Murillo	



Polytechnic Engineering School of the University of Tours (Polytech Tours)	Electronic and Mechanical Engineering - Electronic program	U.E.3: Heat transfer ; U.E.4: Piezoelectric Materials and their Applications; U.E.7a : Materials and Technologies for Microelectronics; U.E.6: Power Devices and Systems	Nathalie Batut <a href="http://international.univ-tours.fr/admissions-courses/master-research-electronic-and-mechanical-engineering-eme--276437.kjsp?RH=1324239582177">http://international.univ-tours.fr/admissions-courses/master-research-electronic-and-mechanical-engineering-eme--276437.kjsp?RH=1324239582177</a>	<a href="http://polytech.univ-tours.fr/formations/research-master-electronic-and-mechanical-engineering-electronic-program-423992.kjsp?RF=1410854106999">http://polytech.univ-tours.fr/formations/research-master-electronic-and-mechanical-engineering-electronic-program-423992.kjsp?RF=1410854106999</a>
Université de Tours	Master Materials Sciences - Multifunctional materials and new technology for energy	U.E.1 Electrolytes, interfaces and materials; U.E.2 Devices for Energy; U.E.5 Materials for new technologies	Larbi Ammor, François Tran-Van	<a href="http://international.univ-tours.fr/admissions-courses/master-materials-sciences-specialite-multifunctional-materials-and-new-technology-for-energy--313520.kjsp?RH=1324239582177">http://international.univ-tours.fr/admissions-courses/master-materials-sciences-specialite-multifunctional-materials-and-new-technology-for-energy--313520.kjsp?RH=1324239582177</a>
Université de Liège	Master Ingénieur civil électricien	Signal processing and control; Electronic systems and devices; Electric power and energy systems; Embedded systems,	<a href="#">Contact (Faculté de Sciences Appliquées)</a>	<a href="http://progcourses.ulg.ac.be/cocoon/fac/facA">http://progcourses.ulg.ac.be/cocoon/fac/facA</a>





Université de Lorraine – Ecole Nationale Supérieure des Mines de Nancy	Multiscale Materials	Materials by Design ; Materials Characterization; Multiscale mechanics; Devices at different length-scales; Modeling at the atomic and molecular scales; From surfaces to coatings; Materials Forming	Bertrand Lenoir	<a href="http://mines-nancy.univ-lorraine.fr/sites/mines-nancy.univ-lorraine.fr/files/minesnancy_graduateprogram_multiscalematerials_vf.pdf">http://mines-nancy.univ-lorraine.fr/sites/mines-nancy.univ-lorraine.fr/files/minesnancy_graduateprogram_multiscalematerials_vf.pdf</a>  <a href="http://mines-nancy.univ-lorraine.fr/node/627">http://mines-nancy.univ-lorraine.fr/node/627</a>
Technical University of Munich	Master Automotive Software Engineering	Ultra Wide-Band Indoor Localization	Leonardo Govoni, Thomas Rehner	<a href="http://www.in.tum.de/en/for-prospective-students/masters-programs/automotive-software-engineering.html">http://www.in.tum.de/en/for-prospective-students/masters-programs/automotive-software-engineering.html</a>

**Table 2 Master or Bachelor programs where EnSO members are involved, in disciplines linked to EnSO project**



## 5 Exchange Programs for University Studies

The survey sent to Academic Research Institutes members, about EU education grants by Exchange Programs for University Studies such as COPERNICUS, ERASMUS, Marie Curie, etc., led to the data listed on table 3.

University	Name of the contact person	Description
Universidad de Sonora	Gonzalo Murillo	Visitor coming from Universidad de Sonora (Hermosillo, Mexico) of a PhD student with 1year stay fellowship.
Université of Tours, University of Catania	Prof. Daniel Alquier (Univ. of Tours), Prof. Salvo Mirabella (Univ. of Catania)	Erasmus+ Programme with University of Catania: Inter-institutional agreement 2017-2021, for the exchange of students and/or staff

**Table 3 Exchange programs for university studies, proposed by academic partners within EnSO scope**



## 6 Next steps

This data will be updated regularly, at least on a quarter basis.

Position offers of EnSO partners, when available, will also be posted on EnSO website.

Based on this material, all EnSO partners will discuss the possibility to:

- propose some training sessions or courses that could enrich the existing Master or Bachelor programs.
- propose internships for student or young professionals : people outside or inside EnSO may circulate within the consortium for a certain period of time.

