


INNOSTORAGE IRSES-610692		Deliverable number:	D7.2
		Title:	Report on Staff Exchange

INNOSTORAGE – USE OF INNOVATIVE THERMAL ENERGY STORAGE FOR MARKED ENERGY SAVINGS AND SIGNIFICANT LOWERING CO₂ EMISSIONS

Beneficiaries:




Partners:




D7.2 - Report on Staff Exchanges

	Name and Institution	Signature and date
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1 Objectives

The present secondment is included in

Workpackage 1: Material development and characterisation. The main objectives of this workpackage are:

- Develop new materials to be used in thermal energy storage
- Look for possible existing materials to be used in thermal energy storage, especially low cost materials, including wastes and by-products
- Characterise the newly developed materials or the newly considered materials
- Compare and contrast characterisation procedures for testing of thermal energy storage materials

Specifically, this secondment is involved in the following tasks:


- Task 1.1: Staff exchanges
- Task 1.2: New materials
 - Develop new materials to be used in TES
 - Look for possible existing materials to be used in thermal energy storage, especially low cost materials, including wastes and by-products
 - Develop a data base for materials to be used in TES

Thus, the objectives of this secondment were:

- To install and put into operation the experimental device to measure the corrosion of materials for containers of molten salts.
- To run different experiments of materials corrosion in molten salts under cycling conditions.
- To find and test some molten salts compositions to work as thermal energy storage systems at high temperatures.

2 Collaboration between UB and UNISA

Collaboration between both Universities was toughened, concerning corrosion tests on materials that can be used for PCM containers. The research group at Universitat de Barcelona has set up and tested a device to measure the corrosion on metals, and during this secondment it has been fully explained to researchers at UNISA. On the other hand, UNISA has been hardly working on the design and set up a large facility for testing high temperature molten salts (whose opening took place during this secondment), in which the experience on corrosion has been taken into account.

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Some articles have been published since my last stay at UNISA in 2014 as a result of our collaboration, and this secondment was very fruitful to finish two others, while continuing our joint research on high temperature molten salts and their corrosion on different metals. The first article has already been published in *Solar Energy Materials and Solar Cells* (M. Liu, S. Bell, M. Segarra, N.H.S. Tay, G. Will, W. Saman, F. Bruno, A eutectic salt high temperature phase change material: Thermal stability and corrosion of SS316 with respect to thermal cycling, *Solar Energy Materials and Solar Cells*, 170 (2017) 1–7), while the second one has already been submitted to the same journal.

3 Opening of high temperature testing facility in UNISA


High Temperature Storage Test Facility at UNISA was official launched in May 12th, 2017. I was invited to attend the opening of the facility, where I could see in-situ, besides the operation of the plant, the corrosion problems that had arisen during its design and operation.



4 Outcomes or future work

As a continuation of the joint research carried out so far, it was decided to carry out diverse corrosion tests. The agreed procedure for studying different metals and different salt mixtures was that the thermal cycles were to be performed at UNISA facilities, while the UB would undertake the corrosion determination and characterization tests using electron microscopy, as well as the tests of isothermal corrosion to determine corrosion kinetics.

Thus, the first samples obtained at UNISA in which stainless steel has been immersed in a mixture of salts of sulphates during several thermal cycles, will be sent to the UB for later

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characterization. At the same time, samples of Inconel, which will be in parallel tested at the UB under isothermal conditions, will be sent to UNISA to perform thermal cycling and returned to the UB for characterization.


The full results will be presented in the form of different articles that will be submitted to international journals.

5 Assessment

This has been a great time for me to dedicate to research and articles writing. I could contribute to the research of some students in University of South Australia with my knowledge as a materials scientist. The experience cannot be more profitable, as I had the possibility of knowing another way of working, finding a lot of things in common, trying to soak all possible skills, enjoy a pleasant stay, and experiencing research and knowledge sharing.

6 Annex

Invitation to UniSA's High Temperature Storage Test Facility official launch.

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You're invited




Professor Duncan Campbell
 Head of School: School of Engineering
 and
Professor Wasim Saman
 Director: Barbara Hardy Institute

are pleased to invite you to
 the official launch of the

High Temperature Storage Test Facility

Developed through funding from UniSA and ARENA

Event Details:

Friday, 12 May 2017
 10.00am - 1.00pm

University of South Australia, Building M, Mawson Lakes campus ([Map](#))

The event will provide an opportunity for a tour of the Solar/Storage facilities at UniSA and to hear about current activities from Senior Industry Partners and Researchers.

There will also be an opportunity for networking over a light lunch with refreshments.

Please note that fully enclosed shoes are required for the laboratory tour.

RSVP:

Please RSVP to [Tina Christopoulos](mailto:Tina.Christopoulos@unisa.edu.au) by COB Wednesday 10th May 2017.

Please advise of any special dietary requirements.

Email: tina.christopoulos@unisa.edu.au
 Telephone: 08 8302 3802

We look forward to welcoming you to this event.

Download the High Temperature Testing Facility brochure ([Here](#))


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