Deliverable report

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TESTIMONIES FROM USERS OF TRANSNATIONAL AND VIRTUAL ACCESS (3RD RELEASE)

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Authors:	Laurent Ghys (STIS/BELSPO)

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0.1	20.02.2018	First draft	Laurent Ghys

RICH (Research Infrastructures Consortium for Horizon 2020) has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement number 646713

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1. EXECUTIVE SUMMARY

The production of testimonies of users of transnational and virtual access services (TVAs) provided by research (e-) infrastructures is a similar and complementary activity to the production of the videos and animations. They are aiming at producing promotion and dissemination tools for the use of the RICH network and each individual RI NCP to fulfill the objectives of WP4:

- increase the awareness of the scientific community, the industry and other thematic NCP networks on the TVAs opportunities offered by the (e-)RI, targeting particularly specific/less familiar user communities (SMEs, other thematic NCPs, RI in the SSH field);
- providing tools to the network and to individual to promote TVAs during events, infodays.

For the 3rd release, we have collected testimonies from:

- 3 users of different facilities, accessed via the SFERA II transnational access programme.

The 3 testimonies are from researchers in countries that usually are not big users of the transnational access opportunities. The first testimony also illustrates the use of a facility by a private company.

The testimonies can be accessed on the RICH website at http://www.rich2020.eu/rich-success-stories.

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2. INTRODUCTION

The production of testimonies of users of TVAs is one of the activities from WP4 Task 4.5 aiming at promoting the TVAs to the wide scientific communities, the industry and the other thematic NCPs. The testimonies target specifically specific user communities (SMEs, industry, SSH researchers), multipliers as the other thematic NCPs and less-known, less-used research (e-) infrastructures (SSH,…).

The testimonies are available online on the RICH website and ad hoc, on paper for dissemination/promotion at events/conference with a RICH presence.

4 questions to the users are shaping the testimony:

1. What is your main research interest? Briefly explain the aim of the project submitted to access the (e-) RI
2. Why did you choose this particular (e-) RI? How crucial is TVAs for your project?
3. What is the purpose of your research? Basic or applied research?
4. Describe shortly your impression on the visit/use of the (e-) RI and of the submission process.

A template to collect further user testimonies is available on the RICH intranet website.

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3. CONTENT SECTION

Solar Facilities for the European Research Area-Second Phase
SFERA-II

Short description	Few Facts:
The purpose of this project is to integrate, coordinate and further focus scientific collaboration among the leading European research institutions in solar concentrating systems which are partners of this project and offer European research and industry access to the best-qualified research and test infrastructures. **Website:** http://sfera2.sollab.eu/	- SFERA-II is a project funded under the FP7-INFRASTRUCTURES-2012-1 call for integrating activities - Duration: 1/01/2014 - 31/12/2017 - Budget: EUR 8.560.764,37 - Coordinator: CIEMAT, Almeria, Spain - Contact: Isabel Oller - access-sfera@sollab.eu - N° of partners: 12

Dr Rimantas Levinskas

I am working at the Lithuanian energy institute Materials Research and Testing Laboratory as a Senior research associate. One of main research areas of the laboratory is the development and research of multifunctional materials and composites. I was a responsible person for formation of research tasks for our institute researchers who have used PSA'S facilities.

Can you explain your main research interest and briefly describe the research project that you have submitted to SFERA-II?
Although some of the experiments described below have been performed at early stage of SFERA program, I hope the information will be useful.

Two tests campaigns, together with Joint Stock Company "Idomus", were carried out in the PSA's solar furnace SF60:

1. calcium hydro silicates samples and
2. fire proof doors mini-elements in 2012.

The main goal of the project was to test the calcium hydrosilicates (xonotlite slab) modified with sodium metasilicate including additive of synthetic gyrolite, montmorillonite and modified montmorillonite at 950 C. The modified xonotlite slab has demonstrated very good structural resistivity to the attack of high energy sunlight's.

These experiments have received financial support by the Access to Research Infrastructures activity in the 7th Framework Programme of the European Union (SFERA Grant Agreement n. 228296) and excellent service of a technical staff of Platforma Solar de Almeria.

Please select the infrastructure you requested access to: CIEMAT-PSA. *Why did you choose this particular infrastructure? Explain how crucial it is for your project?*

It is needed to mention that a few researchers of the Lithuanian energy institute are familiar with capability

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of the *Platforma Solar de Almeria* since 2002. Thanks to the financial support of the "Improving Human Potential" programme of EU-DGXII(2002) and the financial support by the Access to Research Infrastructures activity in the 7th Framework Programme, a lot of tests were performed related with Zr-Nb alloy during hydride phase transformation and synthesis of YSZ thin films in 2002. Also with the possibility to use hydrosilicates and ceramic for fire proof doors, applications have been performed using concentrated solar energy in 2012.
The concentrated sun light provided us with a much cheaper and effective opportunity to help the private company "Idomus" to find solutions for improving fire resistance of fire proof doors and to test the heat resistance of the new materials.

What is the meaning of your research – purely basic or applied?

In all cases our research was related with applied research, however, some fundamental knowledges have been received as well.

What is your opinion on the visit? Can you tell us also a bit on the practical details (submission process, arrangements for your visit,…)?

The applications submission process was very well organized and arrangements for our visits was done very professionally. I would like to express many thanks for the PSA staff, who has prepared facilities for experimental work and supplied their professional knowledge during the performance of tests.

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Group Leader: Sylwia Mozia
Participants: Dominika Darowna (Ph.D. Student), Agnieszka Wanag (Ph.D. Student)

We are from the Institute of Inorganic Chemical Technology and Environment Engineering (IIChTEE) that belongs to the Faculty of Chemical Engineering of the West Pomeranian University of Technology, Szczecin (Poland). The scientific staff of IIChTEE are 28 employees, including 8 full professors, 4 associate professors and 7 assistant professors. Additional 15 employees are working within a framework of research projects and almost 40 PhD students are engaged in the research realized in IIChTEE.
One of the main research directions of the IIChTEE is photocatalysis. The research on this technology was started in the institute in the 1990's. Since then over 150 full papers concerning this subject were published by the IIChTEE staff. The main projects related to photocatalysis include: photocatalysis and hybrid photocatalysis - membrane processes for water/wastewater treatment; novel photocatalytic materials for water and air purification; photocatalytic building materials and self-cleaning surfaces; antimicrobial properties of photocatalytic materials, photocatalytic generation of useful hydrocarbons.

Can you explain your main research interest and briefly describe the research project that you have submitted to SFERA-II?

The aim of the research was a comparison of different Advanced Oxidation Processes (AOPs) at the pilot plant scale as a tertiary treatment for the removal of micro-contaminants, especially pharmaceuticals. Pharmaceuticals are emerging environmental problem due to the continuous pollution of aquatic ecosystems. Constant input into the environment may cause undesirable effects on the health of many organisms. After their usage, most of the pharmaceuticals and their metabolites enter the sewage. Since the biodegradation of these drugs is limited, conventional wastewater treatment plants using biological processes are unable to dispose these compounds and they are consequently considered to be the source of the water contamination. Therefore, it is necessary to develop an effective method of removal of the pharmaceuticals from the water.

In the study realized within the SFERA-II project we have investigated the possibilities of application of Advanced Oxidation Processes, mainly solar photo-Fenton (with the use of hydrogen peroxide or peroxydisulfate and Fe (II) or Fe (III)) and UV irradiation processes to remove pharmaceuticals from water. The experiments were realized with application of the compound parabolic collector (CPC) solar plant and a

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UV pilot plant.

The research realized within the framework of the SFERA-II programme is published in:

S. Miralles-Cuevas, D. Darowna, A. Wanag, S. Mozia, S. Malato, I. Oller, Comparison of UV/H_2O_2, UV/$S_2O_8^{2-}$, solar/Fe(II)/H_2O_2 and solar/Fe(II)/$S_2O_8^{2-}$ at pilot plant scale for the elimination of micro-contaminants in natural water: An economic assessment, Chemical Engineering Journal, In Press, 2016, DOI: 10.1016/j.cej.2016.06.121

It has also been presented at the 9th European meeting on Solar Chemistry and Photocatalysis: Envoronmental Applications (SPEA9), Strasbourg, France, 13-17.06.2016:

S. Miralles-Cuevas, D. Darowna, A. Wanag, S. Mozia, S. Malato, I. Oller, Economical Assessment of UV/H_2O_2, UV/$S_2O_8^{2-}$, solar/Fe(II)/H_2O_2 and solar/Fe(II)/$S_2O_8^{2-}$ Processes for the Removal of Micro-contaminants, Abstract Book p. 122.

Please select the infrastructure you requested access to: CIEMAT-PSA. *Why did you choose this particular infrastructure? Explain how crucial it is for your project?*

One of the main reasons of our interest in the PSA, and especially the TSA run by Dr. Pilar Fernández Ibáñez(Solar Treatment of Water) is the possibility of conducting research using natural sunlight. A small number of sunny days in Poland makes the studies with the implementation of natural sunlight for the degradation of pharmaceuticals particularly difficult. PSA also has a pilot compound parabolic collector (CPC) solar plant designed for solar photocatalytic applications and installation combining photo-Fenton process with nanofiltration, both of which could be used for the removal of pharmaceuticals from water. There are no such installations in our Institute.

What is the meaning of your research – purely basic or applied?

The research has an application potential due to fact it was conducted in CPC pilot plant and it could be used for the treatment of water contaminated with pharmaceuticals.

What is your opinion on the visit? Can you tell us also a bit on the practical details (submission process, arrangements for your visit,…)?

The visit was organized very professionally. The PSA staff was very helpful. The submission process was very clear. We would like to thank the organizers of the SFERA-II programme for choosing our project. We are extremely grateful for the opportunity to work in such an interesting place with many highly qualified scientists. Thanks to SFERA-II project we also had an opportunity to learn how interesting the Spanish culture is. If it is possible, we would like to extend our cooperation with the PSA on other projects and we hope the SFERA-II project will be continued.

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Ioan MILOSAN, PhD Eng.

I am Full Professor at the Transylvania University of Brasov - Romania, in the field of Materials Engineering since 1989. My areas of competence cover heat treatment and surface engineering, clean technologies, tribology, modelling and optimization of the industrial processes, products innovation, management and audit of quality and environment (ISO 9001, ISO 14001, ISO 19011).

Can you explain your main research interest and briefly describe the research project that you have submitted to SFERA-II?

Title of the research project-2016: *Researches regarding the influence of the heat treatments with solar energy over the wear resistant steels properties; Acronym: RESOL-WEAR*

Our main research interest are:

1. To improve the wear resistance of these materials by applying different heat treatments using solar energy and has shown that superior results are comparable determinations in conventional ovens.
2. Develop new wear resistant materials used in fields such as: automotive, mining; chemical and oil drilling.
3. Explore the advantages of using solar energy in comparison with the classic energy and reduction of costs for producing of these specials steels by using renewable and non-polluting energy.

During the research project we will use 6 different types of special steel alloys on which we will use different thermal treatment by using focalized solar energy on the surface of the metal probe, process which will take place both in a natural environment and in a protective atmosphere (N_2, Ar), followed by the controlled cooling of the pieces in different environments (air, N_2, Ar,).

The 6 types of steel alloys are alloyed with several chemical elements such as: Mn, Cr, Ni, Mo, Cu, Co and W. The additional alloying, are desired to obtained some new finer structures with superior properties, which will be further enhanced by applying heat treatments using solar energy. Additional alloys were

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realized with the purpose of obtaining a better structure and wear properties, demanded in diverse industrial applications of high importance.

Our objective is to use the prepared probes in different thermal treatment, specific to special alloys resistant to wear such us: normalizing, quenching, cooling and tempering. The temperatures used in the experiments are between 300 and 1150°C.

Please select the infrastructure you requested access to: CNRS-PROMES. *Why did you choose this particular infrastructure? Explain how crucial it is for your project?*

I requested access from CNRS-PROMES to:

- Medium Size Solar Furnaces facility (MSSFs), from 1 to 6 kW;
- installation of generating the controlled atmosphere (N_2 or Ar);
- a thermocouple (TC) type K, for the temperature control;
- other devices from endowed centre necessary in realizing the study.

I choose this particular infrastructure of the CNRS-PROMES Research Centre, because it offers the possibility to achieving this project and obtaining the foreseen results at a high level for realization of the proposed research.

Without the support of this EC grant agreement I am not able to carry out my research work.

What is the meaning of your research – purely basic or applied?

It is a combination between basic and applied.

At the end of the research, after having finished the critical analyze of these results, I expect to obtain in the studied materials, finished structures, constituents want and consequently higher values of properties. With this materials, I intend to utilize the new wear resistant materials used in fields such as: automotive (engine components for heavy tonnage vehicles), mining and oil drilling. (mills for mine and drill bit)

What is your opinion on the visit? Can you tell us also a bit on the practical details (submission process, arrangements for your visit,…)?

My opinion is that:

- the submission process is very efficient: explicit, easily accessible and understandable to all;
- publicity, made by the infrastructure, concerning the access supported by the EC is very good;
- practical information provided on how to apply for access is very good;
- information provided, once my project it was accepted, on how to use the facility is very good;
- coordinator and technical team are professionals, being together whenever we requested the opinion or technical aids;
- logistic support at the facility (office space, computing, libraries, accommodation) is very good;
- administrative support (including *the arrangements for my visit,* the reimbursement of travel & subsistence expenses): so far all administrative support was carried out at a professional level.

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The CNRS-PROMES's Director came several times at each research team. He was interested about every research project, he asked if everything is in order and if everything takes place in good conditions.

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