

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

Short description

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/>

Few Facts:

- 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. Anton Meier (PSI)

Dr. Anton Meier was Head of the Solar Technology Laboratory at the Paul Scherrer Institute (PSI) until July 31, 2016 (now retired). He served as Operating Agent for Solar Chemistry Research of IEA's SolarPACES Program and as Coordinator for Solar Fuels within the CSP Joint Program of EERA (European Energy Research Alliance) and the EU-FP7 Programme STAGE-STE.

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

The main research interest includes high-temperature thermochemical processes for the production of solar fuels and energy-intensive materials.

Research project Solar2Zinc-3 submitted to SFERA-II: Following the technical demonstration with a 10 kW_{th} solar reactor prototype, a 100 kW_{th} solar pilot plant for solar thermal dissociation of ZnO has been designed, fabricated, and experimentally tested in two experimental campaigns in 2011 and 2012 (both partly funded by SFERA) at the 1 MW Solar Furnace (MWSF) of PROMES-CNRS in Odeillo, France. For the 3rd experimental campaign, conducted in September/October 2014 at the MWSF, the solar thermochemical reactor has been substantially modified in order to optimize the reactor performance and reliability. The goal of the 3rd experimental campaign (Solar2Zinc-3, partly funded by SFERA-II) at the MWSF was to demonstrate reliable reactor operation including aerodynamic window protection at very high temperature (up to 1800°C) and to optimize the reactor performance in order to reach a Zn yield exceeding 50% and a solar-to-chemical energy conversion efficiency approaching 10%.

*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?*

The MWSF at Odeillo, France, is the only solar facility in Europe capable of delivering the necessary solar thermal power of 100 kW_{th} at high concentration (> 3500 suns), required to reach reactor temperatures exceeding 1700°C – a temperature that is requisite to drive the ZnO dissociation process. Furthermore, the MWSF provides horizontal beam irradiation, which allows operating the rotary reactor in its currently preferred horizontal position. We greatly value the experience obtained by performing on-sun experiments with our 100 kW_{th} solar reactor in the MWSF.



Testimonies of users of transnational and virtual access to research (e-) infrastructures

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

Successful demonstration and characterization of the 100 kW_{th} solar reactor pilot plant for thermal reduction of ZnO was finally achieved after nearly 15 years of intense fundamental and applied research and development. The results from this research extend the ability to store solar energy as a fuel – such as Zn, H₂, or syngas – in a manner that increases the chances of having a sustainable solution to the current world problem of being dependent on a limited supply of fossil fuels.

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 stay at the PROMES-CNRS MegaWatt Solar Furnace (MWSF) in Odeillo was well prepared and supervised by skilled and helpful staff. Besides having access to the solar facilities, we very much appreciated the continuous availability of the staff at CNRS-PROMES, in particular the SISIA team lead by Emmanuel Guillot. We thank Emmanuel for his dedicated technical and administrative support, and both Jean-Louis Sans and Nicolas Boulet for their technical support and for operating the MWSF. We also wish to thank Marie Prouteau for her kind help with SFERA administration, travel arrangements and accommodation.

The testimonies of users of transnational and virtual access are available on the RICH 2020 website at <http://www.rich2020.eu/rich-success-stories>