

Doctoral Program in Energy, Chemical and Environmental Engineering



Workshop on Thermochemical Solar conversion (Seville, 18-19 October 2018)

Organization: Chemical and Environmental Engineering Department, University of Seville

Chair: Alberto Gómez-Barea (agomezbarea@us.es),

Secretar: Israel Pardo (rpardo@us.es)

Web: <http://institucional.us.es/docenequiamb/>

Venue: Sala Juan Larrañeta (planta ático), Escuela Técnica Superior de Ingenieros), Seville.
Camino de los Descubrimientos S/N. Seville, SPAIN ([ETSI](http://www.us.es))



Summary

A great interest has emerged over the last two decades on the development of solar thermochemical conversion from concentrated solar technologies (CST). This offers the option of converting solar energy into thermal, electrical, and chemical forms. Technologies based on direct and indirect irradiated reactors can be used to efficiently supply solar heat to high-temperature endothermic processes like reforming and gasification of carbonaceous feeds like coal, methane and biomass, resulting in net solar energy embodied in the product gas, as well as splitting water at high temperature to produce hydrogen by different thermochemical cycles.

This workshop is aimed at reviewing the development of technologies in the area of solar thermochemical conversion and storage applied to solar reactors. Special technologies considered are syngas/hydrogen production by solar gasification and chemical looping reforming, high temperature gas-solid receivers, radiative heat transfer to solar reactors, chemical storage by gas-solid reversible reactions, biomass-solar hybrid integration and other developments in the field. The main issues to deal with will be outlined, and the challenges and opportunities to develop solar reactors and integrated technologies for an energy transition toward a decarbonized will be reviewed.

Reputed experts on outstanding topics in the field will give keynotes/lectures. The course is oriented for PhD students and young researchers willing to share their project results in a friendlier environment than conventional conferences. Some of the PhD students dealing with activities related to the conference topic will give an oral presentation and participate in the discussion.

** Jornadas celebradas dentro de las actividades de apoyo a la formación doctoral en el programa de doctorado de Ingeniería Energética Química y Ambiental de la US (+info: <http://institucional.us.es/docenequiamb/index.php>)*



SCHEDULE

Thursday 18 th October	
9:30 - 9:45	Welcome Alberto Gómez Barea <i>Coordinator of Doctoral Program in Energy, Chemical and Environmental Engineering at University of Seville</i>
9:45 - 10:50	Keynote 1 Solar receivers for high temperature applications Manuel Silva Pérez <i>University of Seville</i>
10:50 - 11:20	Coffee break
11:20 - 12:25	Keynote 2 Fluidized particles-in-tubes, an option for innovative solar receivers and reactors Gilles Flamant <i>PROMES</i>
12:25 - 13:30	Keynote 3 Indirectly and directly irradiated fluidized bed solar receivers for thermal and thermochemical energy storage: heat transfer, solid mixing and chemical reaction Roberto Solimene <i>IRC/University of Naples</i>
13:30 - 14:30	Lunch time
14:30 - 15:35	Keynote 4 Applications and limitations of two step thermochemical redox cycles Brendan Bulfin <i>Swiss Federal Institute of Technology (ETH)</i>
15:35 - 16:40	Keynote 5 Integration solar thermal energy with CO₂ capture and storage methods Ricardo Chacartegui <i>University of Seville</i>
16:40 - 17:45	Keynote 6 Materializing solar thermochemistry to structured reactor/heat exchanger concepts for efficient solar energy harvesting, transformation and storage Christos Agrafiotis <i>German Aerospace Center. Institute of Solar Research (DLR)</i>

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Friday 19 th October	
9:30 - 10:35	Keynote 7 <i>Allothermal solar gasification of biomass and wastes</i> Alberto Gómez Barea University of Seville
10:35 - 11:00	Coffee Break
11:00 - 12:05	Keynote 8 <i>Experimental Testing of Multi-Tubular Reactor for Hydrogen Production</i> Aurelio González CIEMAT-PSA University of Almería
12:05 - 13:10	Keynote 9 <i>Development of directly illuminated particle reactors for thermochemical applications</i> Manuel Romero IMDEA Energy Institute
13:10 - 13:40	Wrap-up Alberto Gómez Barea University of Seville
13:40 - 14:40	Lunch time
14:40 - 16:00	<i>Discussion about ITN preparation (only invited speakers)</i>

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