Components' and Materials' Performance for Advanced Solar Supercritical CO_2 Powerplants

COMPASsCO$_2$ SECOND STAKEHOLDERS WORKSHOP

Next generation advanced materials for particle/supercritical CO_2 heat exchangers

Hybrid - physical venue: Hotel Anker,
Kolpingstraße 7, 97828
Marktheidenfeld, Germany &
Online: Zoom

September 25th, 2023
11h00 – 15h00 CET
No registration fees

WORKSHOP OVERVIEW

As recalled by the Green Deal Industrial Plan of the European Commission[1], the next decade will be crucial to put the EU on the right track to reach 2050 carbon neutrality objectives. New markets will have been created, breakthrough clean technologies will have been innovated, developed, and brought to market, and our energy systems transformed. Research, development and innovation are key to enable a reliable emission pathway towards sustainable industry, as recalled also in the SPIRE[2] Roadmap. The Horizon 2020 COMPASsCO2 project intends to contribute to sustainability by focusing on a series of key innovations in terms of renewable energy system integration, material durability and process improvement, in line with the SPIRE action concepts. In order to exchange knowledge, validate results and identify areas for improvement, a series of stakeholders workshops are envisaged throughout the project implementation (2020-2024).

This second stakeholder workshop focuses on the demanding material requirements of the proposed concentrated solar power (CSP) particle/Brayton cycle heat exchanger (HEX). On the interior HEX walls the materials will be exposed to supercritical CO2, while on the exterior wall side the materials will be subjected to oxidation and erosion by the hot falling particles. The main research findings to-date will be presented with discussions on project next steps and industrial perspectives. The workshop is addressed to researchers, EU and international consortia working on similar topics, industry representatives and any other interested stakeholder willing to learn more about advanced heat exchangers for supercritical CO_2 cycles and aggressive industrial environments towards sustainable industrial solutions for the energy industry.

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[1]Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions: A Green Deal Industrial Plan for the Net-Zero Age, Brussels, 1.2.2023, COM(2023) 62 final.
[2] Sustainable Process Industry through Resource and Energy Efficiency

AGENDA

Time	Topic	Speaker(s)
11:00 – 11:15	**Welcome Coffee**	
11:15 – 11:25	Welcome, Project Overview (CSP HEX) and Workshop Objectives	Daniel Benitez, DLR
11:25 – 12:15	**Session 1: Advanced materials for abrasive environments (Exterior HEX wall)**	Mathias Galetz, DFI
11:25 – 11:40	External wall investigation results	Florian Lebendig, FZJ
11:40 – 11:55	Development of new materials	Thomas Blackburn, UoB
11:55 – 12:15	**Roundtable discussion with stakeholders** *Are there other commercial erosion resistant materials or coatings that should be tested? Costs? Availability? Also applicable as HEX tubes?* *Is the current testing aggressive enough? Why/why not?* *Are there other new material directions currently being explored? What is their timeframe? Feasibility of industrial application?*	
12:15 – 13:15	**Networking Lunch**	
13:15 – 13:45	Keynote Speech: Current status of materials for sCO_2 processes for more efficient and sustainable energy systems: approaches and challenges	Bruce Pint, ORNL

AGENDA

Time	Topic	Speaker (s)
13:45 – 14:55	**Session 2: Material behaviour in sCO_2 environment (Interior HEX wall)**	Mitsutoshi Ueda
13:45 – 14:00	Materials requirements for sCO_2 (oxidation/carburization)	Dmitry Naumenko, FZJ/CIEMAT
14:00 – 14:15	Testing results on state-of-the-art materials (mechanical properties - creep)	Christoph Grimme, DFI
14:15 – 14:30	Exploitation opportunities: an industrial perspective	Company participants
14:30 – 14:55	**Roundtable discussion with stakeholders** *What properties need to be tested for s-CO_2 applications?* *What experiments should be done? In labs vs. industry?* *What testing standards exist/should be developed?* *Are today's commercial materials applicable in s-CO_2? Why/why not?* *Are there other commercial s-CO_2 resistant materials that should be tested?* *Costs? Availability? Also applicable as HEX tubes?* *Is oxidation/carburization or erosion more critical? Are there better ways to evaluate these combined properties?* *Is s-CO_2 as far as it will be, as currently defined, or will it go further/be more aggressive in future processes?*	
14:55 – 15:00	**Concluding Remarks & Takeaways**	Daniel Benitez, DLR
15:00	**End of meeting**	

HOW TO REGISTER

REGISTRATION

Please **register** to the event through the link below:

REGISTER HERE

NO REGISTRATION FEES

You are kindly invited to forward the invitation to all your colleagues who might be interested in participating at the event.

Further instructions will be sent in due time.

REGISTRATION

This project has received funding from the European Union's Horizon 2020 Research and Innovation Action (RIA) under grant agreement No. **958418.**

COMPASsCO$_2$

THANK YOU

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