ETH zürich

Institute of Fluid Dynamics
Institute of Energy and Process Engineering

Colloquium Thermo- and Fluid Dynamics

Thermal Integration in Photo-Electrochemical Splitting of H2O and CO2

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Solar radiation is the most abundant renewable energy source but it is distributed and intermittent, thereby necessitating its storage via conversion to a fuel or chemical commodity for practical use. Solar thermochemical and photoelectro-chemical approaches (and combinations thereof) provide viable, non-biological routes for the direct synthesis of solar fuels and chemical commodities. I will review the state of the art of the technical solar fuel processing approaches. Given the economic and sustainability advantage of utilizing concentrated radiation in photoelectrochemistry, a focus will lie on discussing the challenges associated with the utilization of concentrated solar irradiation and the provided opportunities by thermal integration. Detailed multi-scale and multi-physics models and demonstrations will be used to support the development of general design guidelines on the materials and reactor scale. I will end by highlighting engineering challenges to scale such solar fuel approaches to industrial scales.

Sophia Haussener is an Associate Professor in the Institute of Mechanical Engineering at the Ecole Polytechnique Fédérale de Lausanne. She is Head of the Laboratory of Renewable Energy Science and Engineering that is focused on research in the area of design of solar-thermal, solar-thermochemical, and photoelectrochemical energy conversion reactors through multi-scale and multi-physics modeling and demonstration. She is co-founder of the startup SoHHytec which aims at commercializing photo-electrochemical hydrogen production. She is the former chair of the American Society of Mechanical Engineers' (ASME) Solar Energy Division and has co-authored more than 90 peer reviewed publications in the field of (solar) energy conversion.

Date: Wednesday, 22 May 2024
Time: 16:15 - 17:15h
Place: ETH Zurich, ML H 44
Host: Prof. Aldo Steinfeld

Prof. Aldo Steinfeld

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