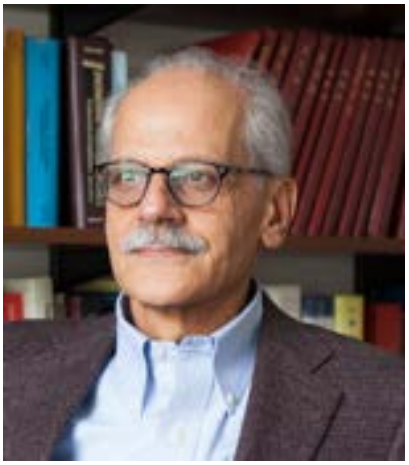
CERC | Clean Energy Research Centre

Solar Thermochemical Hydrogen Production using a Reactor-Train System



Speaker: Dr. Ahmed F. Ghoniem,
Massachusetts Institute of Technology

Abstract

Hydrogen, as a fuel or a fuel component in ammonia, LOHC, etc., is set to become a major chemical energy carrier in long-haul (ground, water and air) transportation, some industries, energy storage and electricity production. Scalable and distributed hydrogen production requires significant improvement in efficiency and economics using mostly renewable sources and incorporating different technologies at all scales: materials, reactors and systems' levels. An exciting development is a reactor-train system design capable of approaching the theoretical limit of solar energy to hydrogen continuously while incorporating high effectiveness heat and pressure recovery, thermochemical pumping, and thermal energy storage with favorable economics. While approaching 5-8X the demonstrated efficiency, preliminary TEA shows that the optimized design can produce hydrogen at 50% of the current estimates.

Biography

Ahmed Ghoniem is the Ronald C. Crane Professor of Mechanical Engineering, Director of the Center for Energy and Propulsion Research and the Reacting Gas Dynamics Laboratory. He received his B.Sc. and M.Sc. degree from Cairo University, and Ph.D. at the University of California, Berkeley. His research covers computational engineering, combustion, multiphase flow, clean energy technologies with focus on CO2 capture, renewable energy and fuels. He supervised more than 120 masters, Ph.D. and post-doctoral students; published more than 500 articles in leading journals and conferences; and consulted for the aerospace, automotive and energy industry. He is fellow of the American Society of Mechanical Engineer, the American Physical Society, and the Combustion Institute. He received several awards including the ASME James Harry Potter Award in Thermodynamics, the AIAA Propellant and Combustion Award, the KAUST Investigator Award and the "Committed to Caring Professor" at MIT.

Tuesday July 26, 2022 @ 3:00pm
CHBE 202, 2360 East Mall, Vancouver