ETH zürich

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chairman: Prof. Dr. Rudi Gunawan

THE ROLE OF INTERFACIAL WATER ON WATER DESALINATION, HYDRATES MANAGEMENT, AND OIL & GAS PRODUCTION

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HCI J 7, 17.00 h
The Seminar will be followed by an Apéro

Abstract. The molecular structure of interfacial water, and in particular of the electric double layer, is known to determine the outcome of a number of physical processes, including the dissolution of minerals, corrosion, and perhaps even the biological activity of enzymes. Our research group has employed massive molecular simulation studies to quantify how interfaces, in particular wet ones, determine the outcome of processes of vast societal importance. In this presentation we will explore how water adsorption within clays can affect the transport of natural gas through shale formations, how water and CO2 affect the mobility of hydrocarbons through silicates, how designing appropriately carbon-based electrodes could lead to new processes for water desalination, and finally how hydrates particles assemble within hydrocarbon systems. We will discuss how experimental information, obtained via appropriate collaborations, could be used to validate our predictions and perhaps lead to advancements in all the processes just discussed.

Speaker highlights. Dr. Striolo is Professor of Molecular Thermodynamics within the Department of Chemical Engineering at University College London, London's global university. Prior to this position, Dr. Striolo was the Lloyd and Joyce Austin Presidential Associate Professor within the School of Chemical, Biological and Materials Engineering at the University of Oklahoma, US. During his career Dr. Striolo has applied an arsenal of modelling and simulation techniques to characterize the structure of fluid at solid-liquid interfaces. He held visiting positions at Lawrence Berkeley National Laboratory, Berkeley, CA, and at Princeton University, NJ, to verify the theoretical predictions using experimental observables and to correlate the interfacial fluids structure to their transport. Striolo is interested in quantifying interfacial effects, especially those that can be related to practical applications such as water desalination, management of hydrates in flow assurance problems, separations, self- and directed assembly, and many others.