

Plenary Lecture

ON THE SPONTANEOUS IGNITION OF LIQUID HYDROGEN

Liquid hydrogen is a cryogenic fluid stored at about 20 K (-253°C) that provides a high-density storage solution, offering significantly greater volumetric energy density than compressed hydrogen gas.

When liquid hydrogen is released onto water or in underwater environments, spontaneous ignition consistently occurs (a phenomenon also observed with gaseous hydrogen jets under certain conditions).

The underlying mechanisms remain under investigation, with proposed explanations including electrostatic charge generation from ice particle collisions, interaction with atmospheric electric fields, and other complex physicochemical phenomena that are not yet fully clarified (that similarly to the spontaneous ignition of gaseous jet of hydrogen) and will be examined in the plenary lecture. Indeed, understanding these ignition mechanisms is critical for the safe development and deployment of hydrogen-based energy systems, particularly for storage, transportation, and applications.

Prof. Ernesto Salzano (short bio)

Ernesto Salzano is a Full Professor of Chemical Plant at the University of Bologna, where he serves as the Director of Studies for Chemical and Process Engineering. Additionally, he is an academic board member for the Ph.D. program in Future Earth, Climate Change, and Societal Challenge.

He is the Chair holder of the European Research Area (ERA-Chair) of the Centre of Excellence for Safety Research (CESAR), VSB Ostrava, Czech Republic and an Associate Research of the Italian National Research Council.

The research activities refer to process safety and industrial risks, with over 250 articles in scientific journals and books. He is an associate editor of the Process Safety and Environmental Protection and of the Journal of Loss Prevention in the Process Industry.