Minimum ignition energy of hydrogen and hydrogen – carrying fuels

Master's thesis number: MT-23-22

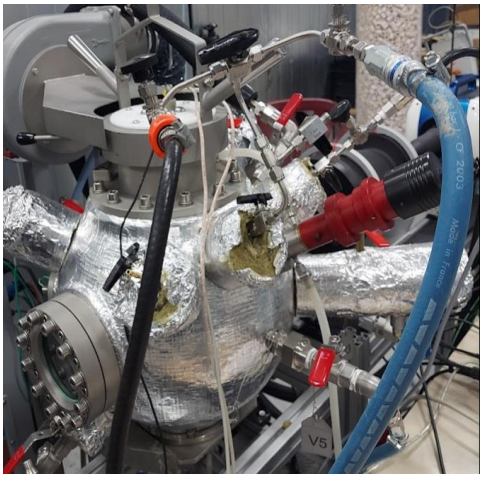
Introduction and background: Hydrogen now has been the buzzword in the field of energy in recent decades but in present the still major part of the world uses non-renewable sources to meet the energy demands in various sectors which contributes to high carbon emissions beacuse very little is known about hydrogen and its combustional properties. It also imposes great safety risk since because of its problem in transportation, and storage. But the target is to invest in the technologies that could help us in better understanding of hydrogen as a fuel and ultimately contribute to the green hydrogen shift to meet global demand.

A study shows that steel industry alone contribute to 8% of the global emissions since as of now and 1 tonne of coal-based steel produced accounts for about 1.5-3 tonne of carbon emissions as reported. And even though if the use of hydrogen is adopted in some sectors, it's mostly in the grey hydrogen form which is produced through steam methane reforming which is not the sustainable approach for hydrogen generation. Therefore, world is now focusing on affordable green hydrogen production techniques.

Problem description and objective:

A lot of incidents have been reported in which accidents have happened due to uncontrolled ignition of hydrogen. Safety risk associated to hydrogen use case and not fully knowing the combustionl properties of hydrogen – air mixture is a problem.

The objectives are to investigate the combustion properties of hydrogen and hydrogen-carrying fuels by developing a reliable and controllable spark ignition system for the facility that is USN using a 20-Liter explosion vessel to contribute to the clean energy transition by performing spark ignition experiments in the 20-Liter combustion vessel.



Candidate:

Sarthak Jakar

Telephone:

+47 40987903

Email:

sarthak.jakar@gmail.com