



Name of the organization

Karlsruher Institut für Technologie (KIT)

Name of the infrastructure / laboratory

HYKA-HPEB (a High Pressure Explosion Bomb)

Address and country of the infrastructure / laboratory

Karlsruher Institut für Technologie (KIT), Campus Nord, Hermann-von-Helmholtz-Platz 1 - 76344 Eggenstein-Leopoldshafen, Germany

Person responsible of the access / Contact person

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Main field of activity of the infrastructure / laboratory

► Hydrogen safety, hydrogen storages

Short description of the infrastructure / laboratory

The High Pressure Explosion Bomb (HPEB) is a spherical volume of 8.2 dm³ and internal diameter of 25 cm with a wall thickness of \rightarrow 34 mm equipped with two quartz windows for optical observations. The explosion bomb was used to investigate flammability limits, minimum ignition energy, laminar flame velocity, and flame structure for different hydrogen-air and hydrogen-oxygen mixtures with or without steam at different pressures from several 10 mbar to 800 bar and temperature in the range of 20-300 °C. The vessel is equipped with measuring ports for pressure transducers and thermocouples and as well as windows for visual observations. The existing gas-filling system based on mass flow controllers allows creating hydrogen-air mixtures at different concentrations and pressures. The measuring system consists of thermocouples array (gas temperature), piezoelectric and piezoresistive gauges (initial pressure, explosion pressure), gas analyzer and mass spectrometer (to control mixture composition). The data acquisition system is based on multi-channel [64] ADC with a sampling rate of 1 MHz. The vessel was successfully tested for hydrogen explosion at 70 bar of initial pressure and temperatures up to 300 °C.

Main research areas) of the infrastructure / laboratory

Such fundamental properties as flammability limits, laminar flame velocity, minimum ignition energy for hydrogen compositions with air, oxygen, steam and other gases at different pressures and temperatures.

Instruments and tools available for the above mentioned research

Vacuum pump, gas filling system, high speed imaging (up to 200000 fr.p.s.)

