EXPERIMENTAL INVESTIGATION OF THE INFLUENCE OF PRESSURE BOUNDARY RUPTURE RATE ON THE IGNITION OF PRESSURIZED HYDROGEN RELEASE

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The phenomenon of hydrogen self ignition at abrupt release from high pressure chamber into ambient atmosphere was experimentally investigated. The diameter of outlet hole was equal to 10 mm and hydrogen pressure in the vessel was changed up to 150 bars. In order to investigate the influence of the diaphragm rupture rate on hydrogen self ignition and ignition appearance location originally light-based method was developed. It makes it possible to measure the moment of the beginning of diaphragm rupture and dynamics of this process. The experiments showed that the diaphragm rupturing process has important influence on the spontaneous ignition of pressurized hydrogen release. Ignition pressure threshold dependence on diaphragm rupture rate was obtained.

Keywords: hydrogen, hydrogen safety, self-ignition, diaphragm rupture rate

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