

CONTINUOUS DETONATION COMBUSTION OF TERNARY “HYDROGEN – LIQUID PROPANE – AIR” MIXTURE

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Abstract: Experiments on continuous-detonation combustion of ternary “hydrogen – liquid propane – air” mixture in an annular continuous-detonation combustor 406 mm in diameter with an annular gap of 30 mm have been performed. The liquid propane was fed into the chamber at the time when the sustained continuous detonation combustion of the hydrogen–air mixture was recorded. Mass flow rates ranged from 0.1 to 0.5 kg/s for hydrogen and propane and from 5 to 12 kg/s for air. Continuous-detonation combustion of liquid propane was obtained for the first time due to the addition of hydrogen rather than due to air enrichment with oxygen. The operation process with a single detonation wave rotating in the annular gap was registered at the time when hydrogen flow was rapidly decreasing, whereas propane and air flow rates remained constant.

Keywords: continuous-detonation combustion; liquid propane; hydrogen; air; experiment; detonation wave

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