

SPACE PROPULSION SYMPOSIUM (C4)
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AN EXPERIMENTAL STUDY OF LOX/METHANE SUBSCALE INJECTOR

Abstract

A 600kN class LOX/Methane thrust chamber has been developed in China since 2006 to develop rocket engine reusability technology. 12 subscale injector hot firing tests were conducted to optimize injector in 2013. The chamber pressure was varied over range from 6.1 to 7.2 MPa, methane injection temperature from 148K to 271K, mixture ratio was about 3.6, mass flowrate was about 7.8 kg/s. Influences of different injector types including shear coaxial injector and swirl coaxial injector, different LOX injector post thickness, different injector density, different methane injection temperature on combustion efficiency and combustion stability were obtained. Results showed that swirl coaxial injector was more efficient and stable than shear coaxial injector when methane injection temperature was below 230K. Subscale injector design parameters, test facility are presented, experimental results are discussed.