

SPACE PROPULSION SYMPOSIUM (C4)
Interactive Presentations (IP)

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EXPERIMENTAL AND COMPUTATIONAL STUDIES OF SUPERSONIC COMBUSTION
CHARACTERISTICS OF HYPERMIXER IN MACH 8 FLIGHT CONDITION

Abstract

Supersonic mixing and combustion enhancement is the key technology for success of the development of the scramjet especially working at the higher Mach number ($Ma > 7$). In this study, some alternating-ramp-wedge-type Hypermixer injectors were investigated by the combustion test and CFD calculation. The experiments were conducted at a stagnation enthalpy of 2.8MJ/kg, a static temperature of 960K, a static pressure of 46kPa, and Mach number of 3.4. The total temperature of the injected hydrogen was 300K. The ignition and flame holding characteristics induced by the HyperMixer were investigated using high speed camera and pressure sensors. In addition, a qualitative comparison between the computational fluid dynamic and wind-tunnel experimental results was made.