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Author: Mr. Longfei Li
Xi'an Aerospace Propulsion Institute, China, 1163070347@qq.com

Prof. Zhanguo LIU
Xi'an Aerospace Propulsion Institute, China, long1056@sohu.com
Prof. Jianhua CHEN
Xi'an Aerospace Propulsion Institute, China, long1056@sohu.com

EXPERIMENTAL STUDIES OF THE EFFECTS OF BAFFLES GEOMETRY ON HIGH-FREQUENCY COMBUSTION INSTABILITY OF LIQUID ROCKET ENGINE

Abstract

Abstracts: High frequency combustion instability(HFCI) are considered as a primary problem encountered during the development of a liquid rocket engine (LRE), which are manifested by the excitation of acoustic pressure and combustion oscillations in the combustor chamber. Method such as baffles placement has shown the ability to control combustion instability , especially to the first tangential (1T) mode. In spite of baffle systems being able to prevent the onset of the 1T, the effects of baffles geometry , such as the clearance among baffles and length of baffle on combustion instability have still not distinctly known. Recently, own "laboratory" scale LRE experiments have been successful in recreating the complex phenomenon of tangential HFCI. In the present study, the methods proposed in the previous studies are realized experimentally and the combustion stability boundaries of the subscale LRE chamber are discussed based on the experimental data. The results have shown that baffles can damp the 1T mode, and the clearance and length of baffle have an distinct effect on HFCI.

Keywords: High frequency combustion instability;liquid rocket engine, baffle