连续9年被评为“百种中国杰出学术

航空学报 » 2006, Vol. 27 » Issue (5) :737-741 DOI:

模型脉冲爆震火箭发动机可爆范围的实验研究

范玮, 严传俊, 李强, 丁永强, 李江红

西北工业大学 动力与能源学院, 陕西 西安 710072

Experimental Investigation on Detonable Range of Pulse Detonations Rocket Engine Model

FAN Wei, YAN Chuan-jun, LI Qiang, DING Yong-qiang, LI Jiang-hong

School of Power and Energy, Northwestern Polytechnical University, Xi'an 710072, China

摘要 在采用电磁阀控制间歇式供应的脉冲爆震火箭发动机模型上,研究了燃料、氧化剂的喷射占空比、喷射及点火的时序对两相爆震波形成的影响,得出了在一定供应条件下的可爆范围,掌握了控制规律。分析了这些影响的实质在于混合物的当量比和有效混合程度。实验结果表明,燃料/氧化剂喷射占空比应尽可能接近,并保证爆震管的有效填充,在此条件下应尽可能保证喷射相位一致,以达到最好的混合效果。

关键词: 两相爆震 可爆范围 实验研究

Abstract: The duty cycle for kerosene/oxygen injection and time sequence for injection, mixing and ignition to produce two-phase and fully-developed detonations are investigated in a pulse detonation rocket engine model, which uses solenoid valves for intermittently supplying propellants. In some given supply conditions, the detonable ranges in terms of injection duty cycle and the control law are obtained. In the final analysis, these effects stem from the appropriate equivalence ratio and mixing. The experimental results show that to gain reliable detonations, the injection duty cycles for kerosene and oxygen should ensure enough filling first and then the injection time phases and duty cycles should keep as close as possible to attain the effective mixing.

Keywords: two-pulse detonation detonable range experimental investigation.

Received 2004-11-11; published 2006-10-25

引用本文:

范玮;严传俊;李强;丁永强;李江红. 模型脉冲爆震火箭发动机可爆范围的实验研究[J]. 航空学报, 2006, 27(5): 737-741.

FAN Wei;YAN Chuan-jun;LI Qiang;DING Yong-qiang;LI Jiang-hong. Experimental Investigation on Detonable Range of Pulse Detonations Rocket Engine Model[J]. Acta Aeronautica et Astronautica Sinica, 2006, 27(5): 737-741.

Copyright 2010 by 航空学报