

王超,刘卫东,刘世杰,林志勇,蒋鑫欣.连续旋转爆震波的瞬时传播特性[J].航空动力学报,2015,30(11):2600~2606

连续旋转爆震波的瞬时传播特性

Instantaneous propagation characteristics of continuous rotating detonation wave

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英文关键词: [continuous rotating detonation](#) [instantaneous propagation characteristics](#) [relative standard deviation](#) [propagation stability](#) [detonation propulsion](#)

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中文摘要:

开展氢气/空气连续旋转爆震试验,并计算连续旋转爆震波的瞬时传播频率与传播速度,统计其相对标准偏差,并以此作为爆震波瞬时传播过程稳定性的评价标准.研究推进剂流量对连续旋转爆震波瞬时传播特性的影响.结果表明:在当量比为1.0时,空气流量由321g/s增加至505g/s,连续旋转爆震波的平均传播频率由4.60 kHz升高至5.33kHz,平均传播速度由1445m/s增加为1674m/s,连续旋转爆震波瞬时传播频率的相对标准偏差则由4.00%减小至1.69%.这表明连续旋转爆震波在较大的推进剂流量下的传播过程更加稳定.

英文摘要:

Experiments on continuous rotating detonation were performed using hydrogen/air. The instantaneous propagation frequency and velocity of the continuous rotating detonation wave (CRDW) were analyzed, and the relative standard deviation was obtained to describe the stability of detonation wave instantaneous propagation process. The effect of propellant mass flow rate on the CRDW instantaneous propagation characteristics was studied. The results showed that when the mass flow rate of air increased from 321g/s to 505g/s with the equivalence ratio of 1.0, the average propagation frequency of CRDW rose from 4.60kHz to 5.33kHz, and the average propagation velocity increased from 1445m/s to 1674m/s. Correspondingly, the relative standard deviation of instantaneous propagation frequency of CRDW decreased from 4.00% to 1.69%, indicating a more stable propagation process of CRDW at a higher propellant mass flow rate.

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