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## 两相脉冲爆震涡轮发动机原理性试验

## Principle experiments on two phase pulse detonation turbine engine

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中文关键词: [脉冲爆震燃烧室](#) [涡轮](#) [压气机](#) [试验](#) [发动机](#)英文关键词: [pulse detonation combustor](#) [turbine](#) [compressor](#) [experiment](#) [engine](#)

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中文摘要:

为验证脉冲爆震涡轮发动机(PDTE)的可行性,建立了PDTE原理性试验系统,主要由脉冲爆震燃烧室、离心压气机和向心涡轮等组成.以汽油为燃料,空气为氧化剂,开展了PDTE原理性试验研究.试验结果表明:爆震燃烧室、压气机与涡轮三者能够协调工作,发动机能够在自吸气模式下长时间稳定连续工作,发动机工作频率最高达18Hz.研究中所采用的气动阀对爆震反传压力波具有很好的衰减作用,低频下衰减效果更为明显,发动机工作在6Hz时压力波峰值可衰减93.8%,在18Hz时衰减幅度降为78.4%.反传压力的降低有利于爆震燃烧室与压气机之间的匹配工作,同时可缩短反传距离,有助于提高发动机工作频率.

英文摘要:

In order to verify the feasibility of the pulse detonation turbine engine(PDTE), a principle experiment system mainly composed of pulse detonation combustor, compressor and turbine, etc., was established. By taking gasoline as fuel and air as oxidizer, the principle experiments of PDTE were carried out. The test results show that the pulse detonation combustor, compressor and turbine can match each other successfully and the engine can stably work at the self-suction mode for a long time. The operating frequency of the engine is up to 18Hz after installation of the pneumatic valve, showing a good attenuation effect on the back propagation detonation wave. It is found that the effect of the pneumatic valve is more significant at low frequencies. When the engine works at 6Hz, the pressure wave peak attenuation is 93.8%, while at 18Hz it is reduced to 78.4%. Decreasing the back propagation pressure is conducive to the coordination between the chamber and the compressor, and at the same time it can shorten the back propagation distance, helping to improve the operating frequency of the engine.

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