

SPACE PROPULSION SYMPOSIUM (C4)

Poster Session (P)

Author: Mr. Chunqin Luo

Science and Technology on Scramjet Laboratory, Beijing Power Machinery Research Institute, China,
luozhyi@sina.com

Dr. Baoxi Wei

Science and Technology on Scramjet Laboratory, Beijing Power Machinery Research Institute, China,
weibaohuasky@163.com

Dr. Feiteng Luo

Science and Technology on Scramjet Laboratory, Beijing Power Machinery Research Institute, China,
loftn@163.com

Mr. Xin Ren

Science and Technology on Scramjet Laboratory, The 31st Research Institute of CASIC, China,
renxin9600@sohu.com

Mr. Zhuang Ning

Science and Technology on Scramjet Laboratory, Beijing Power Machinery Research Institute, China,
nz0806@163.com

Dr. Qiang Gang

Science and Technology on Scramjet Laboratory, Beijing Power Machinery Research Institute, China,
48251836@qq.comDESIGN AND EXPERIMENTAL INVESTIGATION OF RBCC ENGINE OPERATING FROM MACH
2.0 TO 6.0**Abstract**

Rocket Based Combined Cycle(RBCC) engine can be designed by several different types to adapt different application missions, which integrates rocket and ramjet or scramjet. A RBCC engine flowpath model operating from Mach 2.0 to 6.0 flight condition is designed, that mainly works at ramjet mode and rocket-ramjet mode. Such type of RBCC engine has merits with easiness to design and relatively high reliability, because the mature design method for ramjet can be referenced. A series of direct-connect tests were conducted on the designed RBCC engine model at Mach 2.0, Mach 4.0 and Mach 6.0 conditions. In all tests, gaseous oxygen and liquid kerosene are used for the rocket thruster, with nominal total pressure and O/F ratio fixed at 2.0MPa and 1.6 respectively. Reliable ignition and steady combustion realized under all test modes. Performance of ramjet mode and rocket-ramjet mode were carefully investigated by analyzing test data. Test results indicate that rocket jet and total equivalence ratio in ramjet combustor have important effects on RBCC engine.