

SPACE PROPULSION SYMPOSIUM (C4)
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RESEARCH ON THE COOLING METHOD FOR AN OXYGEN RICH PREBURNER

Abstract

A preburner was designed, manufactured and tested for the technologies development of the kerosene-LOx staged combustion cycle liquid rocket engines. Because oxygen rich combustion occurs in the chamber, cooling is one of the most important factors developing the preburner. Thus, a special cooling channel in which liquid oxygen was running was devised. The design was carried out majorly by numerical method and confirmed by actual hot fire tests. Fluent was used for the numerical analysis. The hydraulic characteristics such as the pressure loss and the mass flow rate from the numerical and experimental results were well matched. The difference of the flow coefficient, Kv was less than 2%. However, the heat flow rate was not predict as good as the Kv. The temperature drop from the inlet and outlet of the channel by the numerical prediction was about 18 K while the experimental result was about 10 K. However, this temperature difference was little enough to ensure that the surface temperature of the chamber was below the critical temperature.