

Development of a Hydrogen Fueled Combustor for a Gas Turbine at Micro-scale

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A hydrogen-fueled micro-combustor for a palm-top gas turbine has been developed. The liner volume of the combustor is 2 cm³ that is 4 to 5 order smaller than that of conventional gas turbine combustors. The basic structure is the same as conventional combustors, because the length scale of the combustor is two orders larger than the quenching distance of hydrogen, and gas-phase reaction is predominant. The 10mJ piezo-electric element was applied as an energy source of ignition spark, and stable ignition was achieved.

The ranges of ignition and stable combustion were wide enough to the practical operations. The combustion efficiency was almost 100% through the operation conditions. The liner and fuel nozzle of the combustor did not have a remarkable heat-mark after the combustion tests, so the combustor can apply to the practical use.

This work had been conducted under a construct with the NEDO (New Energy and Industrial Technology Development Organization).

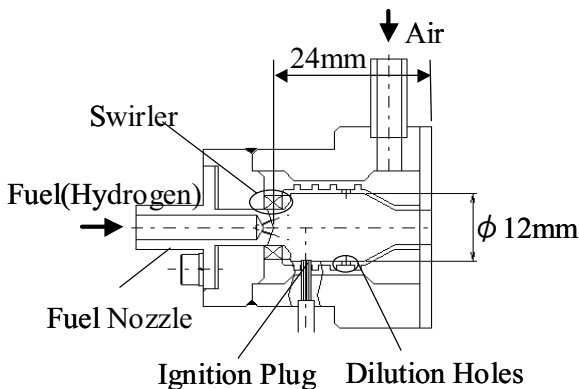


Fig. 1 A hydrogen fueled combustor

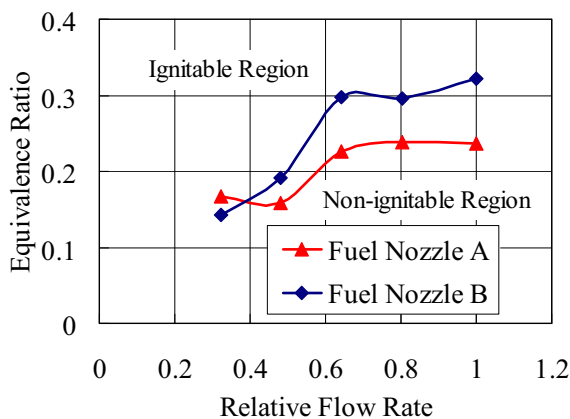


Fig. 2 Ignition region

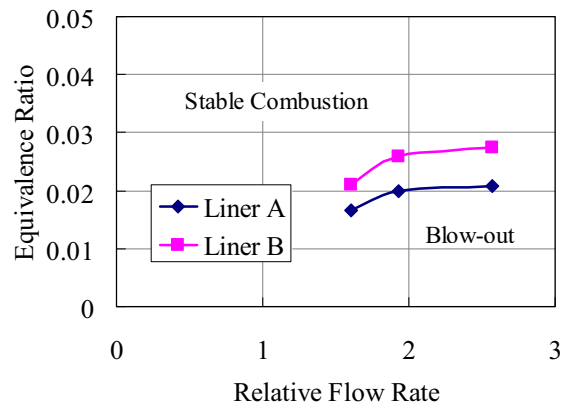


Fig. 3 Stable combustion region

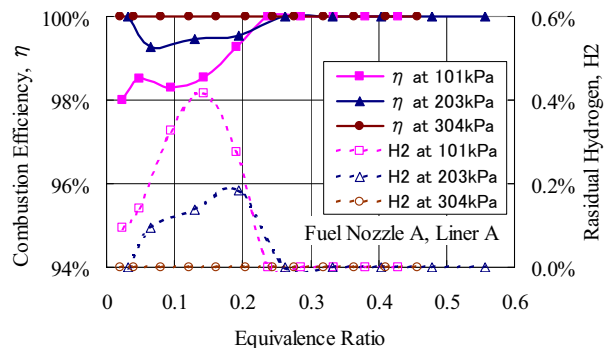


Fig.4 Combustion efficiency

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