NOx Emission Characteristics of High Temperature Air Combustion

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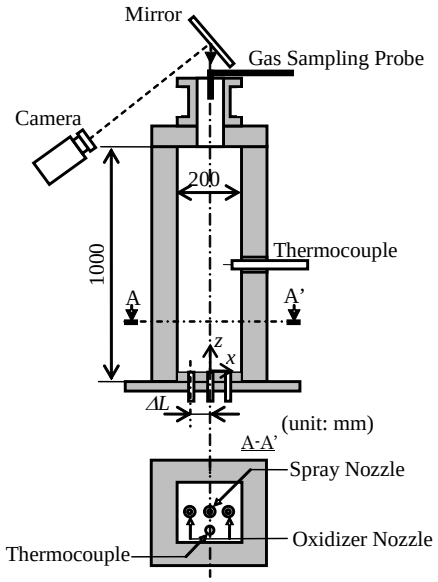

Fig. 1 HiTAC furnace.

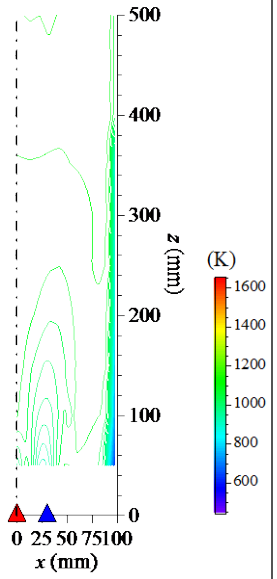

Fig. 2 Temperature distribution in HiTAC furnace.

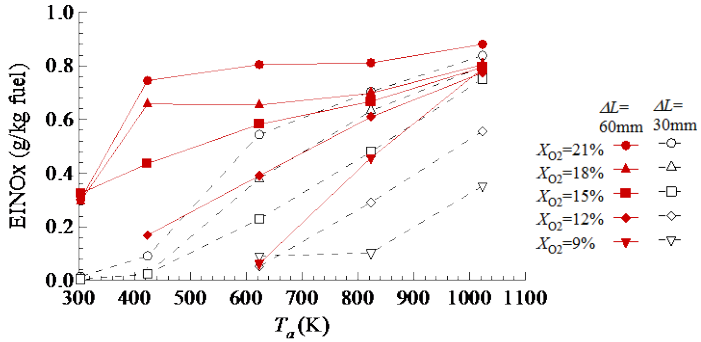

Fig. 3 Effects of properties of preheated oxidizer and nozzle distance on NOx emission.

Content:

To date, various combustion technologies based on dilution with burned gases have been developed to allow further reductions of NOx and soot emissions and to improve the thermal efficiency of furnace systems. These technologies are referred to as MILD combustion in Italy, flameless oxidation in Germany and high temperature air combustion (HiTAC) in Japan.

We focus on the flame stability and NOx emission characteristics of high temperature air combustion with liquid fuels. Figure 1 shows schematics of a HiTAC furnace used in our studies. The furnace has a parallel jet burner incorporating a central spray nozzle and oxidizer nozzles with electric heaters for preheating oxidizers. As shown in Fig. 2, in this furnace, a MILD combustion state with a uniform temperature distribution can be reproduced even in the laboratory-scale furnace. We investigate effects of nozzle distance between spray and oxidizer nozzles on NOx emission characteristics as shown in Fig. 3.

Keywords : combustion, NOx emission, flame stability

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