

Characteristics of Catalytic Combustion in Micro Heat Exchanger

이승재, 정남조, 유인수, 김희연, 강성규, 송광섭*
한국에너지기술연구원
(kssong@kier.re.kr*)

Micro heat exchangers were fabricated with $40 \times 40 \times 0.3$ mm³ of stainless steel plates, where microchannels (0.3–0.5 mm of width, 0.2 mm of depth, 20 mm of length) were formed by photolithography and chemical etching. The metal plates with microchannels were stacked and then brazed to seal up the gaps between the metal plates. For catalytic combustion of methane, one of two flow paths was washcoated with a mixture of 10 wt.% Pd/ γ -Al₂O₃ powder and alumina sol. First, temperature difference between inlet and outlet of the micro heat exchanger was examined varying air flowrate. For catalytic combustion of methane, inlet concentration of methane was controlled from 0.4 vol. % to 3.8 vol. % in air. Conversion of methane and outlet temperatures were measured with increasing temperature of the micro heat exchanger from 150 °C to 500 °C. Pre-heating effect of the reactants on conversion was investigated as well.