

Performance of a microchannel reactor combined with combustor for methanol steam reforming

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The microchannel reactor with combustor for methanol steam reforming was investigated for production of hydrogen onboard proton exchange membrane(PEM) fuel cell device. A commercial copper-containing catalyst($\text{Cu/ZnO/Al}_2\text{O}_3$) and Pt/ZrO_2 were used as catalyst for methanol steam reforming and combustion reaction, respectively. It was found that catalyst layer with zirconia-sol solution in microchannel showed no crack on catalyst surface layer and good adherence with substrate even after reaction. To obtain the appropriate design of heat exchanger structure, the temperature profiles were studied according to flow patterns of reforming and combustion reaction stream. The temperature of combustor was controlled in range of 200~300°C. At 270°C, the hydrogen of 3.1L/hr was obtained at the reforming feed flow rate of 2.0g/hr.