

Micro heat exchanger for gas phase reaction

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Each microstructured stainless steel foil was brazed in vacuum for stacking. Inner surface of micro channels was coated with Al₂O₃ layer to support Pt catalyst by sol-gel method. The stack was designed like a cross-flow type heat exchanger to perform the combination of exothermic and endothermic reactions simultaneously. As the first step in our study, we measured experimentally the heat transfer rate and the spatial temperature distribution of the stack. And we compared that with CFD results. Finally, the reaction of C₃H₈-air with heat transfer to cold air flow was performed in the stack. As a consequence, quantitative and qualitative thermal characteristics of the stack for reaction were investigated.