

Comparative study on CFD simulations with experiment for catalytic methane steam reforming
in high pressure environment

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The hydrogen station technologies need to be developed to promote the full-scale popularization of fuel cell vehicles. Up to the present time, the hydrogen production by steam reforming is the most practically advanced method, even in the actual state that pipeline network has been established and the steam reforming using relatively cheap natural gas is the most promising technology. And, the carrying out of high pressure natural gas steam reforming, if possible, could enhance price competitiveness to compress and store the produced hydrogen about 40MPa, then fill with 35MPa storage pressure. In this study, methane, a main component of natural gas, steam reforming was performed at pilot scale in atmospheric and high pressure using a commercial catalyst to examine the characteristics of methane steam reforming reaction and the experiments were compared with the simulation results of CFD based on previously reported kinetic model. Also methane conversion and the product composition were investigated in accordance with the experimental parameters and reactor internal reactor shape.