

## Operation Characteristics of Integrated Fuel Processor for Residential PEMFCs System

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The residential PEMFCs system has been widely developed over the past years and increasing the pace for commercialization in many countries. KIER has been developing natural gas fuel processor adopting steam reforming process as one of key components for realizing the residential PEMFCs system. Currently developed 1kW class fuel processor showed thermal efficiency of 78% as a HHV basis with methane conversion of 89%. The preferential oxidation unit with two staged cascade reactors reduces CO concentration below 10 ppm using Pt and Ru-based catalysts. After evaluating the initial performance of fuel processor, the partial load operation was carried out to test the performance and reliability of the fuel processor at various loads. The efficiency did not decreased below 74% until 50% load operation but decreased to 64% at 30% load operation, while maintaining the methane conversion of more than 85%. The durability of fuel processor was also demonstrated with successive five days operation, showing stable methane conversion of 89% and thermal efficiency of 78%. The two staged preferential oxidation unit maintained CO concentration below 10 ppm with additive air ratio of  $[O_2]/[CO]=1.5$ .