

PEMFC 적용을 위한 1kWe DME 연료처리기 설계 및 운전특성 평가

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DME is the acronym of dimethyl ether, which is attractive for future transport fuel. Therefore, we need to research fuel processor for DME to apply PEMFC APU system. In the research, we experimented DME fuel processing - Autothermal reforming(ATR), 2 steps of water gas shift(WGS), Preferential oxidation(PROx) - in micro reactor and produced 1kWe class DME fuel processor and operated to verify the micro reactor test. We obtained proper operating conditions as 700°C, SCR 1.5, OCR 0.45, GHSV 15000/h using CGO-Ru (3.0 w.t.%) catalyst. In CO removing process, we used commercial catalysts and obtained operating conditions were 420°C, 5000/h for HTS and 240°C, 3000/h for LTS, 75°C, GHSV 2000/h and O₂/CO=1 for PROx. Final conversion efficiency of micro reactor test was 75% and produce 250ml/min hydrogen. With this result, we produced 1kWe class DME fuel processor and operated. There was little condition changes, however it generated 15.3 l/min hydrogen with CO level below 10ppm. Conversion efficiency of 1kWe fuel processor was about 70%.