

Development of Compact NG Reformer for Residential PEMFCs

서동주, 윤왕래*, 정진혁¹, 서유탉, 박종수, 정 현, 이호태
한국에너지기술연구원 전환공정연구센터;
¹경북대학교 화학공학과
(wlyoon@kier.re.kr*)

To apply PEMFCs (polymer electrolyte membrane fuel cells) as a residential cogeneration system (1–5 kW) requires a fuel processor to convert fuel into hydrogen. A compact and efficient reformer is necessary for this type of distributed power generation system. An integrated reformer of 2 kW class was developed. In order to reduce the size and improve the efficiency of reforming system, heat exchangers and each catalytic reactor were integrated with a suitable configuration, namely, dual pipe heat exchanging geometry. The total volume of the reformer including thermal insulation was 58 liters.

The developed reformer system showed the highest efficiency of 73% as a HHV basis. The typical compositions of reformed gas from the exit of low temperature shift reactor were 73.6% H₂, 21.7% CO₂, 1.8% CO and 2.8% CH₄. Further improvement of the thermal efficiency and integration of a preferential oxidation reactor as a carbon monoxide remover are on-going.