MCFC 전략제품 개발

*황 정태

Development of new MCFC application products

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Since the commencement of the fuel cell business in 2007, POSCO POWER has been the major supplier of the MCFC (Molten Carbonate Fuel Cell), which is the most commercialized stationary fuel cell system in the world. With its quite, yet active movement, more than 20MW MCFC systems have been installed and are operating in Korea. While trying to localize the components and set up a firm supply chain in Korea to provide more reliable and cost-competitive products to its customers, POSCO POWER is also devoting itself to developing new MCFC application products. One such product is a back-up power system, in which a back-up algorithm is embedded to the present system so that the product can work as a back-up generator in case of grid failure. The technology to enhance load following capability of a stack module is also being developed with the back-up algorithm. Another example is a building application, the goal being to make the present Sub-MW product suitable for urban area. For this, downsizing and modularization are the main R&D scope. The project for developing ship service fuel cell for APU application will launch soon as well. In the project, a system which can operate in marine environment, and reforming technology for liquid logistic fuel will be developed.

Key words : MCFC(용융탄산염 연료전지), Fuel cell system(연료전지 시스템), load following(부하추종), back-up power system(무정전 시스템), building application(건물용 연료전지), ship service fuel cell(선박용 연료전지)

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세공충진 음이온 전도성막의 제조 및 이를 이용한 고체알칼리 연료전지 성능 평가

*최 영우, 이 미순, 박 구곤, 임 성대, 양 태현, **김 창수

Pore-filling anion conducting membranes and their cell performance for a solid alkaline fuel cell

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AEM which were used for solid alkaline fuel cell(SAFC) were prepared by photo polymerization in method pore-filling with various quaternary ammonium cationic monomers and crosslinkers without an amination process. Their specific thermal and chemical properties were characterized through various analyses and the physico-chemical properties of the prepared electrolyte membranes such as swelling behavior, ion exchange capacity and ionic conductivity were also investigated in correlation with the electrolyte composition. The polymer electrolyte membranes prepared in this study have a very wide hydroxyl ion conductivity range of 0.01 – 0.45S/cm depending on the composition ratio of the electrolyte monomer and crosslinking agent used for polymerization. However, the hydroxyl ion conductivity of the membranes was relatively higher at the whole cases than those of commercial products such as A201 membrane of Tokuyama. These pore-filling membranes have also excellent properties such as smaller dimensional affects when swollen in solvents, higher mechanical strength, lowest electrolyte crossover through the membranes, and easier preparation process compared of traditional cast membranes. The prepared membranes were then applied to solid alkaline fuel cell and it was found comparable fuel cell performance to A201 membrane of Tokuyama.

Key words : Anion exchange membrane(음이온교환막), Solid alkaline fuel cell(고체알칼리 연료전지), pore-filling membrane(세공충진막)

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