

## 고분자 전해질 연료전지 가스켓 설계 및 성능 평가

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### Development and Evaluation of Gasket for Polymer Electrolyte Membrane Fuel Cell Stacks

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The design and fabrication of a metallic bipolar plate-gasket assembly for polymer electrolyte fuel cells (PEMFCs) is defined. This bipolar plate-gasket assembly was prepared by inserting a previously prepared bipolar plate in the specially designed gasket mold. For this aim, a proprietary fluoro-silicone based rubber was injected directly into the bipolar plate borders. Gaskets obtained like this showed the chemically / physically stable and the good sealability in typically operating PEM fuel cell conditions. And also, this bipolar plate-gasket assembly shows lots of advantages with respect to traditional PEMFCs stack assembling systems: useful application to automotive stacking due to easy handling, reduced fabrication time, possibility of quality control and failed elements substitution. This bipolar plate-gasket assembly was evaluated in the short fuel cell stack and met the leakage requirement for normal operation both in short-term and in long-term operation. Especially, it was confirmed that this gasket could be applied successfully even in the high pressure PEM fuel cell systems(over 2.0 bar in absolute pressure).

**Key words** : Polymer Electrolyte Membrane Fuel Cell(고분자전해질연료전지), Gasket(가스켓), 분리판(Bipolar plate)

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## Noble Metal이 코팅된 금속분리판 개발 및 성능 평가

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### Development and Evaluation of Bipolar Plates Coated with Noble Metals for Polymer Electrolyte Membrane Fuel Cells

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The coated metallic bipolar plates are getting attractive due to their good feasibility of mass production, low contact resistance, high electrical/thermal conductivity, low gas permeability and good mechanical strength comparing with graphite materials. Yet, metallic bipolar plates for polymer electrolyte membrane(PEM) fuel cells typically require coatings for corrosion protection. Other requirements for the corrosion protective coatings include low electrical contact resistance between metallic bipolar plate and gas diffusion layer, good mechanical robustness, low mechanical and fabrication cost. The authors have evaluated a number of protective coatings deposited on stainless steel substrate by electroplating. The coated metallic bipolar plates are investigated with an electrochemical polarization tests, salt dipping tests, adhesion tests for corrosion resistance and then the contact resistance was measured. The results showed that the selective samples electroplated with optimized method, satisfied the DOE target for corrosion resistance and contact resistance, and also were very stabilized in the typical fuel cell environments in the long-term.

**Key words** : Polymer Electrolyte Membrane Fuel Cell(고분자전해질연료전지), Noble Metal(귀금속), 분리판(Bipolar plate)

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