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Fabrication and evaluation of the PEM for the fuel cell by irradiation graft polymerization using electron beam accelerator

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Our laboratory has been studying about polymer electrolyte membrane (PEM) for polymer electrolyte fuel cell (PEFC) by irradiation graft polymerization using electron beam accelerator. Irradiation graft polymerization can reduce the production cost of the PEM compared with the current product, perfluoro-sulfonic acid (PFSA) ionomer such as Nafion® by DuPont. We have two methods to fabricate high-performance PEMs using the accelerator. One is to give the micro-structure of hydrophilic and hydrophobic region to the PEM. The other is to generate the concentration gradient of hydrophilic region inside of the PEM. Both methods were able to generate high power density as much as Nafion® . In previous study, we used ion beam to give these characteristics. Ion beam has highly straightness and easy to create micro-structure and the concentration gradient of hydrophilic region inside of the PEM. But, its production equipment costs too much. Therefore, in this study, we use electron beam that production equipment costs less than ion beam and fabricate the PEM which has above both methods for advanced application of the electron beam accelerator.

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Footnotes

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