

고체 알칼리 연료전지 모델링

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Numerical Modeling of Solid Alkaline Fuel Cell

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We present here an isothermal, one-dimensional, steady-state model for a solid alkaline fuel cell (SAFC) with an anion exchange membrane. The conducting ions now move from the cathode to the anode in SAFC. The water is produced at the anode and is also a stoichiometric reactant at the cathode as well as hydrogen and oxygen. In the present model, a net-water-per-proton flux ratio can be predicted and the water transport in the SAFC is explained for various operating conditions.

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Key words : Solid Alkaline Fuel Cell(고체 알칼리 연료전지), Anion exchange membrane(음이온교환막), Modeling(모델링), Water transport(물 이동), Maxwell-Stefan model(맥스웰-스테판 모델)

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Performance Evaluation of a Plate-Type Membrane Humidifier for PEMFC

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For optimal performance of a proton exchange membrane fuel cell (PEMFC), the membrane electrode assembly (MEA) requires hydration, and the membrane's conductivity depends on water content. A humidifier is required to ensure that the reactant gas, usually hydrogen and air, is hydrated before entering the fuel cell. Dry membrane operation or improper hydration causes performance degradation.

Typically, the humidification of a fuel cell is carried out by means of an internal or external humidifier. A membrane humidifier is applied to the external humidification of transportation or residential power generation fuel cell due to its convenience and high performance. In this study, The experiments were constructed with a plate-type membrane humidifier in terms of geometric parameters and operating parameters.

The results show that the temperature and pressure, the channel length, the membrane thickness and gas flow rate are critical parameters affecting the performance of the humidifier.

Key words : PEMFC, Humidifier, Membrane, 이온교환막, 연료전지, 막가습기, 가습

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