

용융탄산염 연료전지에서 지지체를 사용한 얇은 연료극의 제작과 각기 다른 온도에서의 영향.

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Fabrication and effect of different temperatures on the supported thin Anode for molten carbonate fuel cell.

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Recently, Molten carbonate fuel cells(MCFCs) have been developing to get a good durability and economic feasibility for commercialization. To achieve these objectives, the cost of nickel based electrodes should be reduced. Regular anode thickness used in MCFCs is normally 0.7mm. Thus, in our study, the purpose was to reduce anode thickness up to 0.3 mm keeping MCFC performance on standard levels. In-situ sintering has been used, with 2 different fabrication methods (method A and B) and 2 different supports (support 1 and 2). Voltage losses at different temperature (600,620,640,650°C) and after 1000 hours showed the higher performance that can be obtained using method B and support 2. After single cell test, an open-circuit voltage(OCV) of 1.075 V and a closed-circuit voltage(CCV) of 0.829V were obtained, at current density of 150mV/cm². Also the voltage loss ratio at different cell temperature was lower in the case of method B and support 2. According to these results, the cost of anode fabrication can be reduced in the future, contributing for the economical feasibility of MCFCs.

Key words : Molten Carbonate Fuel Cell(용융탄산염 연료전지), Anode(연료극), thin Anode(얇은 연료극), Support (주요용어), Temperature(온도)

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저온 PEMFC용 금속분리판 코팅의 내구 특성 연구

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Coating Durability of Metal Bipolar plate for Low Temperature PEMFC

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The development of bipolar plate having high efficiency and chemical properties has a major impact on fuel cell applications commercialization. Even though graphite bipolar plate has high electric conductivity and chemical resistance, it has demerits about mass production and brittle property for commercialization. Hence, metallic bipolar plate can be substitute for fuel cell bipolar plate. Although its inadequate corrosion behavior under PEMFC environment lead to a deterioration of membrane by dissolved metal ions, metallic bipolar plate for PEMFC is more suitable for automotive and residential power generation system because of its high mechanical strength, low gas permeability and applicability to mass production. Therefore, several types of coating has been applied to prevent corrosion and oxide film growth and to achieve more high durability.

This work presents durability of coated metal bipolar plate for low temperature PEMFC which made for fuel cell vehicle. This results showed surface treatment increase long-term durability, even electric conductivity and corrosion resistance.

Key words : Metal Bipolar plate(금속분리판), Durability(내구성), Coating(코팅), PEMFC

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