Management of the Air-Flow and Electrolyte of the Zn-Air Fuel Cell

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ABSTRACT

The objective of this thesis is to examine numerically the effects of inlet gas velocity on the reactant oxygen transports and cell performance of zn-air fuel cell. To the end, a CFDRC software with the numerically scheme of the method of finite volume is used. Additionally, the model of zn-air fuel cell is preliminarily assumed to be three dimensional. In the section of results and discussion, the effects of inlet oxygen velocity and electrolyte velocity on the local current density, reactant oxygen、water transports and operation voltage, are well examined. These local results are useful for the design of the zn-air fuel cell and can effectively improve the cell performance. The predicted results show when the oxygen velocity effect is taken into in the modeling, the effect of air velocity and electrolyte velocity can be neglected for the operation condition of voltage being large than 1V, but low operation condition of voltage being small than 1V, the effect of air velocity and electrolyte velocity cannot be neglected. Because the predicted results show, air velocity announced the 1m/s and 2m/s approach of cell performance. Therefore, for the inlet velocity effect, it is cleanly seen that the better cell performance is not high inlet velocity for a system. Additionally, the predicted results show, high electrolyte velocity results low cell performance in the operation condition of voltage being small than 1V. The last predicted results show, for the operation voltage to effect cell performance. The high operation voltage was need high oxygen.

Keywords : zn-air fuel cell, oxygen transports, water transports ; design ; system

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