Performance Evaluation of a Plate-Type Membrane Humidifier for PEMFC under Dead-end Operation

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In dead-end mode, PEMFC can achieve not only high fuel efficiency through minimizing fuel consumption, but the system also can be simplified because gas supply system is not required. 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.