

عنوان مقاله:

Experimental Study of Oxidant Effect on Lifetime of PEM Fuel Cell

محل انتشار:

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خلاصه مقاله:

In recent decades, fuel cells have been widely used in energy generation. In a PEMFC, considering the specific application, two types of oxidants are used. Durability tests, which are highly costly products, are of crucial importance in evaluating the lifetime of fuel cells. The purpose of the present paper is to investigate the performance of a fuel cell by changing the type of oxidant from air to pure oxygen. Because of the presence of impurities in the air oxidant, a cell with air oxidant is more sensitive to operating conditions than one with pure oxygen. In this experiment, a single fuel cell was assembled and used for testing. The lifetime test was carried out in constant current, and the voltage decay rate was reported. Effects of various parameters, like air stoichiometry, Dew point Temperature, and Pressure, have been investigated. Increasing the stoichiometry of the oxidant to 3 greatly increased the voltage of the fuel cell, but no significant increase in the fuel cell voltage was observed in stoichiometries above this value. A comparison of inlet gas temperatures demonstrated that the fuel cell had the best performance at 75 °C, but due to the fluctuation of the output voltage at this temperature, the temperature was decreased to 65 °C. Finally, upon performing durability test with pure oxygen for 9 hours and comparing the results with those of air oxidant, the possibility of using a fuel cell with two different oxidants has been confirmed.

کلمات کلیدی:

Long-term test, Oxidant Type, PEM fuel cell, Stoichiometry, Voltage Decay

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