Experimental Study of the Operating Temperature Effect on the Performance of PEM Fuel Cell

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Abstract

The fuel cell is one of the most important renewable energy sources and increased attention in recent years to replace conventional energy sources, particularly internal combustion engines. The performance of fuel cells depends on a number of physical and chemical parameters .This paper included an experimental study of the operating temperature effect on the performance of the fuel cell type (PEM) when the fuel cell work at variable flow rate of hydrogen and under variable electrical loads.The experimental tests were conducted using fuel cell stack with capacity of 100 watts at three operating temperatures (50, 58,65)ºC , and the flow rate of hydrogen (0- 1100) ml / min. The results showed that the fuel cell efficiency decreases with increasing operating temperature due to the activation loss increasing, in addition to the increase of ohmic losses while the effect of operating temperature on the concentration polarization loss were limited