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Abstract
This research used home-made membrane electrode assemblies (MEAs), by varying different operating parameters in the experiments, to explore their effects on the performance of direct methanol fuel cell (DMFC) for reference to the optimal operating requirements. To understand the effects of each parameter on the cell performance, investigated parameters were divided into external and internal groups. The external parameters include methanol temperature, cell temperature, concentration of methanol, methanol feeding rate, back pressure of cathode outlet and charge humidity. The internal parameter was the thickness of proton exchange membrane. Taguchi Method was employed to study the experiments results, by analyzing the larger the better characteristic of peak power to approach the maximized output responses, therefore, to gain the optimal combination of parameter values. The results showed that effects on peak power by each parameter, according to the weight, are: 45.61% of the thickness of proton exchange membrane, which was the most. 37.15% of methanol temperature was the second, and the third was 10.24% of the cell temperature, these three parameters affect the performance of DMFC mostly.
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