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Abstract
The objective of this study is to investigate the relationship between the press pressure and performance of PEM fuel cells. The press pressure was taken as a parameter under the condition of 140℃ working temperature and 100 seconds press time. Proton Exchange Membrane Nafion 112, 115 and 117 were used for different MEAs (membrane electrode assemblies). A single cell was then assembled and tightened by 40 1b-in torque to analyze the effects of different press pressure.
According to the experiments, the results show that the performance of MEA is strong influenced by the press pressure during the making process of MEA. A lower press pressure will cause MEA pealed off and low performance, a higher press pressure can avoid the separation phenomenon and improve the performance remarkably; however, the performance declined after exceeding certain press pressure.
In addition to understand the influence of humidity on the output power of fuel cells, by using one of the home-made MEAs with the best performance, a single cell was tested with different humidity of oxygen and hydrogen. The results proved the power increased noticeably with higher humidity of oxygen and hydrogen until certain limit (90%), after that the accumulated water produced from the porous cathode will cause flooding and result to higher resistance to mass transport, and lower performance relatively. Therefore, the water management is very important for power improving of PEM fuel cells.
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