

Effect of MPL on Temperature Distribution in Single PEFC with Various Thicknesses of PEM and GDL Operated at Higher Temperature

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Abstract. The aim of this study is to analyse the effect of MPL on not only heat and mass transfer characteristics, but also power generation performance with various thicknesses of PEM and GDL at 90 °C which is the target temperature for stationary system of polymer electrolyte fuel cell (PEFC) by 2025 in Japan. The in-plane temperature distributions on anode and cathode separator back have been measured by thermograph under different power generation conditions. The voltage and local current have been measured to evaluate the performance of PEFC. As a result, it is clarified that the power generation performance is enhanced by micro porous layer (MPL) irrespective of initial temperature of cell and relative humidity condition. However, the improvement is not obvious when the thin PEM is used. In addition, the in-plane temperature distribution with MPL becomes narrower compared to that without MPL. It has confirmed that the addition of MPL is effective for the improvement of power generation performance of single PEFC operated at higher temperature than normal. However, the in-plane temperature distribution with MPL is not even.