

The effect of the size of pore-forming additives on polymer electrolyte membrane fuel cell

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The influence of pore-size distribution of the diffusion layer on mass-transport problems of proton exchange membrane fuel cells (PEMFCs) is investigated using electrodes with hydrophobic diffusion layers for which the pore-size distribution is designed by pore-forming additive. It is confirmed that the pore-size distribution of the diffusion layer is a more critical parameter for mass-transport processes within the electrode and for cell performance characteristics than the total porosity itself. This study focused on the differences of the performance according to the size of pore-forming additives. Pore-forming additives for PEMFCs are used to minimize the effect of polarization which causes the decrease of cell performance. Single-cell performance tests and ac impedance analyses indicate that the performance loss due to mass-transport limitations can be reduced by enlarging the macropore volume in the diffusion layer. Catalyst layer was prepared onto the gas diffusion layer using spraying method.