

Investigation of Water Transport Dynamics in Polymer Electrolyte Membrane Fuel Cells Based on a Gas Diffusion Media Layers

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Abstract : In this investigation, synchrotron X-ray imaging is used to study water transport inside polymer electrolyte membrane fuel cells. Two measurement techniques are used, namely in-situ radiography and quasi-in-situ tomography combining together in order to reveal the relationship between the structures of the microporous layers (MPLs) and the gas diffusion layers (GDLs), the operation temperature and the water flow. The developed cell is equipped with a thick GDL and a high back pressure MPL. It is found that these modifications strongly influence the overall water transport in the whole adjacent GDM.

Keywords : polymer electrolyte membrane fuel cell, microporous layer, water transport, radiography, tomography

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