Influence of PTFE on water transport in gas diffusion layer of polymer electrolyte membrane fuel cell

Yanan Chen¹, Tian Tian¹, Zhaohui Wan^{1,2}, Fan Wu¹, Jinting Tan^{1,*}, Mu Pan^{1,*}

¹ Hubei Key Laboratory of Fuel Cells, State Key Laboratory of Advanced Technology for Materials Synthesis and Processing, 430070, Wuhan China;

² Wuhan WUT New Energy Co., Ltd, 430223, Wuhan China

*E-mail: tanjinting@whut.edu.cn, panmu@whut.edu.cn

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Hydrophobic coatings (PTFE) have been introduced in gas diffusion layers to improve the performance of fuel cells. Eight different cell configurations with various PTFE loading in cathode and anode GDLs were assembled. The oxygen transport ability and the water behavior are investigated based on the limiting current theory. The results demonstrate that fuel cell with a PTFE loading in GDL of 10 wt. % has the best performance of $1.003 \text{ W}\cdot\text{cm}^{-2}$ under $1686.6 \text{ mA}\cdot\text{cm}^{-2}$. The high operating temperature ($\geq 60 \text{ }^{\circ}\text{C}$) will be properly applied to characterize the oxygen transport through limiting current method. Moreover, the content of PTFE in GDL used in anode will affect the water behaviors of cathode CLs which will determine the R_{NP} in corresponding cathode, especially low Pt loading.

Keywords: PEMFC, PTFE, GDL, limiting current, oxygen transport, water behavior

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