

A study on the effect of crack on water management of PEFC in low and high humidity conditions

박영제^{1,2}, 최원영¹, 최형욱¹, 최서원¹, 이명화¹, 윤영기¹, 엄석기², 정치영^{1,†}

¹한국에너지기술연구원; ²한양대학교

(cyjung@kier.re.kr[†])

GDL processes as a heat and mass transfer path between the catalyst layer and the flow channel. Water molecules generated by the ORR affect mass transfer resistance. For water management, that is performed using the morphology of the pores in the MPL. Crack is one of the critical element of water management in hydrogen fuel cells, as the mass flow to the larger side first, such as crack, when they reach the MPL surface because when water molecules reach the surface of the MPL, the pores flow first to the larger side, such as crack, by the pressure gradient. So three-dimensional structural analysis is indispensable to identify the effect of such cracks on structures within GDL. Using an X-ray microscope, GDL of 150um or more was divided into MPL and backing layer, and the effect of crack on the entire MPL and GDL was classified. As a result, MPL crack had a 3% and 7% ratio to the pore of the total GDL. As a result, the tortuosity is decreased. Through this, the correlation between water management and MTR was determined through structure of crack.