

Effect of the physical damages of MEA on the electrochemical properties and performance of PEFCs

임수진^{1,2}, 박구곤^{1,*}, 박진수¹, 윤영기¹, 박석희¹, 이원용¹,
이영무², 김창수¹
¹한국에너지기술연구원; ²한양대학교
(gugon@kier.re.kr*)

The efficiency and lifetime of the polymer electrolyte fuel cell (PEFC) closely relate with the polymer electrolyte membrane. The durability and safety should be guaranteed for the commercialization of fuel cells. In this work, the effects of physical damages which can be caused in the process of membrane electrode assembly (MEA) fabrication, cell clamping and cell operation were investigated. To simulate the real PEFC conditions, the various sizes of cracks and holes were intentionally formed at the MEAs. The various sizes of holes were punched at the gas input, middle and output parts of MEAs. The I-V performance was evaluated for the prepared MEA samples along with cyclic voltammetry. The result of I-V performances and hydrogen-crossover rate could be directly correlated. The results show that, without precise electrochemical analysis apparatus, it's difficult to aware any signs of physical breakage in the MEAs by checking just voltage changes before the physical destroy getting severe.