

Effect of on/off cycle on physical degradation of MEA in PEM fuel cell

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The durability of PEMFCs is one of the most important factors for application especially in automotive vehicles with repeated start-up and shut-down system. The understanding of degradation issues such as reasons, mechanisms and influence of working condition is essential to improve the performance and lifetime of PEMFCs. The impacts of accelerated physical degradation test by on/off cycles with ultra pure nitrogen gas on the membrane electrode assembly (MEA) were assessed in single cell configuration. After on/off cycle operation, the characteristics of the MEAs were examined by X-ray diffraction (XRD), scanning electron microscopy (SEM) and transmission electron microscopy (TEM). The degradation of cell performance was observed due to increase the charge transfer resistance after 100,000 on/off cycles.