

Investigation of Degradation Mechanism of Direct Methanol Fuel Cell using TOF-SIMS and XPS

정영수¹, 박찬호², 박경수¹, 전우성¹, 김지래², 이운희², 장 혁², 송도영²

¹삼성종합기술원 AE center, ²삼성종합기술원 Energy and Materials Research Laboratory

We investigated the compositional changes in the catalyst layers of the direct methanol fuel cell (DMFC) with a performance degradation using x-ray photoelectron spectroscopy (XPS) and time-of-flight secondary ion mass spectroscopy (TOF-SIMS). The metallic property of anode catalyst layer was decreased with the performance drop. It has been found that ruthenium and platinum were driven to the cathode surface i.e. the interface with gas diffusion layer (GDL) by the gradient of electric field during the durability test. The crossover ruthenium was not uniformly distributed in depth within the cathode catalyst layer but more enriched at the surface of cathode catalyst layer. There seems to be a close correlation between the degree of oxidation of crossover ruthenium and performance drop.