

Study of polyelectrolyte-membrane performance for direct methanol fuel cell with various thickness

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Direct methanol fuel cell (DMFC) is in the limelight because of usage of renewable liquid fuel, high efficiency and low environmental cost. However, phenomenon of methanol penetration through polyelectrolyte membrane, methanol crossover, significantly damage to electrodes and reduce the power density and cell efficiency. In this study, we successfully prepared polyelectrolyte membranes having various thickness to suppress methanol crossover and also maintain proton conductivity and ion exchange capacity compared to mono-layer Nafion 117 (180 μ m). FE-SEM, Raman spectroscopy, small angle X-ray scattering, proton conductivity, methanol crossover were confirmed to characterize the prepared polyelectrolyte membrane. We demonstrated that results of study show the possibility of improving cell performance of direct methanol fuel cell.