

Effective Inorganic Fillers of Organic/Inorganic Nanocomposite membranes for Direct Methanol Fuel Cell

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Direct methanol fuel cell (DMFC) is expected to find the major application in powering portable devices replacing batteries in the near future because of their simple system design and the ease of handling storable liquid methanol. Yet they have major technical drawbacks, i.e. slow oxidation kinetics of methanol and high methanol crossover rates from the anode to the cathode. In particular, the high methanol crossover rate has been one of the main issues impeding wide application of DMFC. The nanocomposite membranes were casted together Nafion with a surface functionalized montmorillonites (MMTs) by ionic liquid as the inorganic fillers. By introducing Functionalized MMT to the membrane, the methanol permeability of that membrane decreased but the proton conductivity of the composite membrane was lowered only slightly from that of pristine Nafion 115. Combination of these effects led to an improvement in the performance of DMFC.