Property of SPEEK/ORMOSIL composite with organic silanes

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DMFC, an energy conversion system generating electricity, uses directly methanol as fuel instead of hydrogen without reforming. DMFC has many attractive merits such as high energy density, low temperature operation, stability and portability. However, it shows low performance that results from the anode methanol crossover and inefficient methanol oxidation. For the advanced performance many researches have been carried on and significant studies have focused on the improvement of electrolyte, proton conducting membrane. Representative ion exchange membrane as electrolyte is perflorinated Nafion having excellent ion conductivity, chemical and mechanical stability. Despite its prominent properties it has a tendency to uptake water and exhibits high methanol permeability. In the stydy to overcome methanol crossover membranes are prepared by casting solution of sulfonated poly(ether ether ketone) and solvent. Then the membranes are treated with premixed mixtures, TEOS and various organic silane groups such as vinyltriethoxisilane(TEVS), diethoxydimethylsilane(DEDMS) and diethoxydiphenylsilane(DEDPS). For each membrane methanol permeability, ion conductivity and ion exchange capacity are measured.