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Nafion-polysulfone Composite Membrane for Direct Methanol Fuel Cell

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The present work relates to a composite membrane having low methanol permeability, which is prepared by solution blending of Nafion and methanol barrier material, sulfonated aryl polymer. A process for preparing the composite membrane that comprises the steps of: obtaining sulfonated poly(arylene ether sulfone) in a solution form, and adding Nafion having high proton conductivity. The composite membrane has phase-separated morphology. In the case of composite membrane using the non-sulfonated polymer, co-continuous morphology in the whole layer was formed. While two-layer structure was formed in composite membrane using the sulfonated polymer. This composite membrane has a lower methanol crossover than that of Nafion membrane. The morphology and property of composite membrane can be regulated by varying the blend composition, the degree of sulfonation or other conditions.