

Synthesis of the Sulfonated Carbon Material and its Application for Proton Exchange Membranes

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Nafion membranes are most commonly used as proton exchange membranes in direct methanol fuel cell because they are excellent proton conductors and good electronic insulators, but they are very expensive and require water for a high proton conductivity.

It was reported that sulfonated amorphous carbon is very useful as a proton exchange membrane because it excels in proton conductivity and thermal stability and can be produced at low cost. Some groups proposed an application in PEMFC as composite proton exchange membrane.

In our study, we have prepared sulfonated carbon materials and characterized by using XRD, IEC, BET and SEM. Sulfonated carbon materials are prepared by heating resorcinol-formaldehyde polymer as carbon source and then treated concentrated sulfuric acid. They consist of small polycyclic aromatic carbon sheets with attached sulfonic acid group. We prepared various sulfonated carbon contented composite membranes. The membranes are measured the methanol permeability and proton conductivity for its application to direct methanol fuel cells.