

Physical Properties of Sulfonated Diels-Alder Polyphenylenes for PEM Fuel Cells.

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Perfluorinated ionomers (i.e. Nafion) demonstrate both high performance and stability under fuel cell conditions. Although these membranes are considered “industry standards”, there still exist needs for improvements.

- better hydration at temperatures above 80 °C
- lower fuel permeation in DMFCs,
- lower costs

These issues have spurred the search for a cheaper and efficient alternative.^{1,2,3}

Recent studies in our labs of Diels Alder polyphenylenes for fuel cell applications have displayed promising results. Until now DA polyphenylenes have not been applied towards polyelectrolyte usage, even though this class of polymer exhibits promising physical properties such as, easily tunable backbone/lateral groups and the potential of incorporating three acidic functional groups per repeat unit compared to one in most poly(arylene) systems.⁴⁻⁶ We report here the physical properties and methanol fuel cell performance of sulfonated Diels Alder polyphenylene (SDAPP).

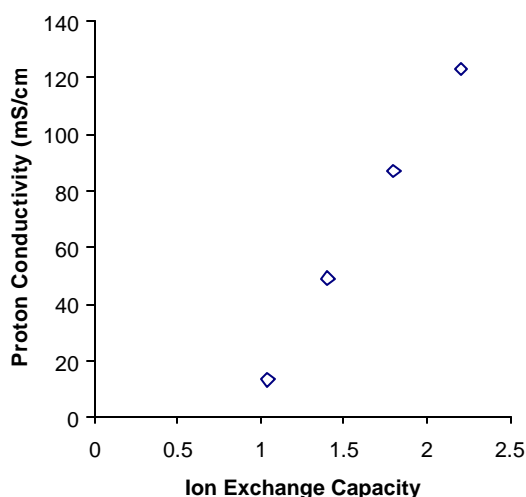


Figure 1. Proton Conductivity vs. Ion Exchange Capacity for the SDAPP.

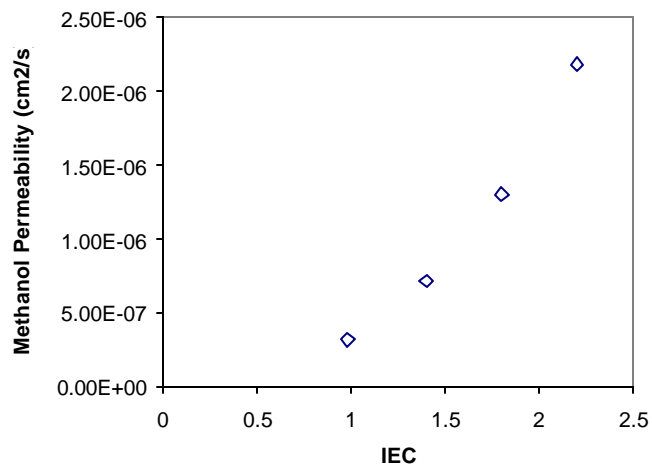


Figure 2. Methanol Permeability vs. ion exchange Capacity for the SDAPP.

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