

Ionomers for Oxygen Reduction in Alkaline Direct Methanol Fuel Cells

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Direct methanol anionic fuel cells are of interest because they have the potential to overcome platinum usage issues with acid cells. The formation of a three dimension electrode structure onto the membrane is of critical importance. The three phase boundary in the electrode is constructed from a supported catalyst, ionomer, and solvent cast onto a carbon-based gas diffusion layer. The degree of catalyst utilization is dependent upon the properties and quantity of ionomer used in the catalyst ink.

In this study, the properties of the ionomer used to make the oxygen reduction cathode were studied. The solubility of oxygen within the ionomer was studied by modifying the polymer backbone with pendent groups with higher oxygen solubility. The fixed cation was changed and the performance of the electrode was evaluated. The degree of catalyst utilization was correlated with the conductivity, water uptake, and other properties of the ionomer.

References

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