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**TITLE:** Development and Characterization of Oxalic Acid based Membrane for PEMFC's

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Polymer electrolyte membrane fuel cell is considered to be the most promising clean and efficient alternative power source. It is able to produce high power density at low temperatures. Current polymer electrolyte membranes have good conductivity at low temperatures; however it must be fully hydrated in order to generate good proton conduction. Polymer/salt-type complexes are able to have good proton conduction without the need for hydration. The ionic motion in these complexes is as a result of continuous motion occurring in the amorphous region of the polymeric material.

In this study polymer-salt complex membranes were synthesized and characterized for their application as separators for polymer electrolyte membrane fuel cell. The study is focused at investigating the ionic conductivity and the morphological properties of the dicarboxylic acid (Oxalic acid) and an aromatic polymer (polystyrene). The membrane films were prepared by solution casting. The ionic conductivity was investigated as a function of polymer/ salt variation and temperature. The conductivity mechanism was determined by using impedance spectroscopy in regions between 1mHz to 100 Hz. The morphological properties were investigated using Scanning Electron Microscopy.