

## **INORGANIC PROTON EXCHANGE MEMBRANE ELECTRODE/ SUPPORT DEVELOPMENT,<sup>†</sup>**

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Nanoporous inorganic membranes are being developed as proton exchange membranes for fuel cells. These new membranes will operate at temperatures  $>100^{\circ}\text{C}$ , will retain water at these elevated temperatures, and will provide high proton conductivities.

The goal of this project is to develop electrically conducting metallic electrodes/ supports and catalytically active ceramic sandwich layers for use in ceramic electrolyte PEM membranes.

The initial electrode/support is based on a tape cast, sintered porous nickel foil. The sintered nickel foil has a porosity of about 55 vol % and an average pore size of about 1-2  $\mu\text{m}$ . A sandwich layer of submicron and nanosized titania particles having a similar porosity and a pore size of about 0.1  $\mu\text{m}$  is deposited on the Ni foil. The sandwich layer is platinized using chlorplatinic acid. The micro-structure is being characterized including pore size and distribution, particle bonding, and Pt particle size, surface area, and surface finish.

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