



## Acidic Ion Exchange Membrane

Greg J. Schlichting and Andrew M. Herring

**Summary:** An acidic ion exchange membrane with very high proton conductivity

**Description:** Polymeric ion exchange membranes are an important component in a variety of electrochemical devices. Ionic transport through the membrane at high temperatures and/or low relative humidity is generally the rate-limiting component for most electrochemical devices. This invention is of an ion exchange membrane that is composed of a copolymer of vinyl phosphonic acid (VPA) and vinyl zirconium phosphorous (VZP) acid. Characterization of the membrane has been accomplished using a variety of methods including FTIR, CP, MAS, NMR, and AFM. These methods show an amorphous membrane, with fairly uniform dispersion throughout the membrane, with very high proton conductivity. The polymerization methodology allows for rapid production of the membrane and the VZP monomer. Ionic transport through the membrane is high, on the order of 0.1 S/cm, which has the potential to improve the commercial viability of fuel cells and new batteries.

### Main Advantages of this Invention

- Uniformity
- High ionic transport
- Simple to manufacture

### Potential Areas of Application

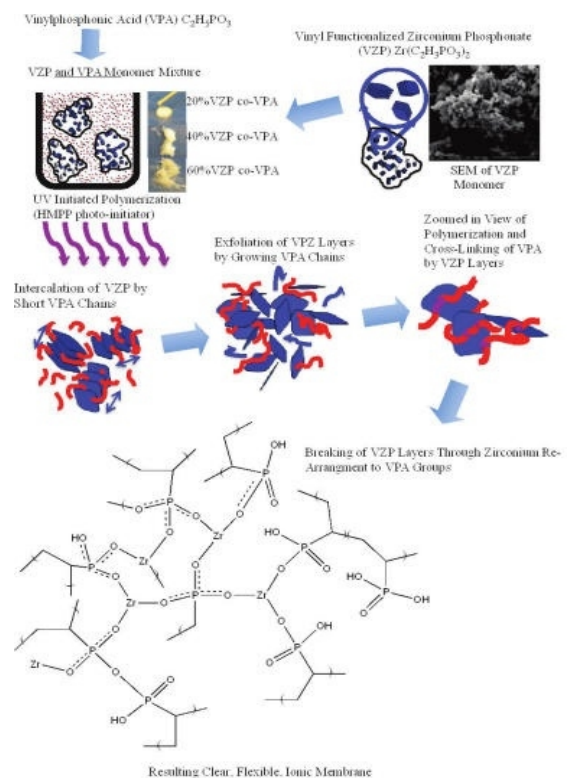
- Batteries
- Water filtration
- Hydrogen production
- Fuel Cells

**ID number:** 10012

**Intellectual Property Status:** US 8,906,270

**Publications:** Schlichting *et al.*, *Macromolecules*, 2012, 45, 3874-3883. (Available upon request.)

**Opportunity:** We are seeking an exclusive or non-exclusive licensee for marketing, manufacturing, and sale of this technology.



### For more information contact:

William Vaughan, Director of Technology Transfer  
Colorado School of Mines, 1500 Illinois Street, Guggenheim Hall Suite 314, Golden, CO 80401  
Phone: 303-384-2555; e-mail: wvaughan@mines.edu