Chemical Storage of Methanol or Ethanol in Polymers

UA ID Technology #ua17-194

**Title:** Chemical Storage of Methanol or Ethanol in Polymers

**Invention:** This technology allows methanol or ethanol for fuel cells to be chemically stored as part of solid polymers of polymeric gels without evaporation. Additionally, it permits controlled delivery of the alcohols to fuel cells with acid catalyzed hydrolysis.

**Background:** Direct methanol fuel cells (DMFC) are attractive as high-energy power supplies for portable electronics and are increasingly attractive for distributed power production due to the sustainability of bio-based, liquid fuel like methanol. However, the methanol in DMFCs must be diluted with water to less than 3 weight percent before introduction into the fuel cell because higher concentrations will dissolve the polymer electrolyte membrane, separating the electrodes in the cell and causing complete device failure. Pre-dilution of the fuel to 3% with water means that 97% dead weight must be carried, reducing the effective energy density of the fuel by more than 33-fold.

**Applications:**

- Power supply for portable electronics

**Advantages:**

- Makes fuel cells for energy efficiency
- Eliminates the need for highly diluted methanol solutions to prevent membrane crossover

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