HIGH PERFORMANCE PYROPHOSPHATE MEMBRANES FOR INTERMEDIATE TEMPERATURE FUEL CELLS

Summary

An innovative regenerated pyrophosphate electrolyte membrane for fuel cells and method of fabricating thereof. An intermediate temperature fuel cell (IT-FC) is a type of fuel cell that operates at temperatures between 200 and 300°C. IT-FCs provide high tolerance for impurities, fuel flexibility, and low-cost construction. Pyrophosphates are commonly used as low-cost electrolyte membrane materials in fuel cells. However, pyrophosphates have decreased proton conductivity at the operating temperatures of IT-FCs. Our researchers have developed a technology to restore the efficacy of pyrophosphate membranes for IT-FCs. The method of restoring pyrophosphate membranes includes integrating a heteropolyacid material into the membrane, which minimizes proton conductivity loss. This method produces pyrophosphate membranes that are highly proton conductive, highly selective, and mechanically strong.

Competitive Advantages

- Successfully recovers the proton conductivity of pyrophosphate membranes for use in IT-FCs
- Does not degrade the mechanical strength of the membrane in the restoring process
- Affordable process to integrate into the production of electrolyte membranes
- Using this technology, IT-FCs are more commercially feasible

Applications

- Intermediate-temperature fuel cells (IT-FCs), which can be used for portable electric generators, large stationary power systems, zero-emission electric automobiles, and green micro-grids

Problem Addressed

- Developing a membrane that has high proton conductivity for use in IT-FCs
- Restoring the mechanical strength and conductivity of pyrophosphate membranes in order to withstand the temperatures of IT-FCs

Patents

- US 2017/039549

Publications


Contact

George Gillespie
Technology Transfer Associate
oipm@Central.uh.edu | 713-743-1053
Case ID: 2016-036

Meet the Inventor

Dr. Anima Bose
Associate Professor,
DEPARTMENT of ENGINEERING TECHNOLOGY