AzTE Arizona Technology Enterprises

www.azte.com

Involatile Protic Electrolytes and Ionic Acids for Fuel Cells and other Applications

AzTE Case #M03-073

Inventors

Dr. Austen Angell

Regent's Professor

Department of Chemistry and Biochemistry

Jean-Philippe Belieres

Assistant Professor

Department of Chemistry and Biochemistry

Dr. Wu Xu

Professor

Department of Chemistry and Biochemistry

Intellectual Property Status

Patent Pending

Contact

Bill Loux

Director of Business Development

Arizona Technology Enterprises, LLC (AzTE)

480.884.1996 main

480.884.1992 desk

Email: bloux@azte.com

Background

Currently, there is a surge in interest in fuel cell research, as companies across the globe race to take advantage of the high energy capacity that fuel cells provide in comparison to other portable electrochemical systems. Many approaches to fuel cell technology use strong acid electrolytes. Such systems suffer from corrosion problems, which limit their functional life. Despite significant research in the area, there remains a need for higher-performance proton carriers for use in fuel cells.

Invention Description

To address this crucial need, researchers at Arizona State University have developed neutral ionic liquids, which function extremely well as proton transport vehicles in fuel cell applications. These neutral liquids are free from the corrosion issues plaguing acidic cells. Likewise, the addition of a certain involatile molecular base leads to a remarkable increase in cell current, allowing the fuel cell to operate effectively at much lower temperatures. The protons are carried by both anions and cations as an integral part of a pronated species, rather than by a Grotthus-type mechanism. Thus, the stability and performance of fuel cells based on the ASU technology are superior to the current state of the art phosphoric acid cells. A high-output, stable, long-lasting fuel cell can now be constructed.

Development

This technology is part of a diverse suite of fuel cell innovations developed at Arizona State University. Significant testing has been completed, and the results have been published. At this time, AzTE is seeking potential partners and licensees for this pending patent and related technologies.

Benefits and Advantages

- **Higher Conductivity** – One configuration of the electrolytes has the highest conductivity ever recorded for a non-aqueous liquid.
- **Wide Operating Temperature** – These compounds exhibit a boiling point in excess of 200° C.
- **Low Volatility** - The electrolytes exhibit high thermal stability and low ambient temperature volatility.