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A NEW APPROACH TO AMBIENT TEMPERATURE FUEL CELLS: USE OF ANIONIC CONDUCTORS

Recent advances in anionic conducting polymers have provided a new tool in achieving cost-effective, ambient temperature fuel cells. The transport of anions, rather than protons as in the proton exchange (PEM) fuel cell, allows operation at higher pH. The high pH environment within the anionic fuel cell addresses many of the PEM shortfalls including facile electrokinetics and improved stability (allowing the use of low-cost, non-noble metals and wider selection of fuels), lowered fuel crossover, and the use of low-cost hydrocarbon membranes.

There are many fundamental issues which must be addressed to realize low-cost anionic cells including the creation of solid polymer electrolytes, electrochemical effects, and cell structures which operate at high pH. In this presentation, advances in alkaline materials and electrochemistry will be presented. New hybrid cell configuration, utilizing the best of anionic and cationic materials, will be presented.

Paul Kohl received a Ph.D. from The University of Texas, in Chemistry in 1978. After graduation, Dr. Kohl was employed at AT&T Bell Laboratories in Murray Hill, NJ from 1978 to 1989. During that time, he was involved in new chemical processes for silicon and compound semiconductor devices and their packaging. In 1989, he joined the faculty of the Georgia Institute of Technology in the School of Chemical and Biomolecular Engineering, where he is currently a Regents' Professor and holder of the Hercules Inc./Thomas L. Gossage Chair. Dr. Kohl's research interests include new materials and processes for advanced interconnects for integrated circuits, and electrochemical energy devices for energy conversion and storage. Dr. Kohl is the Director of the MARCO Interconnect Focus Center.

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