

Oct 18, 2012

Fuel Cells, A Robust Renewable Energy Source: Rewards and Challenges

Anima Bose

Associate Professor

Department of
Engineering
Technology

University of
Houston

Houston, TX

Abstract: The annual energy use in the United States is approaching 100 quadrillion BTU, approximately 85% of which is derived from fossil fuels. To meet our energy needs for a sustainable society, maintain national security, reduce pollution, and avoid drastic climate change, tremendous efforts are directed towards developing clean and renewable energy sources.

Among many renewable approaches, fuel cells are of interest due to their high energy efficiency as electric power generators. Recent advances in R&D are bringing fuel cells closer to commercial deployment for stationary, portable, and transportation applications. My research is primarily devoted to create more efficient proton exchange membrane fuel cells (PEMFC) by reducing precious metal electrocatalysts, improving membrane performance at higher temperatures, and increasing the durability by efficient water managements. The seminar will provide an update on our efforts and successes on nano-catalyst development, better performed composite membranes for better water management, and durability tests of PEMFC-stacks.

Biography: Anima Bose joined the University of Houston as an associate professor in the Engineering Technology Department in 2011. She received her M.S. in solid state physics from Georgetown University and Ph.D in Chemistry (Materials) from Kent State University. After two years as a postdoctoral fellow at the Akron Polymer Institute and Kent State, she was appointed as an associate director of the Fuel Cell Initiative at Northern Illinois University, a collaborative endeavor by the Argonne National Laboratory where she was a visiting scientist from 2004 through 2008. She then moved to Ohio University as a research assistant professor in the Chemical and Biomelecular Engineering Department and the Institute of Sustainable Energy and Environment. She has published many articles in peer-reviewed journals and presented talks in many national meetings. She is an author of three issued patents that include fuel cell catalysts, fuel cell in non-gasoline hybrid vehicle technology, and hydrogen sensor. She also has several pending patent applications on composite boron-carbon catalyst support for fuel cells and battery, composite membrane for fuel cells, and metal-phosphate electrocatalysts. Her research has been supported by several grants from The Department of Energy and Department of Transportation.