Future Direction

The President's 2003 Budget Request calls for the establishment of a Fuel Cell National Resource Center at Los Alamos National Laboratory to provide national focus and an integrated approach to addressing technical barriers to PEM fuel cell commercialization.

For information regarding technologies available for licensing:

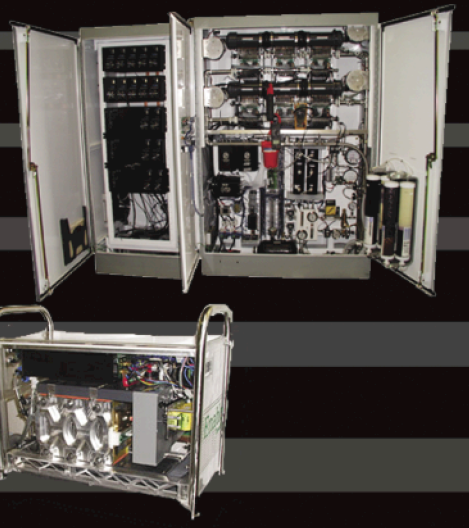
Laura Barber
Licensing Executive
Phone: (505) 667-9266
Fax: (505) 665-0154
Email: ljbb@lanl.gov

http://www.lanl.gov/partnerships/license/techs.htm

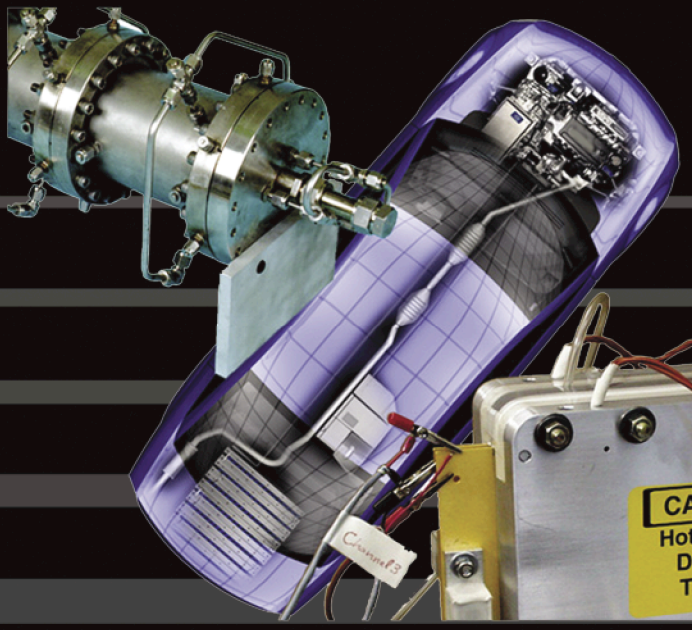
For information regarding fuel cell research at LANL:

Ken Stroh
Program Manager for Hydrogen and Fuel Cells
Phone: (505) 667-7933
Fax: (505) 665-4292
Email: stroh@lanl.gov

http://www.lanl.gov/mst/fuelcells/



Fuel Cell Research at Los Alamos National Laboratory



NNSA
National Nuclear Security Administration

LALP-02-231

Technology Transfer Division
2237 Trinity Dr. MS C334
Los Alamos, NM 87545

Los Alamos
NATIONAL LABORATORY

Fuel Cell Research at Los Alamos National Laboratory (LANL)

With more than twenty years of experience in fuel cell research, the Laboratory has attained an international reputation as an innovator in fuel cell technology. LANL researchers continue to investigate new fuel cell innovations and improve existing designs. LANL's fuel cell research has produced a significant portfolio of fuel cell technologies for use in hand-held and portable electronics, stationary power, military, space, and transportation applications.

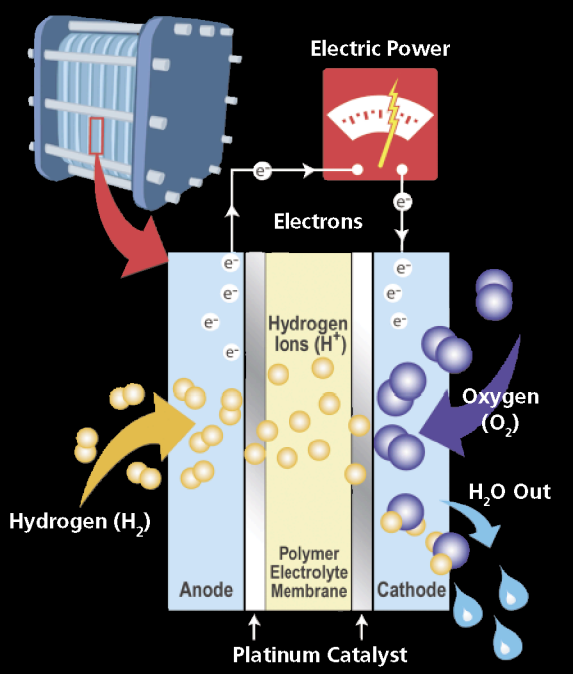
In the early 1980s, LANL scientists pioneered research in polymer electrolyte membrane (PEM) fuel cells focusing their work on decreasing the amount of precious-metal catalysts required for fuel cells while improving cell efficiency. Los Alamos scientists have developed innovative testing and characterization methods for fuel cells that have since become industry standards for performance assessment.

Recent work has focused on improving the structure and composition of the thin-film catalyst layers, decreasing the material costs for the cells; identifying new materials and structures to enhance performance of fuel cell components; and developing advanced electrode technology. LANL scientists have also developed a way to avoid catalyst deactivation in the presence of trace impurities in the hydrogen fuel stream, improved water management in the cell, and successfully removed carbon monoxide from the fuel stream through preferential oxidation.

Government Sponsors for R&D Programmatic Funding

U.S. Department of Energy (primarily the Office of Energy Efficiency and Renewable Energy)

U.S. Department of Defense



The electrochemical energy conversion in a fuel cell is two to three times more efficient than the internal combustion engine for converting fuel to power.

Industrial Partners and/or Licensees

Ball Aerospace & Technologies Corp.
Ballard Power Systems Inc.
Bulk Molding Compounds, Inc. (BMCI)
DCH Technology, Inc./Enable Fuel Cells Corp.
Delphi Corp.
Donaldson Company, Inc.
DuPont
General Motors
Motorola, Inc.
MTI MicroFuel Cells, Inc.
OMG-OM Group
Plug Power
US Council for Automotive Research (USCAR)

University Collaborations

The Laboratory maintains extensive research collaborations with universities through subcontracts and student/faculty exchanges.

Capabilities

The Laboratory has technical expertise and performs research in the following areas:

PEM fuel cells:
- Direct methanol
- Reformate
- Hydrogen

Membrane electrode assembly
Innovative stack designs for various power outputs (micro to kW range)
Hydrogen production, purification, and storage
Catalysts
Advanced polymer electrolyte membranes
Advanced electrochemical reactors
Sensors for PEM and solid oxide fuel cells
System integration
Testing, instrumentation, and control

Technologies Available for Licensing

PEM fuel cells suitable for portable and stationary power and transportation applications comprise a major portion of LANL's portfolio. These technologies operate at low temperatures and have high power densities and high energy-conversion efficiencies. For example:

Adiabatic Stack

This technology suite consists of a simple, low-cost, highly reliable, fuel-cell stack design that operates at near-ambient pressure using liquid water for membrane hydration.

Reformate Fuel Cells

LANL's patent for preventing CO poisoning in fuel cells is an enabling technology for fuel cell operation using reformed hydrocarbon fuels.

Direct Methanol Fuel Cells (DMFC)

The Laboratory's extensive portfolio of DMFC technology provides an excellent alternative to rechargeable batteries currently in use for hand-held or portable electronic devices.

Air-Breathing Fuel Cell Stacks

LANL's unique, cylindrical, passive, fuel-cell design is ideal for low-voltage, low-power applications. These stacks are reliable, self-regulating, and compact.