MPA MaterialsMatter
June 2010

INSIDE

Los Alamos NATIONAL LABORATORY

John Singleton honored in *Who's Who in Technology*

John Singleton (MPA-CMMS) was recently honored for his research on practical applications of pulsar physics by *New Mexico Business Weekly*, which included him in its annual *Who's Who in Technology*. Singleton was among 28 New Mexicans who were honored for making their mark in the technology field. A panel of five technology experts chose the honorees based on their integral contributions to the advancement of technology in New Mexico. Intel, the New Mexico Technology Council, and Sandia National Laboratories' Small Business Utilization Department sponsor *Who's Who in Technology*.

Singleton is the principal investigator of the Los Alamos Laboratory Directed Research and Development project, "Construction and Use of Superluminal Emission Technology Demonstrators with Applications in Radar, Astrophysics, and Secure Communications." In this context, "superluminal" means a source of radiation that travels faster than the speed of light in a vacuum. He and collaborators are addressing the science of this phenomenon and potentially useful technical applications. The comprehensive project comprises 1) studies of superluminal pulsar sources in astronomy and astrophysics, 2) mathematical/computational studies of superluminal sources, and 3) design and construction of practical machines for applications in radar and communications.

Pulsars are extremely dense, quickly spinning stars that send out a regular, sharp pulse of radiation. The reasons how and why they send these bursts have remained a mystery. Singleton, collaborating with Andrea Schmidt (AET-2), has provided strong support for a pulsar emission mechanism—known as the superluminal model—arising from circulating polarization currents in the pulsar's plasma atmosphere that travel faster than the speed of light. Although the polarized region can move faster than the speed of light in a vacuum, the velocities of the charged particles that compose these regions do not. Thus, Einstein's theory of special relativity is not violated. The fact that the source both moves faster than the speed of light and accelerates, results in an electromagnetic equivalent of the "sonic boom" caused by airplanes that accelerate through the speed of sound. By analogy with the sonic boom, the "electromagnetic boom" can cause intense, focused pulses of radiation at very large distances from the pulsar.

Based on this pulsar work, Singleton and colleagues in ISR-6 have built three practical, ground-based superluminal radiofrequency sources to investigate potential applications in radar, long-range communications using low power, satellites in deep space, secure communications without need for encryption, medical applications, and directed energy. The researchers are demonstrating these machines for potential

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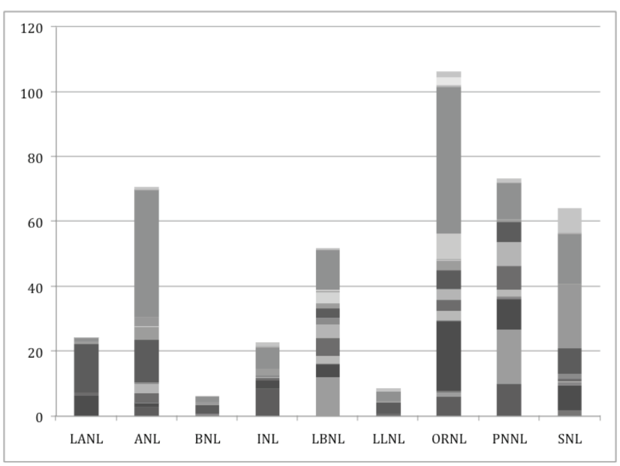
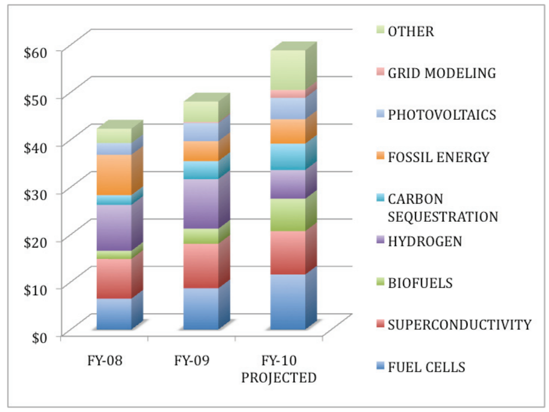
From David's Desk

LANL is in the process of refining its strategy for energy security. This effort is under the auspices of the Energy Security Center, and focuses on the three energy thrust areas: mitigating impacts of global energy demand growth, sustainable nuclear energy, and concepts and materials for clean energy. I have had some involvement across all of these topics, but mainly the third. I thought I would summarize some of the observations we have made in analyzing LANL's strengths and weaknesses.

First, I would like to describe what I see as part of the environment that we have to deal with in applied energy programs. Each year, when DOE submits a budget proposal to Congress, it includes information on allocations to the national laboratories. A plot of these allocations is below. Each shaded area on the plot representations a different program—from vehicle technology to solar energy to the hydrogen program (about 20 Congressional line items). Clearly there are many laboratories that have gotten more funding than LANL. However, one amazing point about this data is that the average size of a program at the laboratories is only \$4.6M, and the median size is \$2.0M. This makes for a hard environment to develop significant programs. In addition, the Energy Policy Act of 2005 requires matching funds for most of these programs.



My next plot shows more detail on LANL funding for concepts and materials for clean energy. In this case, I've broadened the funding sources to include DOE Basic Energy Sciences (BES), Laboratory Directed Research and Development (LDRD), and funds-in from industry. We have seen significant growth as a laboratory over the last three years, and spending may exceed \$60M this year. Almost 40% of the funding is from LDRD and industry.



For the purpose of the energy security strategic planning effort, I organized LANL's research efforts into three categories as follows:

- » Grid science and technology
  - Grid modeling and cybersecurity
  - Superconducting technology
  - Alternative electrical generation technologies (solar, wind, geothermal, and thermo-electrics)
  - Energy storage
- » Fuels
  - Biofuels
  - Fossil fuels
  - Hydrogen
  - Carbon capture and sequestration
- » Efficient energy utilization
  - Fuel cells
  - Solid state lighting
  - Combustion modeling

Clearly, this list expands on the topics I plotted to include some areas where we have only small projects, but would be interested in seeing program growth. As we look to the future, I think we need to take advantage of major institutional strengths. In a broad context, I see our national facilities (CINT, NHMFL, Lujan Center, genome center, etc.) as well as our strategic emphasis on materials and on information science and technology as major strengths of the Laboratory. I believe we face significant challenges as we attempt to assemble partnerships to pursue new and expanded efforts in energy, mainly because LANL does not have effective and efficient means of formalizing partnerships. We have an opportunity to continue to grow our energy programs, and I am optimistic that energy research funding from DOE will increase. I hope to engage MPA personnel as the Laboratory continues to develop its strategies for contributing to the nation's energy security.

MPA Deputy Division Leader David Watkins

Singleton . . . government and industrial sponsors. The design, construction, and potential applications of the devices were the motivations for Singleton's award. Collaborators on the superluminal project include Andrea Schmidt, Joseph Fasel III, and David Bizzozero (AET-2); John Middleditch (CCS-3); Todd Graves (CCS-6); Bill Junor (ISR-2); Dale Dalmas, Larry Earley, Ian Higginson, Frank Krawczyk, Quinn Marksteiner, John Quenzer, Bill Romero, and Zhi-fu Wang (ISR-6); Pinaki Sengupta (MPA-CMMS); Mario Perez (NASA); H. Ardavan (Cambridge University, UK); and A. Ardavan (Oxford University, UK). This work supports the Laboratory's global security mission area.

Technical contact: John Singleton

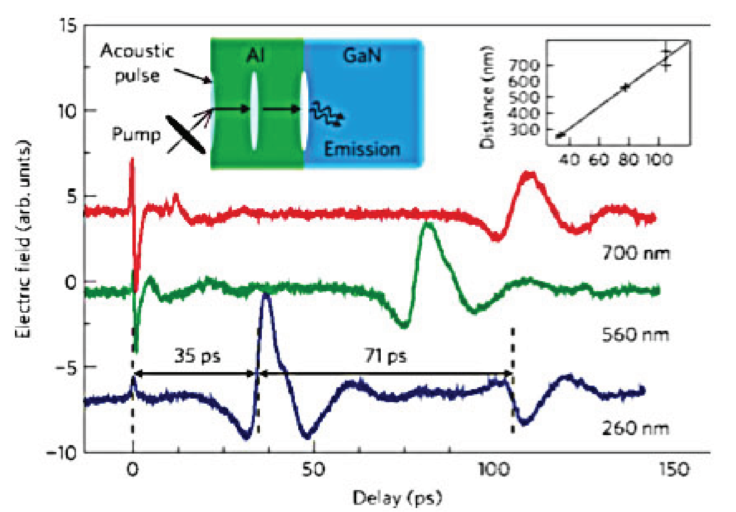
Terahertz radiation is coherently generated by acoustic waves

The term "nanoseismology" describes the study of thin-film nanostructures with high-frequency acoustic waves. The studies have used optical techniques to observe reflected strain waves at surfaces. Experiments using subpicosecond lasers have demonstrated the generation and detection of acoustic and shock waves in materials with terahertz frequencies. This has led to new techniques for probing the structure of thin films. Most existing approaches to measure the time dependence of terahertz-frequency strain waves in materials use time-resolved interferometry or reflectometry, but there are regions of material that are not available for observation of ultrafast strain profiles with these methods.

Ki-Yong Kim and James Glownia (MPA-CINT) and collaborators from Lawrence Livermore National Laboratory (M. Armstrong, R. Reed, and W. Howard) and Nitronex Corporation (E. Piner and J. Roberts) predicted that terahertz-frequency acoustic waves could be detected by observing terahertz radiation emitted when the acoustic wave propagates past an interface between materials of differing piezoelectric coefficients. Recently they published a paper reporting the first experimental observation of this fundamentally new phenomenon and demonstrated that it can be used to probe structural properties of thin films. The scientists show that acoustically generated terahertz radiation is coherently related to the strain-wave time dependence. The radiation is generated by the terahertz-frequency acoustic wave, rather than signal production from the conversion of an ultrashort optical pulse to terahertz radiation through the optical response of the sample.

The figure shows a schematic for the technique and experimental results. Boundaries between regions of differing piezoelectric response are formed by a submicrometer thick layer of aluminum on gallium nitride (GaN), and a layer of aluminum nitride (AlN) is embedded in the gallium. The acoustic wave is generated by focusing an ultrashort (~100 fs) optical pulse onto the aluminum layer, which heats the metal within ~ 3.5 ps through a depth of about 50 nm. Thermal expansion generates a wave with maximum strain of the order of -0.01 corresponding to pressures of the order of 1 GPa. Figure 3 shows the detected electric field for various thicknesses of aluminum coated on GaN. The electric field varies corresponding to the acoustic pulse arrival at the Al-GaN interface. The arrival times at the interface vary linearly with the thickness of the Al layer in each sample (Figure inset), demonstrating a linear correlation between the time of emission and the acoustic transit time with a fitted acoustic velocity of 6.7 km/s (compare to 6.4 km/s sound speed in Al).

The figure also shows the first reflection from the Al-GaN boundary and the Al-free surface for the thinnest sample, after the pulse has made two more passes through the Al layer. The reflected pulse exhibits a 180° total phase shift, resulting from reflection from GaN (a higher impedance material than Al) and the free surface. Although the fastest electric field rise times measured were 2-3 ps (implying < 0.5 THz emission), the stress recovery exhibits lower acoustic bandwidth. For instance, the fast, expansive portion of the stress in the 260nm Al sample has a 5 ps rise (compared with a ~3 ps rise in the electric field). This is consistent with acoustic measurements in related systems using interferometry.



Electric field from Al–GaN interface versus time labeled by Al layer thickness. Dispersion in the shape of the pulse is primarily due to polycrystalline effects in the Al layer. An acoustic reflection in the Al layer radiates around 105 ps in the 260nm Al-coated sample. The transit times are labeled for the 260nm trace. Inset: Layer thickness versus transit time in picoseconds.

Acoustic transition radiation enables a new approach to characterize piezoelectric structures. Structural details of a heterostructure may be determined by injecting a well-characterized acoustic profile and measuring the emitted electric field to

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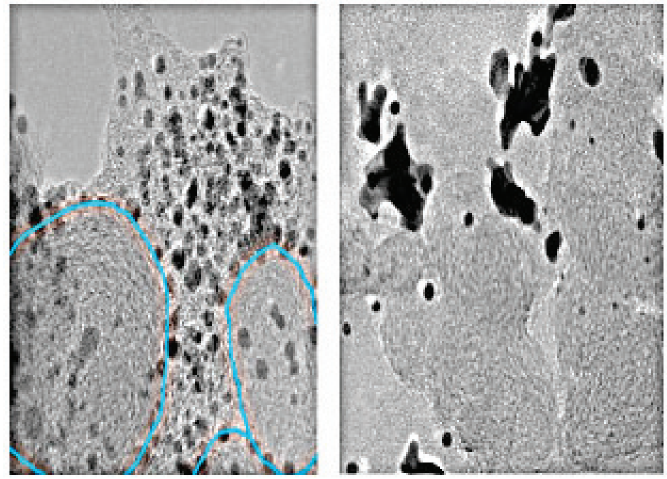
Terahertz . . . determine the locations of boundaries between materials in the heterostructure. Acoustically generated terahertz radiation may be detected independently from an arbitrary number of sufficiently spaced interfaces along the acoustic wave trajectory. Reference: "Observation of Terahertz Radiation Coherently Generated by Acoustic Waves," *Nature Physics* **5**, 285 (2009). The DOE Office of Science, Center for Integrated Technology supported the LANL work.

Technical contact: Rohit Prasankumar

Invited talk showcases polymer electrolyte membrane fuel cell durability, degradation

Rod Borup (MPA-11) gave an invited talk on "PEM Fuel Cell Material Durability and Degradation" at the 2010 TMS (The Minerals, Metals & Materials Society) Annual Meeting's symposium on Materials in Clean Power Systems V: Clean Coal-, Hydrogen Based-Technologies, Fuel Cells, and Materials for Energy Storage. The TMS meeting was held in Seattle, WA.

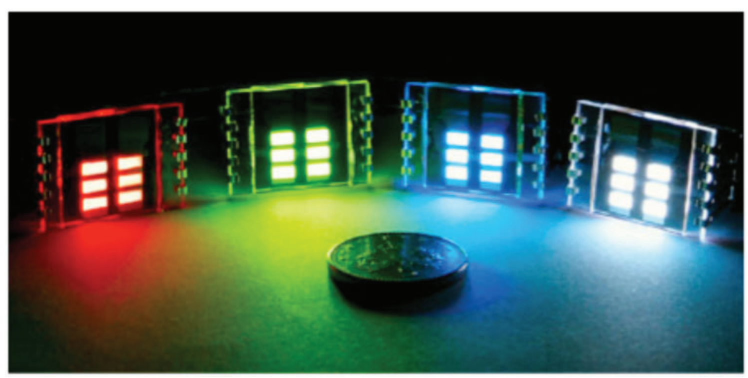
The durability of polymer electrolyte membrane fuel cells (PEMFC) is a major barrier to commercialization for transportation and stationary power applications. Each component and material in the fuel cell has different characteristics, different operational considerations, and potentially different durability concerns. Within a PEMFC, the individual components are exposed to an aggressive combination of strong oxidizing conditions, liquid water, strongly acidic conditions, high temperature, high electrochemical potentials, reactive intermediate reaction products, a chemically reducing atmosphere at the anode, high electric current, and large potential gradients. To improve PEMFC durability, it is important to understand the roles of these various conditions in material degradation processes and work to improve material durability. Borup presented durability testing methods and results including accelerated stress testing, the effect of operating conditions on durability, and the various component materials (membranes, electrocatalysts, catalyst supports, gas-diffusion media and bipolar plates). For example, the agglomeration of platinum catalyst particles as a result of temperature cycling significantly reduces active surface area and overall catalytic site availability, resulting in poor performance over time (see figure). The DOE Energy Efficiency and Renewable Energy Program (Karl Jonietz, LANL program manager) funded the work.



(Left): Fresh platinum catalyst particles. (Right): Platinum particles after 80oC cycling to 1.2 V

DOE recognizes Laboratory's lighting research achievements

The Department of Energy recently recognized a team of researchers from MPA Division and the Los Alamos Neutron Science Center for their research to develop new materials to lower the cost of organic light-emitting diode manufacturing. Anthony Burrell, Eve Bauer, and Tom McCleskey (MPA-MC); Hongmei Luo (LANSCE-LC); and Quanxi Jia (MPA-CINT) were honored at "Transformations in Lighting," the seventh annual U.S. DOE Solid-State Lighting Research & Development Workshop. The team was one of nine recognized by DOE for significant breakthroughs and achievements in 2009, representing research in light-emitting diodes and organic light-emitting diodes conducted at industry, universities, and research institutions.



Organic light-emitting diodes

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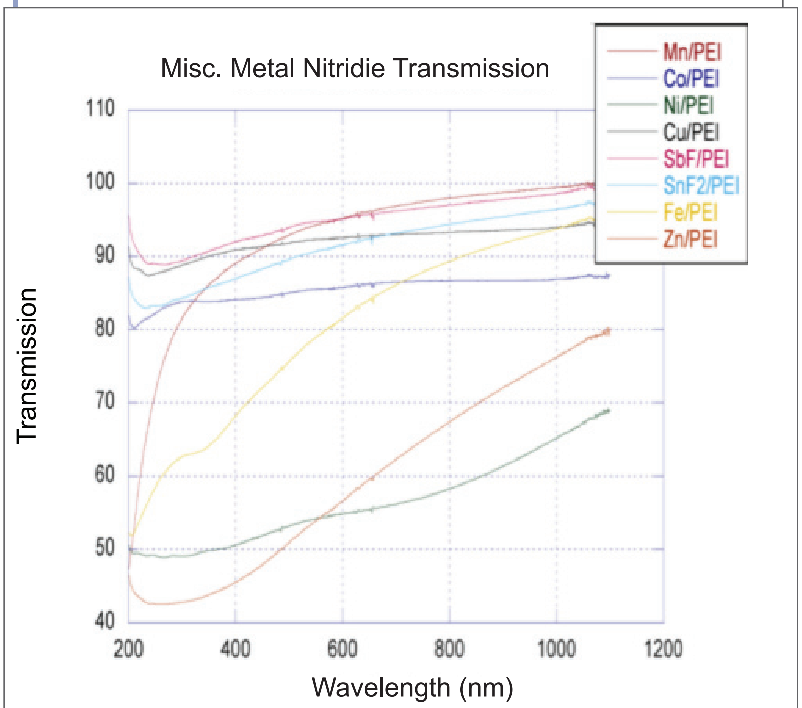
Lighting . . . Lighting consumes about one-fourth of the electricity produced annually in the U.S. Potentially more efficient and environmentally friendly than current lighting sources, organic light-emitting diodes could conceivably replace both fluorescent and incandescent lights as the primary lighting source. The organic light-emitting diodes make light by the controlled movement of electrons, not by heating up a wire filament, as in incandescent lights. Therefore, these diodes use much less energy than conventional lights. Organic light-emitting diodes also have unique properties that make them attractive for lighting applications, including making it possible to electrically control the spectral properties of the light emitted and the ability to be arranged over large areas in various shapes. These diodes are very thin, flexible, and produce bright color. However, cost and long-term application are major issues of this new lighting technology because the indium used in these diodes is a limited resource.



Metal nitride transmissions measured for potential use in organic light-emitting diodes.

Transparent conducting oxides are key components of organic light-emitting diodes. Their properties and production methods are vital to the future of solid-state lighting. Indium tin oxide is the most popular transparent conducting oxide for organic light-emitting diodes applications because of its high transparency and work function. However, indium is a rare material available from only a few places in the world. The consumption trend for indium may exceed production due to the increasing use of this material in flat panel displays and televisions.

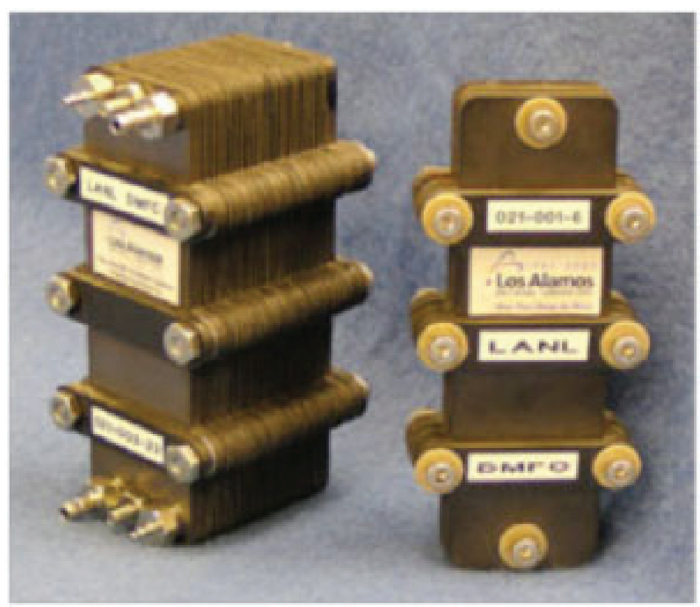
The LANL team identified new compositions that could be alternatives to indium tin oxide for use in organic light-emitting diodes (see figure). The scientists developed transparent thin film nitrides based upon vanadium nitride doped with first row transition metals. These metals are much more readily attainable and economical than indium. The DOE Solid State Lighting program (Karl Jonietz, LANL program manager) funded the work.

Technical contact: Anthony Burrell

Collaboration with industry on fuel cell stack testing procedures

Tommy Rockward (MPA-11) recently traveled to Spain to visit the fuel cell developer, Cidetec, and to collaborate with researchers on the development of testing procedures for fuel cell stacks and to share his expertise in laboratory procedures and experimental techniques as an internationally recognized expert in protocol development and fuel cell single-cell testing for energy applications. In support of this collaborative effort, LANL established a memorandum of understanding and material transfer agreements with Cidetec. The collaborative working relationship with Cidetec helps address technical barriers to commercial applications, which the DOE/EERE Fuel Cell Technologies Program and the international community have identified. Technical barriers include performance impacts of impurities on fuel cell and fuel cell stack performance and test procedure development and validation. LANL will test Cidetec's materials, such as membrane electrode assemblies and the components of a fuel cell. A Cidetec scientist visited LANL for technical exchanges and LANL researchers plan to continue this interaction as part of their international activities for DOE's Fuel Cell Technologies Program.

Technical contact: Tommy Rockward



Example of a Los Alamos fuel cell stack

Catalyst system design recognized with Award of Excellence in Technology Transfer

Kevin Ott (formerly MPA-MC, now program director for applied energy in the PADSTE Science Programs Office) has won an Award for Excellence in Technology Transfer for the Clean Air System's ENDURE SCR catalyst system, which he designed and developed.

The ENDURE SCR catalyst system is an advanced catalytic system that mitigates environmentally problematic forms of nitrogen oxide (NOx) compounds inherent in exhaust systems from diesel engines and other lean burn combustion processes found in many factory operations. The catalyst system functions efficiently, reducing up to 95 percent of the NOx omissions. ENDURE SCR includes an iron zeolite catalyst augmented with cerium-manganese oxide to produce an optimum ratio of exhaust components at low temperature. Unlike competing solutions to mitigate NOx, the ENDURE system does not consume additional fuel and thus retains diesel's inherent efficiency. The Laboratory's patented catalyst composition and structure enables efficient NOx reduction at a broad temperature range unattainable by competing technologies. The invention was developed as part of a long-term Partnership for New Generation of Vehicles/FreedomCAR Cooperative Research and Development Agreement with the U.S. automotive companies, which was funded by DOE's Energy Efficiency and Renewable Energy Office of Transportation Technology (now known as the Office of Vehicle Technologies).

LANL has been collaborating with Santa Fe, New Mexico-based CleanAIR Systems, Inc. to commercialize this technology. CleanAIR Systems manufactures emissions control systems for a worldwide distribution. In 2008, the company signed an agreement with the Lab for an exclusive patent license to use the technology. CleanAIR is developing the technology for applications in stationary diesel and natural gas engines, pipeline compressors, on- and off-road equipment, and gas turbines.The company recently introduced a new product that incorporates the LANL technology, called the E-POD. This is a hybrid technology that is designed to dramatically reduce emissions for large diesel and natural gas stationary engines. In 2008, the Caterpillar Corporation announced its selection of CleanAIR as its strategic alliance partner for emissions control products. Installation of the new system has recently been completed on seven Caterpillar 3512 diesel generator set units operating on drill rigs in Wyoming's Pinedale Anticline Project Area.

The award, presented annually by the Federal Laboratory Consortium for Technology Transfer, recognizes laboratory employees who have demonstrated excellence in the development of technology that was subsequently transferred to industry. It also recognizes the participation of the scientist, engineer, or personal investigator in assisting the Technology Transfer Office in the process of the transfer. Laura Barber (TT-DO) was also instrumental in transferring the technology to Clean Air.

Technical contact: Kevin Ott

Multipurpose acoustic sensor for downhole fluid monitoring of geothermal reservoirs

Cristian Pantea, Dipen Sinha, and Blake Sturtevant (MPA-11) recently gave a presentation on their geothermal project for the New Mexico Office of Recovery and Reinvestment leaders visiting Los Alamos. The scientists explained the concept behind an American Recovery and Reinvestment Act project that could improve enhanced geothermal systems.

In this new type of geothermal power technology, high-pressure cold water is pumped down an injection well into rock. The injection increases the fluid pressure in the naturally fractured rock, enhancing the permeability of the fracture system. Water travels through fractures in the rock, capturing the heat of the rock until it is forced out of a second borehole as very hot water, which can be used to generate electricity. The water, now cooled, is injected back into the ground to heat again in a closed loop (see illustration). The technology could produce power 24 hours a day, as does a fossil fuel power plant.

The high pressures and temperatures in enhanced geothermal systems reservoirs require specialized materials for the down-hole sensor package, starting from the active part of the sensor and ending with communication cables. The team plans to use sound waves as the basis for a sensor package that could operate at very high temperatures and pressures to provide real-time data about temperature, pressure, flow rate, salinity, and other properties of fluids within geothermal reservoirs.

This information could help determine the best locations for potential geothermal reservoirs or how to maximize heat production from them for increased efficiency and cost effectiveness. The researchers are developing a multipurpose acoustic sensor to

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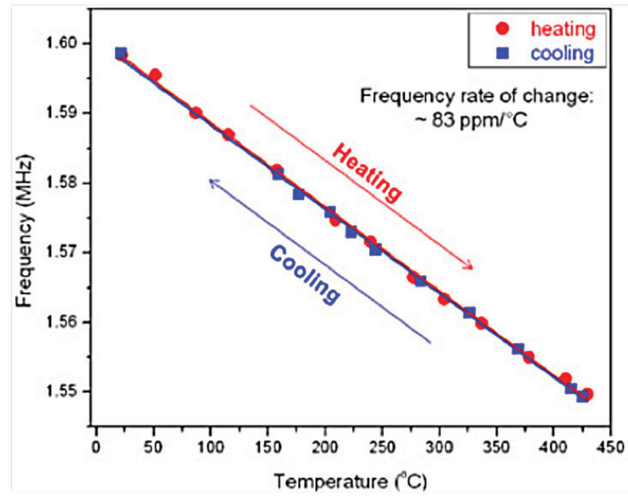
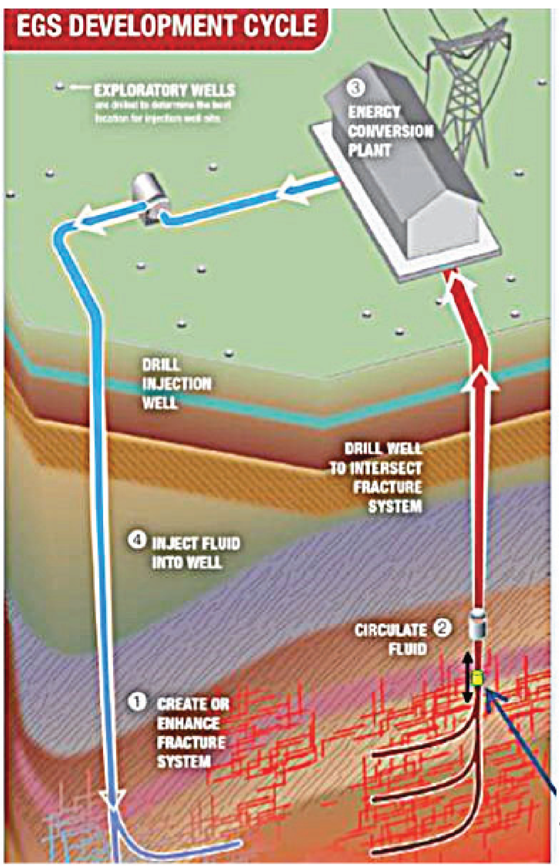
Acoustic . . .use at depths of several thousand feet, pressures up to 220 bar, temperatures up to 374ºC, and in a corrosive environment.

The scientists used the resonance of a piezoelectric crystal for a novel solution to the problem of accurate, repeatable down-hole temperature determination. They found that lower vibrational modes of the crystal provide a reliable temperature determination. The team obtained very good sensitivity of frequency variation as a function of temperature of 83 ppm/deg in the crystal (see figure). There is no hysteresis between the heating and cooling cycle. With appropriate calibration, the temperature of the reservoir can be precisely determined. This new approach can be used for an inexpensive and reliable temperature sensor for harsh environments in general and down-hole measurements in particular. The American Recovery and Reinvestment Act funds the DOE Energy Efficiency and Renewable Energy project.

Technical contacts: Cristian Pantea and Dipen Sinha



Temperature determination from a lower frequency vibrational mode (1.6 MHz)



Schematic representation of an enhanced geothermal system

Research leads to better understanding of the aging mechanism for polymer electrolyte fuel cells

Jerzy Chlistunoff and Rodney Borup (MPA-11), Jaroslaw Majewski, (LANSCE-LC), and David Wood (formerly of MPA-11 and now Oak Ridge National Laboratory) have used the surface profile analysis reflectometer (SPEAR) at LANSCE to examine the interactions of fuel-cell materials that comprise the triple-phase interface where the electrochemical reactions occur. Neutron reflectometry measures thickness resolution to several angstroms. The experiments examined Nafion, a commercially available ionomer used in fuel cells. Nafion contains a hydrophobic backbone with hydrophilic side chains. Image an analogy with a fish skeleton. The “hydrophobic backbone” repels water, and the ribs (hydrophilic side chains) are attracted to water.

Polymer electrolyte fuel cells hold promise for energy production due to their high efficiency, high-energy density, high-power density, and zero emissions. The power-producing center of the fuel cell consists of anode and cathode catalyst layers coated onto either side of an ion-exchange polymer (or ionomer) membrane. The triple-phase interface of an electrode is comprised of three commingled interfaces: a platinum/carbon (Pt/C) interface (for electron transport and catalyst particle dispersion), a Pt/ionomer interface (for proton transport to reaction sites), and an ionomer/carbon interface (for high dispersion of catalyst-support aggregates, electrode structural integrity, and high porosity for molecular oxygen/hydrogen diffusion). From a durability perspective,

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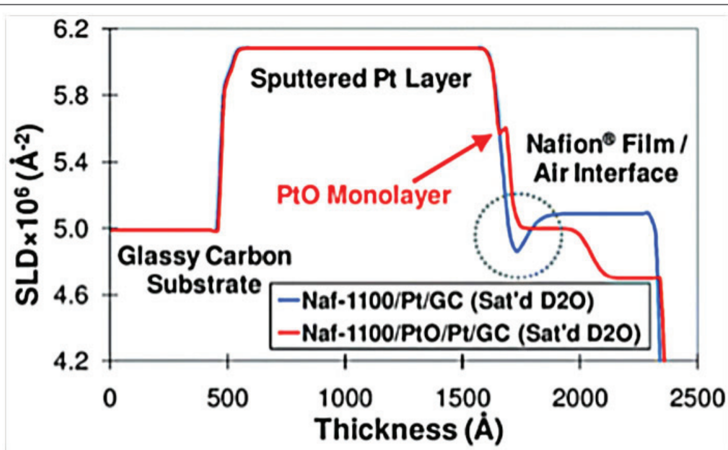
Aging . . understanding the processes involved with catalyst-support corrosion is important for preserving Pt/C contact and triple phase integrity. Identifying these essential interfacial and structural phenomena and related degradation processes will help lead to improved electrode longevity and performance, as well as improved catalyst-support and membrane durability.

When the scientists used smooth, idealized layers of Nafion on glassy carbon and platinum surfaces as experimental models for the fuel-cell electrode interfaces, they found that separate hydrophobic and hydrophilic domains formed within the Nafion layer when equilibrated with saturated deuterated water vapor. The findings reveal that the material with which Nafion is in contact affects Nafion's interfacial and long-range structural properties. Aging of Nafion under simulated fuel cell conditions leads to an irreversible swelling of the Nafion film.

The study is significant for fuel-cell research and development because an understanding of Nafion interfacial phenomena can help improve catalyst utilization and durability of polymer electrolyte fuel cells.

Reference: "Nafion Structural Phenomena at Platinum and Carbon Interfaces," appears in *Journal of the American Chemical Society* **131** (2009). The DOE Fuel Cell Technologies Program, Office of Energy Efficiency and Renewable Energy, and the Office of Basic Energy Sciences supported the work.

Technical contacts: Jerzy Chlistunoff and Rodney Borup



Neutron scattering length density (SLD) profiles for platinum/Nafion interfaces, demonstrating the presence of a hydrophobic layer (circled) in Nafion in the immediate vicinity of a bare platinum surface (blue line) and the lack of it for an oxidized platinum surface (red line).

Betts named head of NHMFL-PFF User Program

Jon Betts has been selected as the new head of the User Program at the National High Magnetic Field Laboratory-Pulsed Field Facility.

Betts joins the MPA management team with 30 years experience in magnet systems and cryogenics as well as an extensive expertise in a broad range of condensed matter experimental physics.

Prior to joining the Laboratory in 1998 as a member of MST-10, Betts worked for Oxford Instruments at many locations around the world, specializing in low temperature and high magnetic field systems. As the new head of the NHMFL-PFF User Program he will serve the high field user community as the primary interface to our facility and user program capabilities.

A new display in the lobby of the Center for Integrated Nanotechnologies highlights the research performed in the national user facility.

Laboratory's top-notch science, facilities are focus of summer lecture series

The fourth annual Summer Lecture Series is underway and features talks by Laboratory scientists, tours of the Laboratory's national user facilities, and closes out with an ice cream social with dessert served by Laboratory Director Michael Anastasio. The series runs through July 28 with events held in a variety of locations.

MPA and MST divisions and the LANL Institutes sponsor the series, which presents a wide spectrum of LANL science to the Laboratory's students, postdoctoral researchers, staff, and visitors. This year's series includes 16 talks by distinguished LANL scientists, a panel discussion on climate change, and tours of the Los Alamos Neutron Science Center, the Center for Integrated Nanotechnologies and the National High Magnet Field Laboratory-Pulsed Field Facility.

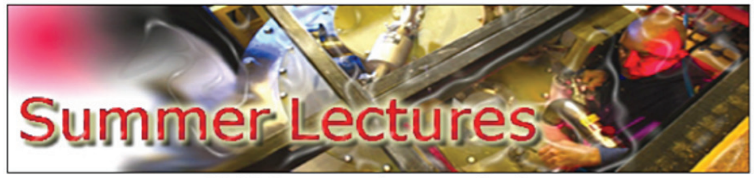
Lectures are open to LANL badge holders, with selected lectures also open to the public.

"All the talks are carefully selected and are talks worth attending," said Tomasz Durakiewicz (MPA-CMMS), who organized the program. "The talks are usually very popular. For several talks in the past, we have enjoyed crowds larger than the room capacities." Not to be missed, Durakiewicz said, is the ice cream social with the Laboratory Director on July 28 at 2 p.m. in the Materials Science Laboratory courtyard.

According to Durakiewicz, one of the series' most anticipated featured speakers is Laboratory Fellow Jim Smith (MST-6), who this year will discuss "Schizophrenic Electrons" on June 16. Smith will provide an introduction for the "Novel Superconductors" talk presented by another Laboratory Fellow and popular speaker, Zachary Fisk (MPA-CMMS) on July 12. The Summer Lecture Series also features five sessions of climate-oriented talks, including a panel discussion on anthropogenic global warming, which will be held July 14-19.

"LANL has a lot to offer in several disciplines and this is the message we want our students to take home," Durakiewicz said.

Summer Lecture Series contact: tomasz@lanl.gov



2010 Summer Lecture Series

Organized by MPA and MST Divisions and LANL Institutes

Our fourth edition of the Summer Lecture Series is designed to present the great science done at LANL to our students, postdoctoral researchers, staff and visitors. In the course of 16 talks, one discussion panel and three site visits we will have a unique opportunity to see the facilities and learn about LANL directly from our top scientists. Ice cream will be served by LANL Director at the series closing. We look forward to meeting you there!

2010 PROGRAM

Refreshments are served only before MSL events and start at 1:45PM. All other talks and tours start at 2:00PM. ACCESS NOTE: All locations are open to badge holders only.

DATE, TIME	LOCATION	AUTHOR AND TITLE
Mon 06/07, 2:00	Study Center	Toni Taylor: Ultrafast Spectroscopy and Other Stories.
Wed 06/09, 2:00	Rosen Auditorium	Dave Clark: Issues Surrounding Plutonium.
Fri 06/11, 1:45	Magnet Lab	Chuck Mielke: Magnet Lab tour.
Mon 06/14, 2:00	Study Center	Jim Smith: Schizophrenic Electrons.
Wed 06/16, 2:00	Rosen Auditorium	Herbert Funsten: Signature Science - Illuminating Things that go Bump in the Night.
Fri 06/18, 1:45	CINT	David Morris: CINT Tour. (NOTE: Closed-toe shoes required, no sandals or flip-flops).
Mon 06/21, 1:45	MSL Auditorium	Eva Birnbaum: Medical Radioisotope Production at Los Alamos.
Wed 06/23, 2:00	Rosen Auditorium	Rusty Gray: Dynamic Properties of Materials.
Fri 06/25, 1:45	MSL Auditorium	Deniece Korzekwa: title tbd.
Mon 06/28, 2:00	Study Center	Kathryn Berchtold: Carbon Separation and Capture: Are Mambranes an Option?
Wed 06/30, 2:00	Rosen Auditorium	Carol Burns: Adventures with Nuclear Forensics.
Wed 07/07, 2:00	Rosen Auditorium	Dana Dattelbaum: Shocking Experiences with Explosives.
Fri 07/09, 1:45	MSL Auditorium	Alan Hurd: LANSCE Tour.
Mon 07/12, 1:45	MSL Auditorium	Zachary Fisk: Novel Superconductors (with introduction by Jim Smith).
Wed 07/14, 2:00	Rosen Auditorium	Petr Chylek: Climate change - Polar Regions.
Fri 07/16, 1:45	MSL Auditorium	Gerald Geernaert: Climate Change – Natural Variability and Anthropogenic Contribution.
Mon 07/19, 2:00	Study Center	Mavendra Dubey: Climate Change – Discussion. Participants: Phil Jones, Gerald Geernaert, Petr Chylek.
Wed 07/21, 1:45	MSL Auditorium	Jackie Kiplinger: Fun with the Actinide Molecular Systems.
Fri 07/23, 1:45	MSL Auditorium	Bob Ecke: Patterns in Natural Systems.
Mon 07/26, 2:00	Study Center	Kurt Sickafus: Ode to Oxides.
Wed 07/28, 2:00	MSL Courtyard	Michael Anastasio: Ice Cream Served by LANL Director - 2010 Series Closing

For additional information please contact: tomasz@lanl.gov

Check LANL homepage frequently for program updates/changes

MPA MaterialsMatter

Published monthly by the Experimental Physical Sciences Directorate.
To submit news items or for more information,
contact Karen Kippen, EPS Communications,
at 606-1822, or kkippen@lanl.gov
LALP-10-007
To read past issues see
www.lanl.gov/orgs/mpa/materialsmatter.shtml

HeadsUP!

WSST Fest set for July 14

Come out and enjoy a little sunshine, some fresh air and learn more about the activities of the Laboratory's Worker Safety and Security Teams (WSST). On July 14, from 11 a.m. to 1 p.m. a WSST Fest will be held in front of the NSSB and Otowi Buildings in Technical Area 3.

WSSTs drive worker involvement in resolving issues and improving safety and security. Representing all workers, the teams facilitate communication among staff and management throughout LANL.

Refreshments, entertainment, a display of Protective Force equipment are planned for the event as are presentations highlighting WSST activities and progress on safety and security initiatives.

Your MPA WSST members

Eve Bauer	MPA-MC
Mike Torrez	MPA-CMMS
Paul Mombourquette	MPA-11
John Rowley	MPC-STC
Lisa Phipps	MPA-CINT

Celebrating service

Congratulations to the following MPA Division employees celebrating service anniversaries this month:

Ian Campbell, MPA-11	20 years
Brian Crone, MPA-11	10 years
Antonya Saunders, MPA-CINT	10 years
Tomasz Durakiewicz, MPA-CMMS,	10 years

Spot awards!

MPA-CMMS
Mike Torrez, for a proactive approach to handling an electrical safety issue.
Kevin Graham, for a proactive approach to handling an electrical safety issue.

MPA-CINT
Quinn McCulloch, for attention to responsible property management
Jinho Lee, for attention to responsible property management.
Georgi Dakovski, for attention to responsible property management.