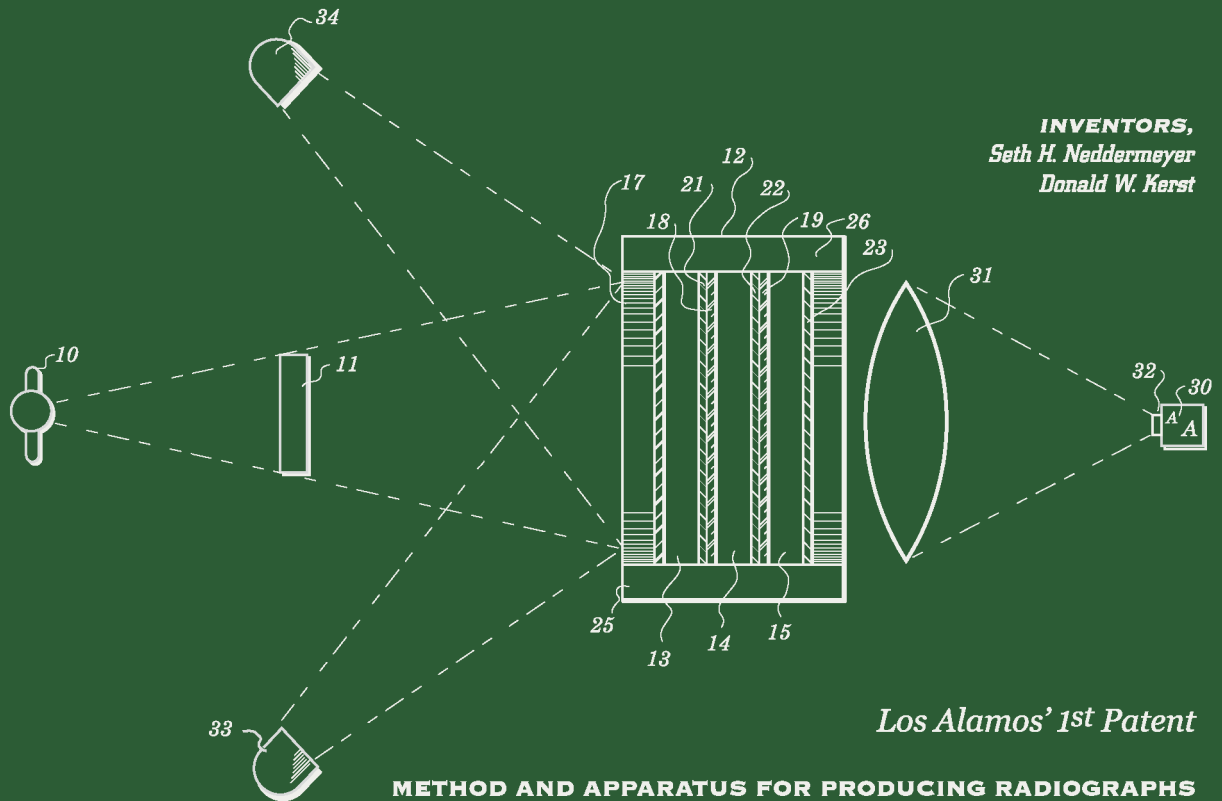




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Applauding our innovators



INVENTORS,
Seth H. Neddermeyer
Donald W. Kerst

Los Alamos' 1st Patent

METHOD AND APPARATUS FOR PRODUCING RADIOGRAPHS

Issued April 1947

THE 2003 PATENT & LICENSING AWARDS
Carrying on the tradition of world-changing innovation

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Applauding our innovators

THE 2003 PATENT & LICENSING AWARDS

Carrying on the tradition of world-changing innovation

Thursday, February 12, 2004
Los Alamos National Laboratory
Los Alamos, New Mexico





Welcome to the sixth Annual Patent and Licensing Awards Ceremony! We are here this evening to honor our innovators for their contributions during the past year to the Laboratory's growing portfolio of copyrighted, patented, and licensable technologies. While the achievements we honor here tonight span a broad spectrum of technologies, they all bear the hallmark of the Laboratory since its inception—scientific discovery and technological innovation making a difference for our nation and the world.

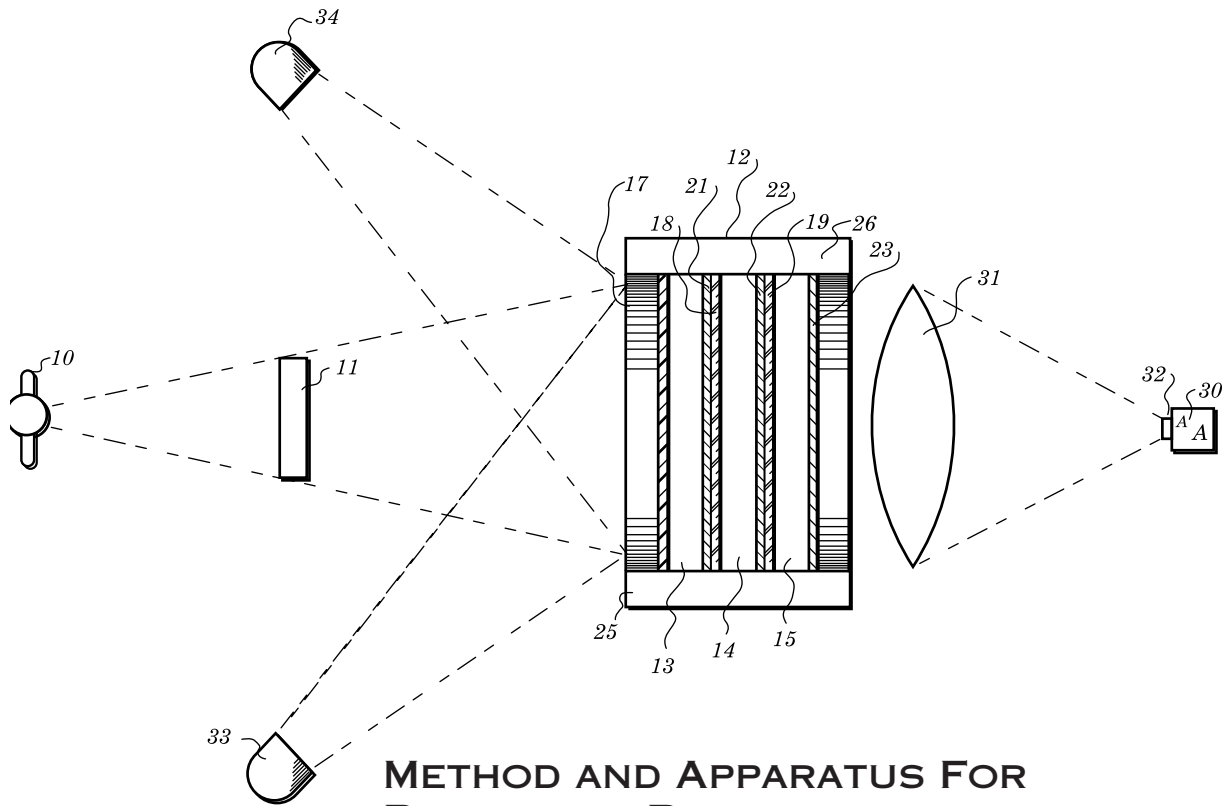
Through their work, these dedicated and creative men and women demonstrate their vital interest in contributing to the Laboratory's technology transfer activities by protecting our intellectual property. When we transfer our inventions and technological advances from the Laboratory to the private sector for commercial development, we strengthen the nation's economic security by enhancing industrial competitiveness. In addition, much of this activity stimulates regional economic development by encouraging new business startups and providing existing businesses with an opportunity to develop and market our cutting-edge technologies. Through our patents, copyrights and licensed technologies, we demonstrate that our work has intrinsic economic value.

I wish to extend congratulations on behalf of the entire Laboratory community to this evening's honorees for their achievements. I also applaud the efforts of our legal and technology transfer staff for the role they play in helping our innovators navigate the often complex path toward achieving these awards.

Thank you all for your outstanding contributions to the Laboratory and to society.

A handwritten signature in black ink, appearing to read "G. Peter Nanos, Jr." The signature is fluid and cursive, with a prominent initial "G" and a long, sweeping underline.

G. Peter Nanos, Jr.
Interim Director



METHOD AND APPARATUS FOR PRODUCING RADIOGRAPHS

The first patent obtained at Los Alamos National Laboratory was filed in 1945 in the names of Seth Neddermeyer and Donald Kerst, two original Los Alamos employees who were well-known for their creative and unrestrained experimentations into the explosive compression of materials. The patent covered an apparatus for conducting high-speed x-ray radiography of explosive detonations. No mention of Los Alamos appears in the published patent, as Los Alamos was a "secret city" when the patent issued in 1947. This invention was an early accomplishment of a research program that has continued for some 60 years and for which Los Alamos is internationally renowned. Today this program has culminated in the operation of the Dual Axis Radiographic Hydrodynamic Test facility (DARHT). Phase 1 of DARHT is now fully operational with a single-pulsed, first axis, x-ray machine. Phase 2 is scheduled for completion in the fall of 2004 with the commissioning of a complex, multi-pulsed, second axis, x-ray machine.

ABSTRACTS OF RECOGNIZED PATENTS

*Listings are in accordance with
issue dates from beginning to end of
fiscal year 2003.*

PROPELLANT CONTAINING 3,6-BIS (1H-1,2,3,4-TETRAZOL- 5-YLAMINO)-1,2,4,5- TETRAZINE OR SALT THEREOF

Michael A. Hiskey (DX-2)
David E. Chavez (DX-2)
Darren Naud (DX-2)
U.S. Patent No. 6,458,227

The compound 3,6-bis(1H-1,2,3,4-tetrazol-5-ylamino)-1,2,4,5-tetrazine and its salts are provided together with a propellant composition including an oxidizer, a binder and 3,6-bis(1H-1,2,3,4-tetrazol-5-ylamino)-1,2,4,5-tetrazine or its salts.

AIR BREATHING DIRECT METHANOL FUEL CELL

Xiaoming Ren (MST-11)
Shimshon Gottesfeld (MST-11)
U.S. Patent No. 6,458,479

An air breathing direct methanol fuel cell is provided with a membrane electrode assembly, a conductive anode assembly that is permeable to air and directly open to atmospheric air, and a conductive cathode assembly that is permeable to methanol and directly contacting a liquid methanol source. Water loss from the cell is minimized by making the conductive cathode assembly hydrophobic and the conductive anode assembly hydrophilic.

REVERSIBLE MICROMACHINING LOCATOR

Leander J. Salzer (MST-7)
Larry R. Foreman (MST-7)
U.S. Patent No. 6,460,436

A locator with a part support is used to hold a part onto the kinematic mount of a tooling machine so that the part can be held in or replaced in exactly the same position relative to the cutting tool for machining different surfaces of the part or for performing different machining operations on the same or different surfaces of the part. The locator has disposed therein a plurality of steel balls placed at equidistant positions around the planar surface of the locator and the kinematic mount has a plurality of magnets that alternate with grooves that accommodate the portions of the steel balls projecting from the locator. The part support holds the part to be machined securely in place in the locator. The locator can be easily detached from the kinematic mount, turned over, and replaced onto the same kinematic mount or another kinematic mount on another tooling machine without removing the part to be machined from the locator so that there is no need to touch or reposition the part within the locator, thereby assuring exact replication of the position of the part in relation to the cutting tool on the tooling machine for each machining operation on the part.

METHOD FOR IDENTIFYING AND PROBING PHASE TRANSITIONS IN MATERIALS

Blaine W. Asay (DX-2)
Bryan F. Henson (C-PCS)
Robert K. Sander (C-PCS)
Jeanne M. Robinson (C-PCS)
Steven F. Son (DX-2)
Peter Dickson (DX-2)
U.S. Patent No. 6,465,255

The present invention includes a method for identifying and probing phase transitions in materials. A polymorphic material capable of existing in at least one non-centrosymmetric phase is interrogated with a beam of laser light at a chosen wavelength and frequency. A phase transition is induced in the material while it is interrogated. The intensity of light scattered by the material and having a wavelength equal to one half the wavelength of the interrogating laser light is detected. If the phase transition results in the production of a non-centrosymmetric phase, the intensity of this scattered light increases; if the phase transition results in the disappearance of a non-centrosymmetric phase, the intensity of this scattered light decreases.

CYLINDRICAL ACOUSTIC LEVITATOR/ CONCENTRATOR

Gregory Kaduchak (MST-11)
Dipen N. Sinha (MST-11)
U.S. Patent No. 6,467,350

A low-power, inexpensive acoustic apparatus for levitation and/or concentration of aerosols and small liquid/solid samples having particulates up to several millimeters in diameter in air or other fluids is described. It is constructed from a commercially available, hollow cylindrical piezoelectric crystal that has been modified to tune the resonance frequency of the breathing mode resonance of the crystal to that of the interior cavity of the cylinder. When the resonance frequency of the interior cylindrical cavity is matched to the breathing mode resonance of the cylindrical piezoelectric transducer, the acoustic efficiency for establishing a standing wave pattern in the cavity is high. The cylinder does not require accurate alignment of a resonant cavity. Water droplets having diameters greater than 1mm have been levitated against the force of gravity using less than 1 W of input electrical power. Concentration of aerosol particles in air is also demonstrated.

HIGH RESOLUTION NON-CONTACT INTERIOR PROFILOMETER

Martin S. Piltch (MST-6)
Alan R. Patterson (MST-6)
Gerald W. Leeches (ESA-WMM)
John Van Nierop
John J. Teti
U.S. Patent No. 6,469,794

Apparatus and method for inspecting the interior surfaces of devices such as vessels having a single entry port. Laser energy is introduced into a device under test and to a time delay. Light reflected from the interior surfaces of the device under test is introduced into one end of a dye-cell and the time-delayed light is introduced into the other end. The amount of time delay is adjusted to produce two-photon fluorescence in the dye-cell so that the amount of time delay is representative of the interior surfaces of the device under test.

DIAGNOSIS AND TREATMENT OF CANCERS USING IN VIVO MAGNETIC DOMAINS

Robert H. Kraus Jr. (P-21)
Don M. Coates (P-DO)
U.S. Patent No. 6,470,220

A method of detecting and treating tumors within a subject is disclosed together with a process for the non-invasive measurement of tissue temperature within a subject.

SYSTEM AND METHOD FOR MEASURING RESIDUAL STRESS

Michael B. Prime (ESA-WR)
U.S. Patent No. 6,470,756

The present invention is a method and system for determining the residual stress within an elastic object. In the method, an elastic object is cut along a path having a known configuration. The cut creates a portion of the object having a new free surface. The free surface then deforms to a contour that is different from the path. Next, the contour is measured to determine how much deformation has occurred across the new free surface. Points defining the contour are collected in an empirical data set. The portion of the object is then modeled in a computer simulator. The points in the empirical data set are entered into the computer simulator. The computer simulator then calculates the residual stress along the path that caused the points within the object to move to the positions measured in the empirical data set. The calculated residual stress is then presented in a useful format to an analyst.

HIGH TEMPERATURE SUPERCONDUCTING JOSEPHSON JUNCTIONS AND SQUIDS

Quanxi Jia (MST-STC)
Xin Di Wu (MST-STC)
Stephen R. Foltyn (MST-STC)
David W. Reagor (MST-STC)
U.S. Patent No. 6,476,413

A high temperature superconducting Josephson junction device with ramp-edge geometry in which silver is combined in a composite with $\text{YBa}_2\text{Cu}_3\text{O}_7$, yttrium-barium-copper-oxide, to form the electrodes, or $\text{PrBa}_2\text{Cu}_3\text{O}_7$, praseodymium-barium-copper-oxide, to form the weak link.

LIGHT SCATTERING APPARATUS AND METHOD FOR DETERMINING RADIATION EXPOSURE TO PLASTIC DETECTORS

Robert E. Hermes (MST-7)
U.S. Patent No. 6,476,910

An improved system and method of analyzing cumulative radiation exposure registered as pits on track etch foils of radiation dosimeters. The light scattering apparatus and method of the present invention increases the speed of analysis while it also provides the ability to analyze exposure levels beyond that which may be properly measured with conventional techniques. Dosimeters often contain small plastic sheets that register accumulated damage when exposed to a radiation source. When the plastic sheet

from the dosimeter is chemically etched, a track etch foil is produced wherein pits or holes are created in the plastic. The number of these pits, or holes, per unit of area (pit density) corresponds to the amount of cumulative radiation exposure that is being optically measured by the apparatus. To measure the cumulative radiation exposure of a track etch foil, a high intensity collimated beam is passed through foil such that the pits and holes within the track etch foil cause a portion of the impinging light beam to become scattered upon exit. The scattered light is focused with a lens, while the primary collimated light beam (unscattered light) is blocked. The scattered light is focused by the lens onto an optical detector capable of registering the optical power of the scattered light, which corresponds to the cumulative radiation to which the track etch foil has been exposed.

BIPHASIC CATALYSIS IN WATER/CARBON DIOXIDE MICELLAR SYSTEMS

Gunilla B. Jacobson (C-ACT)
William Tumas (C-SIC)
Keith Johnston (E-DO)
U.S. Patent No. 6,479,708

A process is provided for catalyzing an organic reaction to form a reaction product by placing reactants and a catalyst for the organic reaction, the catalyst of a metal complex and at least one ligand soluble within one of the phases of said aqueous biphasic system, within an aqueous biphasic system including a water phase, a dense phase fluid, and a

surfactant adapted for forming an emulsion or microemulsion within the aqueous biphasic system, the reactants soluble within one of the phases of the aqueous biphasic system and convertible in the presence of the catalyst to a product having low solubility in the phase in which the catalyst is soluble; and, maintaining the aqueous biphasic system under pressures, at temperatures, and for a period of time sufficient for the organic reaction to occur and form the reaction product and to maintain sufficient density on the dense phase fluid, the reaction product characterized as having low solubility in the phase in which the catalyst is soluble.

PROCESS AND APPARATUS FOR MAKING ORIENTED CRYSTAL LAYERS

Robert W. Springer (MST-7)
U.S. Patent No. 6,485,565

Thin films of single crystal-like materials are made by using flow-through ion beam deposition during specific substrate rotation around an axis in a clocking action. The substrate is quickly rotated to a selected deposition position, paused in the deposition position for ionized material to be deposited, then quickly rotated to the next selected deposition position. The clocking motion can be achieved by use of a lobed cam on the spindle with which the substrate is rotated or by stopping and starting a stepper motor at long and short intervals. Other symmetries can be programmed

into the process, allowing virtually any oriented inorganic crystal to be grown on the substrate surface.

PLASMA ACCELERATOR

Zhehui Wang (P-24)
Cris W. Barnes (P-24)
U.S. Patent No. 6,486,593 (DOE)

There has been invented an apparatus for acceleration of a plasma having coaxially positioned, constant diameter, cylindrical electrodes which are modified to converge (for a positive polarity inner electrode and a negatively charged outer electrode) at the plasma output end of the annulus between the electrodes to achieve improved particle flux per unit of power.

METHOD FOR CHARACTERIZING RESIDUAL STRESS IN METALS

Loren A. Jacobson (MST-6)
David J. Michel
Jeffrey R. Wyatt
U.S. Patent No. 6,487,915 (DOE)

A method is provided for measuring the residual stress in metals. The method includes the steps of drilling one or more holes in a metal workpiece to a preselected depth and mounting one or more acoustic sensors on the metal workpiece and connecting the sensors to an electronic detecting and recording device. A liquid metal capable of penetrating into the metal workpiece placed at the bottom of the hole or holes. A recording is made over a period of time (typically

within about two hours) of the magnitude and number of noise events that occur as the liquid metal penetrates into the metal workpiece. The magnitude and number of noise events are then correlated to the internal stress in the region of the workpiece at the bottom of the hole.

METHANOL SENSOR OPERATED IN A PASSIVE MODE

Xiaoming Ren (MST-11)
Shimshon Gottesfeld (MST-11)
U.S. Patent No. 6,488,837

A sensor outputs a signal related to a concentration of methanol in an aqueous solution adjacent the sensor. A membrane electrode assembly (MEA) is included with an anode side and a cathode side. An anode current collector supports the anode side of the MEA and has a flow channel therethrough for flowing a stream of the aqueous solution and forms a physical barrier to control access of the methanol to the anode side of the MEA. A cathode current collector supports the cathode side of the MEA and is configured for air access to the cathode side of the MEA. A current sensor is connected to measure the current in a short circuit across the sensor electrodes to provide an output signal functionally related to the concentration of methanol in the aqueous solution.

PRODUCTION OF HIGH SPECIFIC ACTIVITY COPPER-67

David J. Jamriska (C-INC)
Wayne A. Taylor (NMT-11)
Martin A. Ott (C-INC)
Malcolm M. Fowler (C-INC)
Richard Heaton (C-INC)
U.S. Patent No. 6,490,330

A process for the selective production and isolation of high specific activity Cu^{67} from proton-irradiated enriched Zn^{70} target comprises target fabrication, target irradiation with low energy (<25 MeV) protons, chemical separation of the Cu^{67} product from the target material and radioactive impurities of gallium, cobalt, iron, and stable aluminum via electrochemical methods or ion exchange using both anion and cation organic ion exchangers, chemical recovery of the enriched Zn^{70} target material, and fabrication of new targets for re-irradiation is disclosed.

AIR BREATHING DIRECT METHANOL FUEL CELL

Xiaoming Ren (MST-11)
U.S. Patent No. 6,492,052

An air breathing direct methanol fuel cell is provided with a membrane electrode assembly, a conductive anode assembly that is permeable to air and directly open to atmospheric air, and a conductive cathode assembly that is permeable to methanol and directly contacting a liquid methanol source.

RADIATION DELIVERY SYSTEM AND METHOD

Scott A. Sorensen
Thomas W. Robison (C-ACT)
Craig M. Taylor (C-ACT)
U.S. Patent No. 6,500,108

A radiation delivery system and method are described. The system includes a treatment configuration such as a stent, balloon catheter, wire, ribbon, or the like, a portion of which is covered with a gold layer. Chemisorbed to the gold layer is a radiation-emitting self-assembled monolayer or a radiation-emitting polymer. The radiation delivery system is compatible with medical catheter-based technologies to provide a therapeutic dose of radiation to a lesion following an angioplasty procedure.

METHOD AND APPARATUS FOR DETERMINING THE COORDINATES OF AN OBJECT

Paul S. Pedersen (CCS-3)
Robert J. Sebring (MST-7)
U.S. Patent No. 6,504,605

A method and apparatus is described for determining the coordinates on the surface of an object that is illuminated by a beam having pixels that have been modulated according to predetermined mathematical relationships with pixel position within the modulator. The reflected illumination is registered by an image sensor at a known location that registers the intensity of the pixels as received. Computa-

tions on the intensity, which relate the pixel intensities received to the pixel intensities transmitted at the modulator, yield the proportional loss of intensity and planar position of the originating pixels. The proportional loss and position information can then be utilized within triangulation equations to resolve the coordinates of associated surface locations on the object.

PREPARATION OF ENERGY STORAGE MATERIALS

Lin Song Li (MST-STC)
Quanxi Jia (MST-STC)
U.S. Patent No. 6,508,959

A process is provided for the preparation of a metallic oxide composite including mixing an aqueous solution of a water-soluble metal compound and colloidal silica, depositing the mixture upon a substrate, heating the mixture-coated substrates at temperatures from about 150° C to about 300° C for time sufficient to form a metallic oxide film, and removing the silica from the metallic oxide film whereby a porous metal oxide structure is formed.

SYNTHESIS OF MAGNESIUM DIBORIDE BY MAGNESIUM VAPOR INFILTRATION PROCESS (MVIP)

Adriana C. Serquis (MST-STC)
Yuntian T. Zhu (MST-STC)
Frederick M. Mueller (MST-STC)
Dean E. Peterson (MST-STC)
Xiaozhou Liao (MST-STC)
U.S. Patent No. 6,511,943

A process of preparing superconducting magnesium diboride powder by heating an admixture of solid magnesium and amorphous boron powder or pellet under an inert atmosphere in a Mg:B ratio of greater than about 0.6:1 at temperatures and for time sufficient to form said superconducting magnesium diboride. The process can further include exposure to residual oxygen at high synthesis temperatures followed by slow cooling. In the cooling process oxygen atoms dissolved into MgB_2 segregated to form nanometer-sized coherent $Mg(B,O)$ precipitates in the MgB_2 matrix, which can act as flux pinning centers.

LASER IGNITION

James W. Early (DX-1)
Charles S. Lester (DX-1)
U.S. Patent No. 6,514,069

In the apparatus of the invention, a first excitation laser or other excitation light source is used in tandem with an ignitor laser to provide a compact, durable, engine deployable fuel ignition laser system. Reliable fuel ignition is provided

over a wide range of fuel conditions by using a single remote excitation light source for one or more small lasers located proximate to one or more fuel combustion zones. In a third embodiment, alternating short and long pulses of light from the excitation light source are directed into the ignitor laser. Each of the embodiments of the invention can be multiplexed so as to provide laser light energy sequentially to more than one ignitor laser.

CHEMICAL SYNTHESIS OF WATER-SOLUBLE, CHIRAL CONDUCTING- POLYMER COMPLEXES

Hsing-Lin Wang (B-4)
Patrick McCarthy (B-4)
Sze Cheng Yang
U.S. Patent No. 6,514,432

The template-guided synthesis of water-soluble, chiral conducting-polymer complexes is described. Synthesis of water-soluble polyaniline complexes is achieved by carefully controlling the experimental parameters such as acid concentration, ionic strength, monomer/template ratio, total reagent concentration, and order of reagent addition. Chiral (helical) polyaniline complexes can be synthesized by addition of a chiral inducing agent (chiral acid) prior to polymerization, and the polyaniline helix can be controlled by the addition of the (+) or (-) form of the chiral acid. Moreover the quantity of chiral acid and the salt content has a significant impact on the degree of chirality in the final polymer

complexes. The polyaniline and the template have been found to be mixed at the molecular level, which results in chiral complexes that are robust through repeated doping and dedoping cycles.

CATALYSTS FOR LEAN BURN ENGINE EXHAUST ABATEMENT

Kevin C. Ott (C-SIC)
Noline C. Clark (C-SIC)
Mark T. Paffett (C-SIC)
U.S. Patent No. 6,514,470

The present invention provides a process for catalytically reducing nitrogen oxides in an exhaust gas stream containing nitrogen oxides and a reductant material by contacting the gas stream under conditions effective to catalytically reduce the nitrogen oxides with a catalyst comprising an aluminum-silicate type material and a minor amount of a metal, the catalyst characterized as having sufficient catalytic activity so as to reduce the nitrogen oxides by at least 60 percent under temperatures within the range of from about 200° C to about 400° C.

TIME-OF-FLIGHT ION MASS SPECTROGRAPH

Herbert O. Funsten Jr. (ISR)
David J. McComas (ISR)
U.S. Patent No. 6,521,887

An ungated, time-of-flight ion mass spectrograph utilizing a continuous ion beam that is rastered (swept) by electrostatic deflection plates at the entrance of a time-of-flight drift tube is described. After an ion is

deflected, it follows a trajectory in the drift tube that depends on the phase of the raster and is detected by a position-sensitive detector. The detected position provides information concerning the time when the ion entered the drift tube. This information, when combined with knowledge of the raster voltage at the time that the ion was detected, provides a method for determining the time-of-flight of the ion in the drift tube. Using the time-of-flight and the distance traveled in the drift tube, which is also determined by the detected position of the ion, ion speed is determined. Ion mass-per-charge ratio can then be determined for a monoenergetic ion beam. When electrostatic rastering is performed in a direction that is orthogonal to deflection with a constant electric field, the ion speed, energy-per-charge ratio, and mass-per-charge ratio can be determined. The present ungated time-of-flight apparatus permits high duty cycle and therefore, rapid acquisition of mass spectra.

OPTICAL LIMITING DEVICE AND METHOD OF PREPARATION THEREOF

Hsing-Lin Wang (B-4)

Su Xu (C-PCS)

Duncan W. McBranch (C-PCS)

U.S. Patent No. 6,522,447

Optical limiting device and method of preparation thereof. The optical limiting device includes a transparent substrate and at least one homogeneous layer of an RSA material in polyvinylbutyral

attached to the substrate. The device may be produced by preparing a solution of an RSA material, preferably a metallophthalocyanine complex and a solution of polyvinylbutyral, and then mixing the two solutions together to remove air bubbles. The resulting solution is layered onto the substrate and the solvent is evaporated. The method can be used to produce a dual tandem optical limiting device.

PROTON RECOIL SCINTILLATOR NEUTRON REM METER

Richard H. Olsher (HSR-4)

David T. Seagraves (HSR-4)

U.S. Patent No. 6,529,573

A neutron rem meter utilizing proton recoil and thermal neutron scintillators to provide neutron detection and dose measurement. In using both fast scintillators and a thermal neutron scintillator the meter provides a wide range of sensitivity, uniform directional response, and uniform dose response. The scintillators output light to a photomultiplier tube that produces an electrical signal to an external neutron counter.

LOGARITHMIC COMPRESSION METHODS FOR SPECTRAL DATA

Mark E. Dunham (D-DOD)

U.S. Patent No. 6,529,927

A method is provided for logarithmic compression, transmission, and expansion of spectral data. A log Gabor transformation is made

of incoming time series data to output spectral phase and logarithmic magnitude values. The output phase and logarithmic magnitude values are compressed by selecting only magnitude values above a selected threshold and corresponding phase values to transmit compressed phase and logarithmic magnitude values. A reverse log Gabor transformation is then performed on the transmitted phase and logarithmic magnitude values to output transmitted time series data to a user.

ALPHA-ENVIRONMENTAL CONTINUOUS AIR MONITOR INLET

John C. Rodgers (HSR-4)

U.S. Patent No. 6,530,287

A wind deceleration and protective shroud that provides representative samples of ambient aerosols to an environmental continuous air monitor (ECAM) has a cylindrical enclosure mounted to an input on the continuous air monitor, the cylindrical enclosure having shrouded nozzles located radially about its periphery. Ambient air, often along with rainwater, flows into the nozzles in a sampling flow generated by a pump in the continuous air monitor. The sampling flow of air creates a cyclonic flow in the enclosure that flows up through the cylindrical enclosure until the flow of air reaches the top of the cylindrical enclosure and then is directed downward to the continuous air monitor. A sloped platform located inside the cylindrical enclosure supports the

nozzles and causes any moisture entering through the nozzle to drain out through the nozzles.

SUPERCONDUCTING STRUCTURE

Chuhee Kwon (MST-STC)
Quanxi Jia (MST-STC)
Stephen R. Foltyn (MST-STC)
U.S. Patent No. 6,541,136

A superconductive structure including a dielectric oxide substrate, a thin buffer layer of a superconducting material thereon; and, a layer of a rare earth-barium-copper oxide superconducting film thereon; the thin layer of yttrium-barium-copper oxide, the rare earth selected from the group consisting of samarium, gadolinium, ytterbium, erbium, neodymium, dysprosium, holmium, lutetium, a combination of more than one element from the rare earth group and a combination of one or more elements from the rare earth group with yttrium, the buffer layer of superconducting material characterized as having chemical and structural compatibility with the dielectric oxide substrate and the rare earth-barium-copper oxide superconducting film is provided.

SYNTHESIS OF ²H- AND ¹³C-SUBSTITUTED DITHANES

Rodolfo A. Martinez (B-3)
Marc A. Alvarez (B-3)
Louis Silks III (B-3)
Clifford J. Unkefer (B-3)
U.S. Patent No. 6,541,671

The present invention is directed to labeled compounds, [^{2-¹³C}]dithiane wherein the ¹³C atom is directly bonded to one or two deuterium atoms. The present invention is also directed to processes of preparing [^{2-¹³C}]dithiane wherein the ¹³C atom is directly bonded to one or two deuterium atoms. The present invention is also directed to labeled compounds, e.g., [²H₁₋₂, ¹³C]methanol (arythio)-, acetates wherein the ¹³C atom is directly bonded to exactly one or two deuterium atoms.

COMBINED PLASMA/ LIQUID CLEANING OF SUBSTRATES

Gary S. Selwyn (P-24)
Ivars Henins (P-24)
U.S. Patent No. 6,546,938

Apparatus and method for cleaning substrates. A substrate is held and rotated by a chuck and an atmospheric pressure plasma jet places a plasma onto predetermined areas of the substrate. Subsequently liquid rinse is sprayed onto the predetermined areas. In one embodiment, a nozzle sprays a gas onto the predetermined areas to assist in drying the predetermined areas when needed.

SYNTHESIS OF FINE-GRAINED TATB

Kien-Yin Lee (DX-2)
James E. Kennedy (DX-1)
U.S. Patent No. 6,547,899

A method for producing fine-grained triamino-trinitrobenzene (TATB) powders having improved detonation-spreading performance and hence increased shock sensitivity when compared with that for ultra-fine TATB is described. A single-step, sonochemical amination of trichlorotrinitrobenzene using ammonium hydroxide solution in a sealed vessel yields TATB having approximately 6 μm median particle diameter and increased shock sensitivity.

PREPARATION OF 3,3'-DIAMINO-4,4'-AZOFURAZAN

Michael A. Hiskey (DX-2)
David E. Chavez (DX-2)
Robert L. Bishop (DX-2)
John F. Kramer (DX-2)
Scott A. Kinkead (DX-2)
U.S. Patent No. 6,552,201

A method of preparing 3,3'-diamino-4,4'-azofurazan is provided together with a composition of matter including a mixture of 3,3'-diamino-4,4'-azofurazan and 1,3,5-triamino-2,4,6-trinitrobenzene.

TAMPER-INDICATING DEVICE HAVING A GLASS BODY

Roger G. Johnston (C-ADI)
Anthony R. E. Garcia (C-ADI)
U.S. Patent No. 6,553,930

A tamper-indicating device is described. The device has a first glass body member and a second glass body member that are attached to each other through a hasp. The glass body members of the device can be tempered. The body members can be configured with hollow volumes into which powders, microparticles, liquids, gels, or combinations thereof are sealed. The choice, the amount, and the location of these materials can produce a visible, band pattern to provide each body member with a unique fingerprint identifier, which makes it extremely difficult to repair or replace once it is damaged in order to avoid tamper detection.

USE OF PROLINES FOR IMPROVING GROWTH AND OTHER PROPERTIES OF PLANTS AND ALGAE

Pat J. Unkefer (B-3)
Thomas J. Knight
Rodolfo A. Martinez (B-3)
U.S. Patent No. 6,555,500

Increasing the concentration of prolines, such as 2-hydroxy-5-oxoproline, in the foliar portions of plants has been shown to cause an increase in carbon dioxide fixation, growth rate, dry weight, nutritional value (amino acids), nodulation and nitrogen fixation, photosyn-

thetically derived chemical energy, and resistance to insect pests over the same properties for wild type plants. This can be accomplished in four ways: (1) the application of a solution of the proline directly to the foliar portions of the plant by spraying these portions; (2) applying a solution of the proline to the plant roots; (3) genetically engineering the plant and screening to produce lines that overexpress glutamine synthetase in the leaves which gives rise to increased concentration of the metabolite, 2-hydroxy-5-oxoproline (this proline is also known as 2-oxoglutarate); and (4) impairing the glutamine synthetase activity in the plant roots which causes increased glutamine synthetase activity in the leaves which gives rise to increased concentration of 2-hydroxy-5-oxoproline. Prolines have also been found to induce similar effects in algae.

IN SITU WELL CLEANING AND REFURBISHING DEVICE

Stephen G. McLin (RRES-WQH)
U.S. Patent No. 6,557,565

In order to simplify the cleaning and disinfection of water wells, perforated casings are installed outside and adjacent to a water well casing and screen. This installation provides cleaning and disinfection capability of the well without removing the well's pump. The number of adjacent perforated casings can range from one for a small diameter well to three or more for

larger diameter wells. The perforated casings define alternating blank sections and perforated sections.

METHOD FOR LASER MACHINING EXPLOSIVES AND ORDNANCE

Ross E. Muenchausen (MST-8)
Thomas Rivera (DX-2)
John A. Sanchez (DX-2)
U.S. Patent No. 6,559,413

Method for laser machining explosives and related articles. A laser beam is directed at a surface portion of a mass of high explosive to melt and/or vaporize the surface portion while directing a flow of gas at the melted and/or vaporized surface portion. The gas flow sends the melted and/or vaporized explosive away from the charge of explosive that remains. The method also involves splitting the casing of a munition having an encased explosive. The method includes rotating a munition while directing a laser beam to a surface portion of the casing of an article of ordnance. While the beam melts and/or vaporizes the surface portion, a flow of gas directed at the melted and/or vaporized surface portion sends it away from the remaining portion of ordnance. After cutting through the casing, the beam then melts and/or vaporizes portions of the encased explosive and the gas stream sends the melted/vaporized explosive away from the ordnance. The beam is continued until it splits the article, after which the encased explosive, now accessible, can be removed safely for recycle or disposal.

OSCILLATING SIDE-BRANCH ENHANCEMENTS OF THERMOACOUSTIC HEAT EXCHANGERS

Gregory W. Swift (MST-10)
U.S. Patent No. 6,560,970

A regenerator-based engine or refrigerator has a regenerator with two ends at two different temperatures, through which a gas oscillates at a first oscillating volumetric flow rate in the direction between the two ends and in which the pressure of the gas oscillates, and first and second heat exchangers, each of which is at one of the two different temperatures. A dead-end side branch into which the gas oscillates has compliance and is connected adjacent to one of the ends of the regenerator to form a second oscillating gas flow rate additive with the first oscillating volumetric flow rate, the compliance having a volume effective to provide a selected total oscillating gas volumetric flow rate through the first heat exchanger. This configuration enables the first heat exchanger to be configured and located to better enhance the performance of the heat exchanger rather than being confined to the location and configuration of the regenerator.

CANISTER, SEALING METHOD AND COMPOSITION FOR SEALING BOREHOLE

Donald W. Brown (EES-11)
Arun S. Wagh
U.S. Patent No. 6,561,269

Canister, sealing method and composition for sealing a borehole. The canister includes a container with slurry inside the container, one or more slurry exits at one end of the container, a pump at the other end of the container, and a piston inside that pushes the slurry through the slurry exit(s), out of the container, and into a borehole. An inflatable packer outside the container provides stabilization in the borehole. A borehole sealing material is made by combining an oxide or hydroxide and a phosphate with water to form a slurry which then sets to form a high strength, minimally porous material which binds well to itself, underground formations, steel and ceramics.

DRIFT STABILIZER FOR RECIPROCATING FREE- PISTON DEVICES

William C. Ward (ESA-AET)
John A. Corey
Gregory W. Swift (MST-10)
U.S. Patent No. 6,564,552

A free-piston device has a stabilized piston drift. A piston having a frequency of reciprocation over a stroke length and with first and second sides facing first and second variable volumes, respectively, for containing a working fluid defin-

ing an acoustic wavelength at the frequency of reciprocation. A bypass tube waveguide connects the first and second variable volumes at all times during reciprocation of the piston. The waveguide has a relatively low impedance for steady flow and a relatively high impedance for oscillating flow at the frequency of reciprocation of the piston, so that steady flow returns fluid leakage from about the piston between the first and second volumes while oscillating flow is not diverted through the waveguide. Thus, net leakage about the piston is returned during each stroke of the piston while oscillating leakage is not allowed and pressure buildup on either the first or second side of the piston is avoided to provide a stable piston location.

CORROSION PROTECTION

Donald W. Brown (EES-11)
Arun S. Wagh
U.S. Patent No. 6,569,263

There has been invented a chemically bonded phosphate corrosion protection material and process for application of the corrosion protection material for corrosion prevention. A slurry of iron oxide and phosphoric acid is used to contact a warm surface of iron, steel or other metal to be treated. In the presence of ferrous ions from the iron, steel or other metal, the slurry reacts to form iron phosphates, which form grains chemically bonded onto the surface of the steel.

ENHANCED PHOTOPHYSICS OF CONJUGATED POLYMERS

Liaohai Chen (B-4)

Su Xu (C-PCS)

Duncan W. McBranch (C-PCS)

David George Whitten (B-4)

U.S. Patent No. 6,569,952

The addition of oppositely charged surfactant to fluorescent ionic conjugated polymer forms a polymer-surfactant complex that exhibits at least one improved photophysical property. The conjugated polymer is a fluorescent ionic polymer that typically has at least one ionic side chain or moiety that interacts with the specific surfactant selected. The photophysical property improvements may include increased fluorescence quantum efficiency, wavelength-independent emission and absorption spectra, and more stable fluorescence decay kinetics. The complexation typically occurs in a solution of a polar solvent in which the polymer and surfactant are soluble, but it may also occur in a mixture of solvents. The solution is commonly prepared with a surfactant molecule:monomer repeat unit of polymer ratio ranging from about 1:100 to about 1:1. A polymer-surfactant complex precipitate is formed as the ratio approaches 1:1. This precipitate is recoverable and usable in many forms.

PREPARATION OF BIS- [1(2)H-TETRAZOL-5-YL]- AMINE MONOHYDRATE

Darren Naud (DX-2)

Michael A. Hiskey (DX-2)

U.S. Patent No. 6,570,022

A process of preparing bis-[1(2)H-tetrazol-5-yl]-amine monohydrate is provided including combining a dicyanamide salt, an azide salt and water to form a first reaction mixture, adding a solution of a first strong acid characterized as having a pKa of less than about 1 to said first reaction mixture over a period of time characterized as providing a controlled reaction rate so as to gradually form hydrazoic acid without loss of significant quantities of hydrazoic acid from the solution while heating the first reaction mixture at temperatures greater than about 65° C, heating the resultant reaction mixture at temperatures greater than about 65° C for a period of time sufficient to substantially completely form a reaction product, treating the reaction product with a solution of a second strong acid to form a product of bis-[1(2)H-tetrazol-5-yl]-amine monohydrate, and recovering the bis-[1(2)H-tetrazol-5-yl]-amine monohydrate product.

FORMING ADHERENT COATINGS USING PLASMA PROCESSING

Michael A. Nastasi (MST-8)

Kevin C. Walter (MST-8)

Donald J. Rej (SNS-DO)

U.S. Patent No. 6,572,933

Process for forming adherent coatings using plasma processing. Plasma Immersion Ion Processing (PIIP) is a process where energetic (hundreds of eV to many tens of keV) metallic and metalloid ions derived from high-vapor-pressure organometallic compounds in a plasma environment are employed to deposit coatings on suitable substrates, which coatings are subsequently relieved of stress using inert ion bombardment, also in a plasma environment, producing thereby strongly adherent coatings having chosen composition, thickness and density. Four processes are utilized: sputter-cleaning, ion implantation, material deposition, and coating stress relief. Targets are placed directly in a plasma and pulse biased to generate a non-line-of-sight deposition without the need for complex fixturing. If the bias is a relatively high negative potential (20 kV–100 kV) ion implantation will result. At lower voltages (50 V–10 kV), deposition occurs, and the extent of the surface modification can routinely be extended between 1 μm and 10 μm. By combining plasma based implantation and film deposition, coatings with greatly reduced stress are possible, allowing the ultimate coating thickness to be expanded to tens of microns.

OPTICALLY TRANSPARENT, SCRATCH- RESISTANT, DIAMOND- LIKE CARBON COATINGS

Xiao-Ming He (MST-8)
Deok-Hyung Lee (MST-8)
Michael A. Nastasi (MST-8)
Kevin C. Walter (MST-8)
Michel G. Tuszewski (ISR-2)
U.S. Patent No. 6,572,935

A plasma-based method for the deposition of diamond-like carbon (DLC) coatings is described. The process uses a radio-frequency inductively coupled discharge to generate a plasma at relatively low gas pressures. The deposition process is environmentally friendly and scalable to large areas, and components that have geometrically complicated surfaces can be processed. The method has been used to deposit adherent 100–400 nm thick DLC coatings on metals, glass, and polymers. These coatings are between three and four times harder than steel and are therefore scratch resistant and transparent to visible light. Boron and silicon doping of the DLC coatings have produced coatings having improved optical properties and lower coating stress levels but with slightly lower hardness.

METHOD FOR PRODUCING FLUORINATED DIAMOND- LIKE CARBON FILMS

Marko J. Hakovirta (MST-8)
Michael A. Nastasi (MST-8)
Deok-Hyung Lee (MST-8)
Xiao-Ming He (MST-8)
U.S. Patent No. 6,572,937

Fluorinated, diamond-like carbon (F-DLC) films are produced by a pulsed, glow-discharge plasma immersion ion processing procedure. The pulsed, glow-discharge plasma was generated at a pressure of 1 Pa from an acetylene (C_2H_2) and hexafluoroethane (C_2F_6) gas mixture, and the fluorinated, diamond-like carbon films were deposited on silicon $\langle 100 \rangle$ substrates. The film hardness and wear resistance were found to be strongly dependent on the fluorine content incorporated into the coatings. The hardness of the F-DLC films was found to decrease considerably when the fluorine content in the coatings reached about 20%. The contact angle of water on the F-DLC coatings was found to increase with increasing film fluorine content and to saturate at a level characteristic of polytetrafluoroethylene.

LASER WELDING OF FUSED QUARTZ

Martin S. Piltch (MST-6)
Robert W. Carpenter II (MST-6)
McIlwaine Archer III (MST-7)
U.S. Patent No. 6,576,863

Refractory materials, such as fused quartz plates and rods are welded using a heat source, such as a high power continuous wave carbon dioxide laser. The radiation is optimized through a process of varying the power, the focus, and the feed rates of the laser such that full penetration welds may be accomplished. The process of optimization varies the characteristic wavelengths of the laser until the radiation is almost completely absorbed by the refractory material, thereby leading to a very rapid heating of the material to the melting point. This optimization naturally occurs when a carbon dioxide laser is used to weld quartz. As such this method of quartz welding creates a minimum sized heat-affected zone. Furthermore, the welding apparatus and process require a ventilation system to carry away the silicon oxides that are produced during the welding process to avoid the deposition of the silicon oxides on the surface of the quartz plates or the contamination of the welds with the silicon oxides.

ARC SUPPRESSION CIRCUIT

Robert W. Springer (MST-7)
Donald E. Tolmie (CCN-5)
U.S. Patent No. 6,577,479

A circuit for suppressing electrical arcing in an ion beam source or other plasma devices is provided. The arc suppression circuit of this invention detects current rises on ion beam source grids which cause arcing, disconnects the current flowing to the grid, and grounds the ion beam source to allow excess charge and current to be drained from the ion beam source rather than letting the charge and current arc on the grids of the ion beam source. A novel timing sequence is used for activating and deactivating the arc suppression circuitry to prevent shorting out of the power source. The arc suppressor circuits of this invention can be used on devices other than ion beam sources or plasma devices.

DOSIMETER AND METHOD FOR USING THE SAME

Benjamin P. Warner (C-SIC)
Deidre M. Johns
U.S. Patent No. 6,582,657

A very sensitive dosimeter that detects ionizing radiation is described. The dosimeter includes a breakable sealed container. A solution of a reducing agent is inside the container. The dosimeter has an airtight dosimeter body with a transparent portion and an opaque portion. The transparent portion includes

a transparent chamber that holds the breakable container with the reducing agent. The opaque portion includes an opaque chamber that holds an emulsion of silver salt (AgX) selected from silver chloride, silver bromide, silver iodide, and combinations of them. A passageway in the dosimeter provides fluid communication between the transparent chamber and the opaque chamber. The dosimeter may also include a chemical pH indicator in the breakable container that provides a detectable color change to the solution for a pH of about 3–10. The invention also includes a method of detecting ionizing radiation that involves producing the dosimeter, breaking the breakable container, allowing the solution to flow through the passageway and contact the emulsion, detecting any color change in the solution and using the color change to determine a radiation dosage.

DOSIMETRY USING SILVER SALTS

Benjamin P. Warner (C-SIC)
U.S. Patent No. 6,583,425

The present invention provides a method for detecting ionizing radiation. Exposure of silver salt AgX to ionizing radiation results in the partial reduction of the salt to a mixture of silver salt and silver metal. The mixture is further reduced by a reducing agent, which causes the production of acid (HX) and the oxidized form of the reducing agent (R). Detection of HX indicates that the silver salt has been exposed to

ionizing radiation. The oxidized form of the reducing agent (R) may also be detected. The invention also includes dosimeters employing the above method for detecting ionizing radiation.

SINGLE PHOTON IMAGING AND TIMING ARRAY SENSOR APPARATUS AND METHOD

R. C. Smith (P-21)
U.S. Patent No. 6,583,863

An apparatus and method are disclosed for generating a three-dimension image of an object or target. The apparatus comprises a photon source for emitting a photon at a target. The emitted photons are received by a photon receiver for receiving the photon when reflected from the target. The photon receiver determines a reflection time of the photon and further determines an arrival position of the photon on the photon receiver. An analyzer is communicatively coupled to the photon receiver, wherein the analyzer generates a three-dimensional image of the object based upon the reflection time and the arrival position.

REFLECTIVE DIFFRACTION GRATING

Bruce C. Lamartine (MST)
U.S. Patent No 6,583,933

Reflective diffraction grating. A focused ion beam (FIB) micromilling apparatus is used to store color images in a durable medium by

milling away portions of the surface of the medium to produce a reflective diffraction grating with blazed pits. The images are retrieved by exposing the surface of the grating to polychromatic light from a particular incident bearing and observing the light reflected by the surface from specified reception bearing.

ENHANCED TAMPER INDICATOR

Anthony R. E. Garcia (C-ADI)
Roger G. Johnston (C-ADI)
U.S. Patent No. 6,588,812

The present invention provides an apparatus and method whereby the reliability and tamper-resistance of tamper indicators can be improved. A flexible connector may be routed through a latch for an enclosure such as a door or container, and the free ends of the flexible connector may be passed through a first locking member and firmly attached to an insert through the use of one or more attachment members such as set screws. A second locking member may then be assembled in interlocking relation with the first locking member to form an interlocked assembly around the insert. The insert may have one or more sharp projections extending toward the first or second locking member so that any compressive force applied in an attempt to disassemble the interlocked assembly results in permanent, visible damage to the first or second locking member.

POLYMER-ASSISTED AQUEOUS DEPOSITION OF METAL OXIDE FILMS

Alexander Dequan Li (MST-STC)
Quanxi Jia (MST-STC)
U.S. Patent No. 6,589,457

An organic solvent-free process for deposition of metal oxide thin films is presented. The process includes aqueous solutions of necessary metal precursors and an aqueous solution of a water-soluble polymer. After a coating operation, the resultant coating is fired at high temperatures to yield optical quality metal oxide thin films.

METHOD FOR DETECTING BIOLOGICAL AGENTS

Liaohai Chen (B-4)
Duncan W. McBranch (C-PCS)
Hsing-Lin Wang (B-4)
David G. Whitten (B-4)
U.S. Patent No. 6,589,731

A sensor element is provided including a polymer exhibiting a measurable property from the group of luminescence and electrical conductivity, the polymer being complexed with a unit including a recognition element, a tethering element and a property-altering element bound thereto so as to alter the measurable property, the unit being susceptible of subsequent separation from the polymer upon exposure to an agent having an affinity for binding to the recognition element whereupon the separation of the unit from the polymer results in a detectable change in the measurable property.

USE OF PROLINES FOR IMPROVING GROWTH AND OTHER PROPERTIES OF PLANTS AND ALGAE

Clifford J. Unkefer (B-3)
Thomas J. Knight
Rodolfo A. Martinez (B-3)
U.S. Patent No. 6,593,275

Increasing the concentration of prolines, such as 2-hydroxy-5-oxo-proline, in the foliar portions of plants has been shown to cause an increase in carbon dioxide fixation, growth rate, dry weight, nutritional value (amino acids), nodulation and nitrogen fixation, photosynthetically derived chemical energy, and resistance to insect pests over the same properties for wild type plants. This can be accomplished in four ways: (1) the application of a solution of the proline directly to the foliar portions of the plant by spraying these portions; (2) applying a solution of the proline to the plant roots; (3) genetically engineering the plant and screening to produce lines that over-express glutamine synthetase in the leaves which gives rise to increased concentration of the metabolite, 2-hydroxy-5-oxoproline (this proline is also known as 2-oxoglutamate); and (4) impairing the glutamine synthetase activity in the plant roots which causes increased glutamine synthetase activity in the leaves which gives rise to increased concentration of 2-hydroxy-5-oxoproline. Prolines have also been found to induce similar effects in algae.

A HIGH PRESSURE NEON ARC LAMP

Robert C. Sze (C-PCS)

Irving Bigio (B-3)

U.S. Patent No. 6,593,706

A high-pressure neon arc lamp and method of using the same for photodynamic therapies is provided. The high-pressure neon arc lamp includes a housing that encloses a quantity of neon gas pressurized to about 500 Torr to about 22,000 Torr. At each end of the housing the lamp is connected by electrodes and wires to a pulse generator. The pulse generator generates an initial pulse voltage to break down the impedance of the neon gas. Then the pulse generator delivers a current through the neon gas to create an electrical arc that emits light having wavelengths from about 620 nanometers to about 645 nanometers. A method for activating a photosensitizer is provided. Initially, a photosensitizer is administered to a patient and allowed time to be absorbed into target cells. Then the high pressure neon arc lamp is used to illuminate the target cells with red light having wavelengths from about 620 nanometers to about 645 nanometers. The red light activates the photosensitizers to start a chain reaction that may involve oxygen free radicals to destroy the target cells. In this manner, a high pressure neon arc lamp that is inexpensive and efficiently generates red light useful in photodynamic therapy is provided.

MAGNETIC PROCESS FOR REMOVING HEAVY METALS FROM WATER EMPLOYING MAGNETITES

F. Coyne Prenger (ESA-AET)

Dallas D. Hill (ESA-AET)

Dennis D. Padilla (NMT-11)

Robert M. Wingo (ESA-AET)

Laura A. Worl (NMT-11)

Michael D. Johnson (SSS-FSA1)

U.S. Patent No. 6,596,182

A process for removing heavy metals from water is provided. The process includes the steps of introducing magnetite to a quantity of water containing heavy metal. The magnetite is mixed with the water such that at least a portion of, and preferably the majority of, the heavy metal in the water is bound to the magnetite. Once this occurs the magnetite and absorbed metal is removed from the water by application of a magnetic field. In most applications the process is achieved by flowing the water through a solid magnetized matrix, such as steel wool, such that the magnetite magnetically binds to the solid matrix. The magnetized matrix preferably has remnant magnetism, but may also be subject to an externally applied magnetic field. Once the magnetite and associated heavy metal is bound to the matrix, it can be removed and disposed of, such as by reverse water or air and water flow through the matrix. The magnetite may be formed *in situ* by the addition of the necessary quantities of Fe(II) and Fe(III) ions, or pre-formed magnetite may be added, or a combination of seed and *in-situ* formation may be used. The invention also relates to an apparatus for

performing the removal of heavy metals from water using the process outlined above.

AIR BREATHING DIRECT METHANOL FUEL CELL

Xiaoming Ren (MST-11)

U.S. Patent No. 6,596,422

A method for activating a membrane electrode assembly for a direct methanol fuel cell is disclosed. The method comprises operating the fuel cell with humidified hydrogen as the fuel followed by running the fuel cell with methanol as the fuel.

REAL TIME VIABILITY DETECTION OF BACTERIAL SPORES

Laura A. Vanderberg (C-ACS)

Timothy J. Herdendorf (C-4)

Richard Obiso Jr. (C-4)

U.S. Patent No. 6,599,715

This invention relates to a process for detecting the presence of viable bacterial spores in a sample and to a spore detection system, the process including placing a sample in a germination medium for a period of time sufficient for commitment of any present viable bacterial spores to occur, mixing the sample with a solution of a lanthanide capable of forming a fluorescent complex with dipicolinic acid, and, measuring the sample for the presence of dipicolinic acid, and the system including a germination chamber having inlets from a sample chamber, a germinant chamber and a bleach chamber, the germination chamber further including an outlet through

a filtering means, the outlet connected to a detection chamber, the detection chamber having an inlet from a fluorescence promoting metal chamber and the detection chamber including a spectral excitation source and a means of measuring emission spectra from a sample, the detection chamber further connected to a waste chamber. A germination reaction mixture useful for promoting commitment of any viable bacterial spores in a sample including a combination of L-alanine, L-asparagine and D-glucose is also described.

INCORPORATION OF ADDITIVES INTO POLYMERS

Thomas M. McCleskey (C-SIC)
Matthew Z. Yates (C-SIC)
U.S. Patent No. 6,599,962

A method has been invented for incorporating additives into polymers comprising: (a) forming an aqueous or alcohol-based colloidal system of the polymer; (b) emulsifying the colloidal system with a compressed fluid; and (c) contacting the colloidal polymer with the additive in the presence of the compressed fluid. The colloidal polymer can be contacted with the additive by having the additive in the compressed fluid used for emulsification or by adding the additive to the colloidal system before or after emulsification with the compressed fluid. The invention process can be carried out either as a batch process or as a continuous on-line process.

SUPERCONDUCTING STRUCTURE INCLUDING MIXED RARE EARTH BARIUM-COPPER COMPOSITIONS

Chuhee Kwon (MST-STC)
Quanxi Jia (MST-STC)
Stephen R. Foltyn (MST-STC)
James L. Smith (MST-6)
Charles G. Peterson (P-21)
William L. Hults (MST-6)
U.S. Patent No. 6,602,588

A superconductive structure including a dielectric oxide substrate and a thin layer of a rare earth-barium-copper oxide superconducting film thereon, the thin layer including at least two rare earth elements is provided.

ELECTRODES FOR SOLID STATE GAS SENSOR

Rangachary Mukundan (MST-11)
Eric L. Brosha (MST-11)
Fernando H. Garzon (MST-11)
U.S. Patent No. 6,605,202

A mixed potential electrochemical sensor for the detection of gases has a ceria-based electrolyte with a surface for exposing to the gases to be detected, and with a reference wire electrode and a sensing wire electrode extending through the surface and fixed within the electrolyte as the electrolyte is compressed and sintered. The electrochemical sensor is formed by placing a wire reference electrode and a wire sensing electrode in a die, where each electrode has a first compressed planar section and a second section depending from the

first section with the second section of each electrode extending axially within the die. The die is filled with an oxide-electrolyte powder and the powder is pressed within the die with the wire electrodes. The wire-electrodes and the pressed oxide-electrolyte powder are sintered to form a ceramic electrolyte base with a reference wire electrode and a sensing wire electrode depending therefrom.

METHOD AND APPARATUS FOR LARGE MOTOR CONTROL

Chris R. Rose (ADWP)
Ronald O. Nelson (LANSCE-12)
U.S. Patent No. 6,605,920

Apparatus and method for providing digital signal processing method for controlling the speed and phase of a motor involves inputting a reference signal having a frequency and relative phase indicative of a time based signal; modifying the reference signal to introduce a slew-rate limited portion of each cycle of the reference signal; inputting a feedback signal having a frequency and relative phase indicative of the operation of said motor; modifying the feedback signal to introduce a slew-rate limited portion of each cycle of the feedback signal; analyzing the modified reference signal and the modified feedback signal to determine the frequency of the modified reference signal and of the modified feedback signal and said relative phase between said modified reference signal and said modified feedback signal; and

outputting control signals to the motor for adjusting said speed and phase of the motor based on the frequency determination and determination of the relative phase.

MICROALLOYING OF TRANSITION METAL SILICIDES BY MECHANICAL ACTIVATION AND FIELD-ACTIVATED REACTION

Zuhair A. Munir
Joe N. Woolman
John J. Petrovic (MST-DO)
U.S. Patent No. 6,613,276

Alloys of transition metal silicides that contain one or more alloying elements are fabricated by a two-stage process involving mechanical activation as the first stage and densification and field-activated reaction as the second stage. Mechanical activation, preferably performed by high-energy planetary milling, results in the incorporation of atoms of the alloying element(s) into the crystal lattice of the transition metal, while the densification and field-activated reaction, preferably performed by spark plasma sintering, result in the formation of the alloyed transition metal silicide. Among the many advantages of the process is its ability to accommodate materials that are incompatible in other alloying methods.

DETERMINATION OF BASE (NUCLEOTIDE) COMPOSITION IN DNA OLIGOMERS BY MASS SPECTROMETRY

Xian Chen (B-2)
U.S. Patent No. 6,613,509

The determination of base (nucleotide) composition in DNA by mass spectrometry is described. Accurate and efficient analyses of the enormous pool of DNA sequences are required for; (a) validation of DNA sequences; (b) comparison of a parent (known) sequence with a related (unknown) sequence, and (c) characterization of sequence polymorphisms in various genes especially those associated with genetically inherited human diseases. The combination of stable isotope-labeling of PCR products of target sequences with analysis of the mass shifts by mass spectrometry (MS) is shown to provide such analyses, since the mass-shift due to the labeling of a single type of nucleotide (i.e., A, T, G, or C) identifies the number of that type of nucleotide in a given DNA fragment. Accurate determinations of nucleotide compositions of DNA fragments have been achieved with an accuracy of $\pm 0.03\%$ with respect to their known sequences. The method has also been applied to identify a known single-nucleotide polymorphism (SNP). The comparisons of nucleotide compositions determined according to the teachings of the present method among homologous sequences are useful in sequence validation, sequence comparison, and characterizations of sequences polymorphisms.

HIGH CRITICAL CURRENT SUPERCONDUCTING TAPES

Terry G. Holesinger (MST-6)
Quanxi Jia (MST-STC)
Stephen R. Foltyn (MST-STC)
U.S. Patent No. 6,624,122

Improvements in critical current capacity for superconducting film structures are disclosed and include the use of a superconducting RE-BCO layer including a mixture of rare earth metals, e.g., yttrium and europium, where the ratio of yttrium to europium in the RE-BCO layer ranges from about 3 to 1 to from about 1.5 to 1.

ADJUSTABLE DIRECT CURRENT AND PULSED CIRCUIT FAULT CURRENT LIMITER

Heinrich J. Boenig (MST-STC)
Josef B. Schillig (MST-NHMFL)
U.S. Patent No. 6,624,993

A fault current limiting system for direct current circuits and for pulsed power circuit. In the circuits, a current source biases a diode that is in series with the circuits' transmission line. If fault current in a circuit exceeds current from the current source biasing the diode open, the diode will cease conducting and route the fault current through the current source and an inductor. This limits the rate of rise and the peak value of the fault current.

INFLUENZA SENSOR

Basil I. Swanson (B-4)
Xuedong Song (B-4)
Clifford J. Unkefer (B-3)
Louis A. Silks III (B-3)
Jurgen G. Schmidt (B-3)
U.S. Patent No. 6,627,396

A sensor for the detection of tetrameric multivalent neuraminidase within a sample is disclosed, where a positive detection indicates the presence of a target virus within the sample. Also disclosed is a trifunctional composition of matter including a trifunctional linker moiety with groups bonded thereto including (a) an alkyl chain adapted for attachment to a substrate, (b) a fluorescent moiety capable of generating a fluorescent signal, and (c) a recognition moiety having a spacer group of a defined length thereon, the recognition moiety capable of binding with tetrameric multivalent neuraminidase.

IDENTIFICATION OF THE GENE CAUSING FAMILIAL MEDITERRANEAN FEVER

Daniel I. Kastner
Ivona Aksentijevichh
Michael Centola
Zuoming Deng (STB-CHGS)
Ramen Sood
Francis S. Collings
Trevor Blake
Paul Liu
Nathan Fischel-Ghodsian
Deborah L. Gumucio
Robert I. Richards
Darrell O. Ricke (B-1)
Norman A. Doggett (B-5)
Mordechai Pras
U.S Patent No. 6,627,745

The invention provides the nucleic acid sequence encoding the protein associated with familial Mediterranean fever (FMF). The cDNA sequence is designated as MEFV. The invention is also directed towards fragments of the DNA sequence, as well as the corresponding sequence for the RNA transcript and fragments thereof. Another aspect of the invention provides the amino acid sequence for a protein (pyrin) associated with FMF. The invention is directed towards both the full-length amino acid sequence, fusion proteins containing the amino acid sequence, and fragments thereof. The invention is also directed towards mutants of the nucleic acid and amino acid sequences associated with FMF. In particular, the invention discloses three missense mutations, clustered in within about 40 to 50 amino acids, in the highly conserved rfp (B30.2) domain at the C-terminal

of the protein. These mutants include M680I, M694V, K695R, and V726A. Additionally, the invention includes methods for diagnosing a patient at risk for having FMF and kits thereof.

TEMPORAL DOSIMETER AND METHOD

Benjamin P. Warner (C-SIC)
Thomas A. Lopez (ISR-10)
U.S. Patent No. 6,627,891

The invention includes a temporal dosimeter. One dosimeter embodiment includes a housing that is opaque to visible light but transparent to ionizing radiation. The dosimeter also includes a sensor for recording dosages of ionizing radiation, a drive mechanism, a power source, and rotatable shields that work together to produce a compound aperture to unveil different portions of the sensor at different times to ionizing radiation. Another dosimeter embodiment includes a housing, a sensor, a shield with an aperture portion, and a linear actuator drive mechanism coupled to the sensor for moving the sensor past the aperture portion. The sensor turns as it moves past the aperture, tracing a timeline record of exposure to ionizing radiation along a helical path on the sensor.

DISTINGUISHED AWARDS

DISTINGUISHED PATENT AWARD

The Distinguished Patent Award honors inventors whose patented invention exhibits outstanding innovation. The award is selected by the Laboratory Fellows and recognizes a premier patent exemplifying significant technical advance, adaptability to public use, and noteworthy value to the mission of Los Alamos National Laboratory. The patent and the inventors recognized for this award reflect the Laboratory's stalwart tradition of superior technical innovation and creativity.

2003 Award Winner

Greg Swift of the Materials Science and Technology Division is the recipient of the 2003 Distinguished Patent Award for his patent "Oscillating Side-Branch Enhancements of Thermoacoustic Heat Exchangers." Since the early 1980s, LANL researchers, led primarily by Swift, have been developing engines and refrigerators powered by acoustic power (sound waves). In one design, the sound waves conduct thermal energy through the device using a regenerator that enables a temperature gradient to be established. Each end of the regenerator has a heat exchanger: one for adding heat and one for removing heat. This enhancement to the heat exchanger design by Swift and his team of researchers has yielded a method that makes the heat exchanger less costly and more efficient to build than previous designs.

The present invention relies on side branch compliances, i.e., volumes

for storing and supplying oscillating fluid. This optimizes volumetric flow rate in the regenerator while maintaining an overall volumetric flow rate for energy transfer to be the sum of the volumetric flow rate in the regenerator and in the side branch. The side branch compliance attaches to the regenerator through a side-branch junction. The heat exchanger can be located on either side of this junction, allowing the heat exchanger design to be somewhat independent of the regenerator geometry; hence, it can be developed more efficiently and less expensively than previous designs.

In earlier designs, the heat exchangers are placed in series with the regenerator with the flow of working fluid moving through the regenerator. This places design constraints on the size of the heat exchangers and on the oscillating volumetric flow rate that result in less than optimal operating parameters in oscillating pressure and oscillating volumetric flow rate. These geometric restraints make it difficult to build inexpensive heat exchangers with excellent heat transfer characteristics.

The simple expedient of providing a side-branch compliance coupled to regenerators in a thermoacoustic device results in increased efficiency for the device as well as a less expensive device. Such results do not always occur simultaneously. The advantages of increased efficiency and decreased cost make the thermoacoustic engine and its cooling applications more feasible for commercial development and enhance the utility of the

technology for multiple applications including mixture separations such as petroleum refining, air separation to produce oxygen, nitrogen, argon, and other gases, and natural gas liquefaction.

DISTINGUISHED LICENSING AWARD

The Distinguished Licensing Award recognizes an innovator who proactively engages in commercialization activities at Los Alamos National Laboratory and has had a positive impact on the Laboratory's Licensing Program. This individual, by example, demonstrates outstanding success in transferring Laboratory-developed technologies to the public and private sectors. In addition, the recipient's commercialization track record has served to enhance the reputations of both the University of California and the Laboratory.

Nominees for this award are evaluated based on ongoing active engagement in the licensing process; active participation in the promotion of their technologies; number of technologies licensed; number of licenses per technology; and support for multiple uses of the licensed technologies (private and public).

The recipient of this distinguished award is a champion for the Laboratory's licensing program and is recognized for his or her role in confirming the benefits of proactive technology commercialization activities.

2003 Award Winner

Gregory Swift of the Materials Science and Technology Division's Condensed Matter and Thermal Physics Group is the recipient of the 2003 Distinguished Licensing Award. For more than 20 years, Swift's work has focused on thermoacoustic engine and cooling technologies. Beginning in 1983, Swift was awarded a patent for his acoustical heat pumping engine and, since then, has submitted 27 invention disclosures and been awarded 32 patents (which includes several "continuation-in-part" applications). Presently, he and his team of co-inventors have five patent applications pending with the United States Patent and Trademark Office.

Swift has been a pioneer in the Laboratory's technology transfer activities. He was the principal investigator on one of the Lab's first cooperative research and development agreements (CRADAs). In total, he has worked on six CRADAs with companies in the area of thermoacoustic engine and cooling applications. One of these partnerships, which focused on advancing the technology for thermoacoustic cooling of natural gas, was described in the March 20, 2003 edition of *The Economist*.

Swift and his team also received a 1999 R&D 100 award from *R&D Magazine* for their acoustic Stirling heat engine technology. The LANL heat engine design, which uses no moving parts, converts heat into acoustic power that may be used in acoustic refrigerators or pulse-tube

refrigerators. The heat engine may also be used to produce electricity. *R&D Magazine* granted the award based on the acoustic Stirling heat engine's potential for significant commercial promise.

Swift is an advocate for and active participant in the licensing process at the Laboratory. His first technology was commercially licensed in 1992. In total, the University of California has granted rights in his technologies in four different license agreements for commercialization of his thermoacoustic engine and cooling technologies.

Swift's most recent collaborative research efforts focus on the use of his thermoacoustic technologies for a wide array of gas separation applications. These include the petroleum and natural gas industries for separation of crude oil and for natural gas liquefaction, air separation for oxygen, nitrogen, and argon production and for refrigeration applications.

Greg Swift's exemplary work sets a standard of excellence in support of the Laboratory's technology transfer mission.

DISTINGUISHED ENTREPRENEUR AWARD

The 2003 Distinguished Entrepreneur Award honors an individual whose hard work, ingenuity, innovation, and perseverance have contributed significantly to the Laboratory's ongoing efforts in commercialization and entrepreneurship, specifically in our region. This distinguished entrepreneur has demonstrated substantial financial and personal risk taking, innovative and creative thinking, professional business planning, the highest integrity in his business dealings, and the intent to contribute to the regional economy through the creation of wealth and new jobs.

The award winner is a pioneer in helping to create a new and vibrant entrepreneurial community in Northern New Mexico. In addition, he serves as a successful role model for others considering the pursuit of an entrepreneurial venture in the region.

2003 Award Winner

Benjamin Warner of the Chemistry Division is the recipient of this year's Distinguished Entrepreneur Award. His work includes inventions in a variety of fields, including radiation dosimetry, electrochromic window technology, and micro x-ray fluorescence for drug discovery. His ability to innovate is apparent not only in the development of these technologies, but also in his tenacity to derive as much commercial value as possible from the

inventions he has developed. His entrepreneurial spirit and drive have been a catalyst to other LANL scientists, encouraging and facilitating more commercialization and start-ups from the Lab. Warner has always been willing to learn, adapt and put in the extra effort required to ensure the successful commercialization of his technologies.

In the past year, Warner has aided in the achievement of major milestones in the commercialization of the radiation dosimeter and successful licensing of the electrochromic window technology to a qualified small business. In addition, he developed a complete business plan for his micro x-ray fluorescence technology, formed a company to compete for a license to the technology, has begun recruiting management, and is seeking startup capital to mold his vision of the technology into an entity that will help save lives and benefit society. He covers all bases with professionalism and acute attention to detail. In addition, his strong initiative and positive attitude have helped drive his vision forward, even in the face of adversity. He represents the true entrepreneurial spirit that dwells within many researchers at the Lab.

Benjamin Warner allows this spirit to manifest itself in the realization of great projects and dreams and motivates others to follow in his path.

LICENSING GROWTH

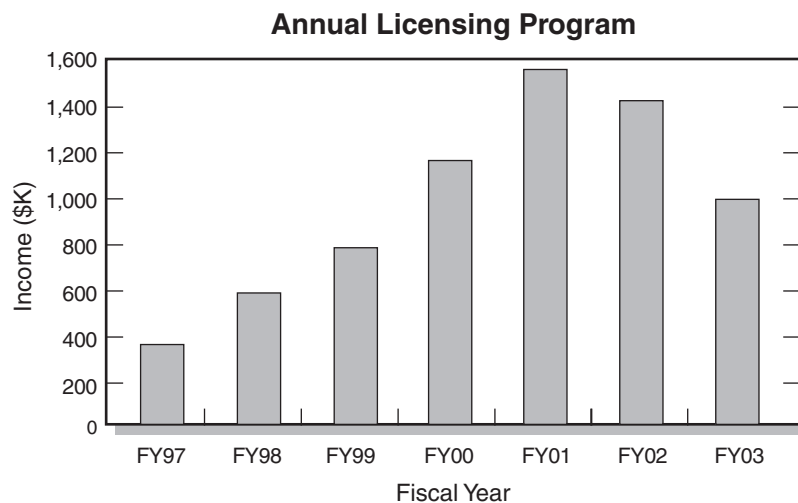
The intellectual property generated by Los Alamos National Laboratory researchers in the form of patents and copyrights is vital to the performance of our stockpile stewardship mission. In addition, the Laboratory has successfully leveraged these intellectual assets to attract funding from federal and private sponsors, form strategic alliances with private industry, foster lucrative technology transfer activities, and enhance regional economic development efforts.

In recent years, federally funded research has become an increasingly important source of innovation needed by U.S. industry to stay competitive. Private industry recognizes that Los Alamos National Laboratory is a reservoir of extraordinary scientific talent and cutting-edge technology. For the past eight years, the Laboratory's Licensing Program has facilitated the transfer of Laboratory-developed technologies to the private sector

through proactive commercialization of our intellectual property portfolio. The new products and services being created by our licensees capitalize on the key technical advances developed by our world-class researchers. In addition to the benefit to U.S. economic competitiveness, these product and service offerings enhance the reputation of the Laboratory as a premier provider of outstanding technology innovations.

The Licensing Program currently manages over 200 active commercial licenses. In addition, the Laboratory's active license portfolio contains over 650 noncommercial licenses with academia, government entities, and other nonprofit organizations. In the last few years, the program has witnessed accelerated growth, due in large part to the heightened awareness and active participation of the Laboratory's technical staff in commercialization activities.

Overall, the Licensing Program has generated over \$8.6 million in licensing income. Eighty-five percent of this income is redistributed to the inventors and to the technical divisions for scientific research and development, technology transfer activities, and education programs at the Laboratory.



ROYALTY RECIPIENTS

Ahrens, Christine – CCN-12

Copyright:

Streams-C C-to-VHDL
Compiler (Streams-C),
Version 1.0

Ammann, Cheryl – CCN-5

Copyright:

Graphical Input Aggregate
Control (GIAC), Version 2.X

Backhaus, Scott – MST-10

Patent:

Traveling-Wave Device with
Mass Flux Suppression

Bai, Ying – N

Copyright:

MinGrand Family

Barbe, Michael – MST-6

Patent:

Laser Production of Articles
from Powders

Barton, Jerome – C-ACT

Patent:

Apparatus and Method for
Providing Pulsed Fluids

Billen, James – SNS

Copyright:

Phase and Radial Motion in
Electron Linear Accelerators
(PARMELA)

Boenig, Heinrich – MST

Patent

Fault Current Limiter and
Alternating Current Circuit
Breaker

Boggs, Marsha – CCN-12

Copyright:

Graphical Input Aggregate
Control (GIAC), Version 2.X

Bourret, Steven – N

Patent:

Cosmic-Ray Neutron
Background Reduction Using
Localized Coincidence Veto
Neutron Counting

Copyright:

MiniGrand Family

Bradley, Jonathan

Patent:

Storage and Retrieval of Large
Digital Images

Brockway, Dennis – D

Copyright:

Graphical Input Aggregate
Control (GIAC), Version 2.X

Burrell, Anthony – C-SIC

Patent:

Electrolytes for Electrooptic
Devices Comprising Ionic
Liquids

Patent:

Radiofrequency Attenuator and
Method

Busick, Deanna – MST

Patent:

Composite Bipolar Plate for
Electrochemical Cells

Butterfield, Kenneth – N-2

Copyright:

NAVI-2

Cai, Hong – B-2

Patent:

DNA Base Mismatch Detection
Using Flow/Cytometry

Carleton, Stewart – B

Patent:

Method for Rapid Base
Sequencing in DNA and RNA

Castro, Alonso – P-21

Patent:

Method for the Detection of Specific Nucleic Acid Sequences by Polymerase Nucleotide Incorporation

Chen, Liaohai – B

Patent:

Method for Detecting Biological Agents

Claytor, Thomas – ESA-AET

Patent:

Fluid Density and Concentration Measurement Using Noninvasive *in Situ* Ultrasonic Resonance Interferometry

Cole, Dean – B

Patent:

Method of Using 5,10,15,20-Tetrakis(4-Carboxyphenyl)Porphine for Detecting Cancers of the Lung

Patent:

Method Using 5,10,15,20-Tetrakis(4-Carboxyphenyl)Porphine for Treating Cancers of the Lung

Collins, Michael – N-1

Copyright:

Hybrid K-Edge/X-Ray Fluorescence Densitometer (HKED)

Cournoyer, Michael – NMT-13

Copyright:

Chemical Software Input (CSWI)

Cremers, David – C-ADI

Patent:

Laser Production of Articles from Powders

Davey, John – MST-11

Patent:

Catalyst Inks and Method of Application for Direct Methanol Fuel Cells

Davis, Anthony – ESA-AET

Copyright:

Flat Panel Amorphous Silicon High Resolution Computed Tomography-Data Acquisition Software

Copyright:

Flat Panel Amorphous Silicon High Resolution Digital Radiography

Dearing, James – D

Copyright:

Graphical Input Aggregate Control (GIAC), Version 2.X

Dixon, Raymond – MST-6

Patent:

Production of Elongated Articles from Particulates

Duan, Yixiang – C-ACS

Patent:

Pulsed, Atmospheric Pressure Plasma Source for Emission Spectrometry

Patent:

Microwave Plasma Monitoring System for Real-time Elemental Analysis

Patent:

Capillary-Discharge Based Hand-Held Detector for Chemical Vapor Monitoring

Fowler, Malcolm – C-INC

Patent:

Production of High Specific Activity Copper-67

Gardner, David – MST-10

Patent:

Pulse Tube Refrigerator with Variable Phase Shift

Patent:

Traveling-Wave Device with Mass Flux Suppression

Gokhale, Maya – ISR-3

Copyright:

Streams-C C-to-VHDL Compiler (Streams-C)

Gottesfeld, Shimson – MST-11

Patent:

Air Breathing Direct Methanol Fuel Cell

Patent:

Catalyst Inks and Method of Application for Direct Methanol Fuel Cells

Patent:

Preventing CO Poisoning in Fuel Cells

Patent:

Methanol Sensor Operated in Passive Mode

Patent:

Methanol Sensor Operated in Driven Mode

Patent:

Flow Channel Device for Electrochemical Cells

Halbig, James – N-1

Copyright:

MiniGrand Family

Hall, Simon Berners – C-SIC

Patent:

Reversible Electrooptic Device Employing Aprotic Molten Salts and Method

Hammond, Mark – B

Patent:

DNA Fragment Sizing and Sorting by Laser-Induced Fluorescence

Hansen, Walter – N

Copyright:

MiniGrand Family

Harker, William – N

Copyright:

SuperHENC Neutron Coincidence Code (Super HENC)

Copyright:

MiniGrand Family

Heaton, Richard – C-INC

Patent:

Production of High Specific Activity Copper-67

Henins, Ivars – P-24

Patent:

Processing Materials Inside an Atmospheric-Pressure Radiofrequency Nonthermal Plasma Discharge

Patent:

Atmospheric Pressure Plasma Processing Reactor

Patent:

Combined Plasma/Liquid Cleaning of Substrates

Herrmann, Hans – P-24

Patent:

Atmospheric-Pressure Plasma Decontamination/Sterilization Chamber

Patent:

Processing Materials Inside an Atmospheric-Pressure Radiofrequency Nonthermal Plasma Discharge

Patent:

Atmospheric Pressure Plasma Processing Reactor

Hicks, Robert – P

Patent:

Deposition of Coatings Using an Atmospheric Pressure Plasma Jet

Horley, Earl – N

Copyright:

Mechanical Drawings for Super-High Efficiency Neutron Coincidence

Howat, Andrew – X

Copyright:

SABRINA

Hsu, Hsiao-Hua – HSR-4

Patent:

Neutron Dose Equivalent Meter

Huang, Jianyu – MST-STC

Patent:

Method for Producing Ultrafine-Grained Materials Using Repetitive Corrugation and Straightening

Ianakiev, Kiril – N

Copyright:

MiniGrand Family

Jamriska, David – C-INC

Patent:

Production of High Specific Activity Copper-67

Jett, James – B-N2

Patent:

DNA Fragment Sizing and Sorting by Laser-Induced Fluorescence

Patent:

Method for Rapid Base Sequencing in DNA and RNA

Jiang, Honggang – MST

Patent:

Method for Producing Ultrafine-Grained Materials Using Repetitive Corrugation and Straightening

Jin, Zhe – C-ACS

Patent:

Pulsed, Atmospheric Pressure Plasma Source for Emission Spectrometry

Johnson, Jeffrey – CCN-7

Copyright:

SABRINA

Johnston, Roger – C-ADI

Patent:

Method for Establishing the Presence of Salmonella Bacteria in Eggs

Kaduchak, Gregory – MST-11

Patent:

Pulsed, Atmospheric Pressure Plasma Source for Emission Spectrometry

Kane, Daniel – C

Patent:

Method and Apparatus for Measuring the Intensity and Phase of an Ultrashort Light Pulse

Keller, Richard – B-2

Patent:

DNA Fragment Sizing and Sorting by Laser-Induced Fluorescence

Patent:

Method for Rapid Base Sequencing in DNA and RNA

Kelley, Thomas – CCN-12

Copyright:

PC/FRAM Software

Klosterbuer, Shirley – N-1

Copyright:

MiniGrand Family

Knight, Thomas – B

Patent:

Use of Prolines for Improving Growth and Other Properties of Plants and Algae

Koscielniak, Michael – D

Copyright:

Graphical Input Aggregate Control (GIAC), Version 2.X

Krick, Merlyn – N

Patent:

Cosmic-Ray Neutron Background Reduction Using Localized Coincidence Veto Neutron Counting

Less, Richard – MST-6

Patent:

Multiple Feed Powder Splitter

Patent:

Rotary Powder Feed Through Apparatus

Patent:

Deposition Head for Laser

Lewis, Gary – MST-6

Patent:

Multiple Feed Powder Splitter

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Patent:

Production of Elongated Articles from Particulates

Lowe, Terry – QIO

Patent:

Method for Producing Ultrafine-Grained Materials Using Repetitive Corrugation and Straightening

Lunsford, James – P-14

Patent:

Offset Stabilizer for Comparator Output

Maas, Lynn – D

Copyright:

Graphical Input Aggregate Control (GIAC), Version 2.X

Marrone, Babetta – B-2

Patent:

DNA Fragment Sizing and Sorting by Laser-Induced Fluorescence

Martin, John – B-N2

Patent:

DNA Fragment Sizing and Sorting by Laser-Induced Fluorescence

Patent:

Method for Rapid Base Sequencing in DNA and RNA

Martinez, Rodolfo – B-3

Patent:

Use of Prolines for Improving Growth and Other Properties of Plants and Algae

McBranch, Duncan – C-PCS

Patent:

Method for Detecting Biological Agents

McCleskey, Thomas – C-SIC

Patent:

Electrolytes for Electrooptic Devices Comprising Ionic Liquids

Patent:

Radiofrequency Attenuator and Method

Patent:

Electrochromic Salts, Solutions and Devices

McGhee, John – CCS

Copyright:

ATTILA Software

Menlove, Howard – N

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Copyright:

Mechanical Drawings for Super-High Efficiency Neutron Coincidence

Milewski, John – MST-6

Patent:

Production of Elongated Articles from Particulates

Patent:

Laser Production of Articles from Powders

Moody III, David – EES-12

Patent:

Method of Using
5,10,15,20-Tetrakis(4-
Carboxyphenyl)Porphine for
Detecting Cancers of the Lung

Patent:

Method Using 5,10,15,20-Tetra-
kis(4-Carboxyphenyl)Porphine
for Treating Cancers of the
Lung

Moyzis, Robert – B

Patent:

Method for Rapid Base Se-
quencing in DNA and RNA

Murray, William – N-2

Copyright:

NAVI-2

Nemec, Ronald – MST-6

Patent:

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Nolan, John – B-2

Patent:

DNA Base Mismatch Detection
Using Flow Cytometry

Patent:

Nucleic Acid Sequence
Detection Using Multiplexed
Oligonucleotide PCR

Olsher, Richard – HSR-4

Patent:

Proton Recoil Scintillator
Neutron REM Meter

Patent:

Neutron Dose Equivalent Meter

Ott, Martin – C-INC

Patent:

Production of High Specific
Activity Copper-67

Park, Jaeyoung – P-24

Patent:

Processing Materials Inside
an Atmospheric-Pressure
Radiofrequency Nonthermal
Plasma Discharge

Parker, Robert – N-1

Copyright:

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Pautz, Shawn – CCS

Copyright:

ATTILA Software

Pelowitz, David – N-1

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Pope, Noah – N-4

Patent:

Fluid Density and Concen-
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Noninvasive *in Situ* Ultrasonic
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Ratliff, Robert – B-3

Patent:

Method for Rapid Base
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Reass, Pamela – N-1

Copyright:

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Ren, Xiaoming – MST-11

Patent:

Methanol Sensor Operated in
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Patent:

Flow Channel Device for
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Air Breathing Direct Methanol
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Patent:

Catalyst Inks and Method
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Methanol Fuel Cells

Rodgers, John – HSR-4

Patent:

Apparatus Having Reduced
Background for Measuring
Radiation Activity in Aerosol
Particles

Patent:

Quick-Change Filter Cartridge

Patent:

Alpha-Environmental
Continuous Air Monitor Inlet

Romero, Amos – LANSCE

Copyright:

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Salazar, Steven – ISR-4

Copyright:

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Sampson, Thomas – N-1

Copyright:

PC/FRAM

Seagrass, David – HSR-4

Patent:

Proton Recoil Scintillator
Neutron REM Meter

Selwyn, Gary – P-24

Patent:

Deposition of Coatings
Using an Atmospheric
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Processing Materials Inside and Atmospheric-Pressure Radio-frequency Nonthermal Plasma Discharge

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Atmospheric Pressure Plasma Processing Reactor

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Combined Plasma/Liquid Cleaning of Substrates

Sheats, Matthew – CCN-7

Copyright:

Flat-Panel Amorphous Silicon High-Resolution Computed Tomography-Data Processing Software

Shera, Brooks – P-21

Patent:

Method for Rapid Base Sequencing in DNA and RNA

Patent:

Ordered Transport and Identification of Particles

Sinha, Dipen – MST-11

Patent:

Cylindrical Acoustic Levitator/ Concentrator Having Non-circular Cross-section

Patent:

Noninvasive Identification of Fluids by Swept-Frequency Acoustic Interferometry

Patent:

Noninvasive Method for Determining the Liquid Level and Density Inside of a Container

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Method for Establishing the Presence of Salmonella Bacteria in Eggs

Patent:

Method for Noninvasive Intracranial Pressure Measurement

Patent:

Ultrasonic Characterization of Single Drops of Liquids

Patent:

Apparatus and Method for Comparing Corresponding Acoustic Resonances in Liquids

Patent:

Apparatus and Method for Non-Contact, Acoustic Resonance Determination of Intraocular Pressure

Patent:

Noninvasive Method for Determining the Liquid Level and Density Inside of a Container

Snyder, Hans – N-2

Patent:

Atmospheric Pressure Plasma Processing Reactor

Stretz, Paula – CCN

Copyright:

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Su, Yongxuan – C-ACS

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Pulsed, Atmospheric Pressure Plasma Source for Emission Spectrometry

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MiniGrand Family

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Swift, Gregory – MST-10

Patent:

Pulse Tube Refrigerator with Variable Phase Shift

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Traveling-Wave Device with Mass Flux Suppression

Taylor, Wayne – NMT-11

Patent:

Production of High Specific Activity Copper-67

Terwilliger, Thomas – B-2

Patent:

Likelihood-Based Modification of Experimental Crystal Structure Electron Density Maps

Patent:

Maximum Likelihood Density Modification by Pattern Recognition of Structural Motifs

Patent:

Map-Likelihood Phasing

Copyright:

SOLVE

Copyright:

RESOLVE

Thomas, Sharon – MST-11

Patent:

Catalyst Inks and Method of Application for Direct Methanol Fuel Cells

Unkefer, Pat – B-3

Patent:

Use of Prolines for Improving Growth and Other Properties of Plants and Algae

Vaccaro Henry

Copyright:

Wisdom & Sense

Van Riper, Kenneth – X

Copyright:
SABRINA

Vasilik, Dennis – HSR-4

Patent:
Neutron Dose Equivalent Meter

Veirs, D. Kirk – NMT-11

Patent:
Fluid Density and
Concentration Measurement
using Noninvasive *in Situ*
Ultrasonic Resonance
Interferometry

Vo Duc – N-1

Copyright:
PC/FRAM

Vondreele, Robert – SSR

Patent:
High Throughput Screening
of Ligand Binding to
Macromolecules Using High
Resolution Powder Diffraction

Waldo, Geoffrey – B-2

Patent:
Method for Determining and
Modifying Protein/Peptide
Solubility

Wang, Hsing-Lin – B-S2

Patent:
Method for Detecting
Biological Agents

Wareing, Todd – CCS

Copyright:
ATTILA Software

Warner, Benjamin – C-SIC

Patent:
Reversible Electrooptic
Device Employing Aprotic
Molten Salts and Method

Patent:

Electrolytes for Electrooptic
Devices Comprising Ionic
Liquids

Patent:

Electrochromic Salts,
Solutions and Devices

Patent:

Radiofrequency Attenuator
and Method

West, James – X

Copyright:
SABRINA

White P. Scott – B-1

Patent:
DNA Base Mismatch Detection
Using Flow Cytometry

Patent:

Nucleic Acid Sequence
Detection Using Multiplexed
Oligonucleotide PCR

Whitten, David – B

Patent:
Method for Detecting
Biological Agents

Wilson, Mahlon – MST-11

Patent:
Fuel Cell Membrane
Humidification

Patent:

Ambient Pressure Fuel Cell
System

Patent:

Annular Feed Air Breathing
Fuel Cell Stack

Patent:

Fuel Cell with Metal Screen
Flow-Field

Patent:

Fuel Cell with Interdigitated
Porous Flow-Fields

Patent:

Composite Biopolar Plate for
Electromechanical Cells

Wray, William – X-7

Patent:

Apparatus and Method for
Non-Contact, Acoustic Resonance
Determination of Intraocular
Pressure

Young, Lloyd – SNS

Copyright:
Phase and Radial Motion in
Electron Linear Accelerators
(PARMELA)

Zawodzinski, Christine – MST-11

Patent:

Fuel Cell with Metal Screen
Flow-Field

Zelenay, Piotr – MST-11

Patent:
Catalyst Inks and Method of
Application for Direct
Methanol Fuel Cells

Zhu, Yutian – MST-STC

Patent:

Method for Producing
Ultrafine-Grained Materials
Using Repetitive Corrugation and
Straightening

CONTACT LIST

Outstanding innovation is the cornerstone that enables patents, copyrights, licenses, and the ensuing entrepreneurial ventures to occur. The teams cited below are key to the Laboratory's activities required to protect our intellectual property and encourage the transfer of technology to the private sector. For questions or assistance please contact any of these individuals.

Technology Transfer Division

Division Leader

Donna M. Smith, 667-9473

Operations

Program Manager

Jerome J. Garcia, 665-4842

Intellectual Property Specialist

Christine Ramos, 665-6846

Licensing Administrator

Debbie Quintana, 665-6704

Licensing Specialist

Susan Brockway, 665-7677

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Samuel L. Borkowsky, 665-3111

Technology Transfer Division

<http://www.lanl.gov/partnerships/>

Laboratory Counsel

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