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Introduction

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The NASA Patent Abstracts Bibliography is a semiannual NASA publication containing comprehensive abstracts of NASA owned inventions covered by U.S. patents. The citations included in the bibliography arrangement of citations were originally published in NASA's Scientific and Technical Aerospace Reports (STAR) and cover STAR announcements made since May 1969.

The citations published in this issue cover the period July 2000 through December 2000. This issue includes 10 major subject divisions separated into 76 specific categories and one general category/division. (See Table of Contents for the scope note of each category, under which are grouped appropriate NASA inventions.) This scheme was devised in 1975 and revised in 1987 in lieu of the 34 category divisions which were utilized in supplements (01) through (06) covering STAR abstracts from May 1969 through January 1974. Each entry consists of a STAR citation accompanied by an abstract and, when appropriate, a key illustration taken from the patent or application for patent. Entries are arranged by subject category in ascending order.

A typical citation and abstract presents the various data elements included in most records cited. This appears after the table of contents.

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Information on obtaining a license to use a NASA patented invention.

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<td>surfaces; and internal flow in ducts</td>
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<td>and turbomachinery. For related</td>
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<td>(satellite and ground based); and air</td>
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<td>traffic control. For related information,</td>
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<td>engines and compressors; and onboard</td>
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<td>and aircraft engine test stands. For</td>
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13 **Astrodynamics**
Includes powered and free-flight trajectories; and orbital and launching dynamics.

14 **Ground Support Systems and Facilities (Space)**
Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators. *For related information, see also 09 Research and Support Facilities (Air).*

15 **Launch Vehicles and Space Vehicles**
Includes boosters; operating problems of launch/space vehicle systems; and reusable vehicles. *For related information, see also 20 Spacecraft Propulsion and Power.*

16 **Space Transportation**
Includes passenger and cargo space transportation, e.g., shuttle operations; and space rescue techniques. *For related information, see also 03 Air Transportation and Safety and 18 Spacecraft Design, Testing and Performance. For space suits, see 54 Man/System Technology and Life Support.*

17 **Space Communications, Spacecraft Communications, Command and Tracking**
Includes telemetry; space communication networks; astronavigation and guidance; and radio blackout. *For related information, see also 04 Aircraft Communications and Navigation and 32 Communications and Radar.*

18 **Spacecraft Design, Testing and Performance**
Includes satellites; space platforms; space stations; spacecraft systems and components such as thermal and environmental controls; and attitude controls. *For life support systems, see 54 Man/System Technology and Life Support. For related information, see also 05 Aircraft Design, Testing and Performance, 39 Structural Mechanics, and 16 Space Transportation.*

19 **Spacecraft Instrumentation**
*For related information, see also 06 Aircraft Instrumentation and 35 Instrumentation and Photography.*

20 **Spacecraft Propulsion and Power**
Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources. *For related information, see also 07 Aircraft Propulsion and Power, 28 Propellants and Fuels, 44 Energy Production and Conversion, and 15 Launch Vehicles and Space Vehicles.*
23 Chemistry and Materials (General)  

24 Composite Materials  
Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see 27 Nonmetallic Materials.

25 Inorganic and Physical Chemistry  
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry. For related information see also 77 Thermodynamics and Statistical Physics.

26 Metallic Materials  
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 Nonmetallic Materials  
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see 24 Composite Materials.

28 Propellants and Fuels  
Includes rocket propellants, igniters and oxidizers; their storage and handling procedures; and aircraft fuels. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 44 Energy Production and Conversion.

29 Materials Processing  
Includes space-based development of products and processes for commercial application. For biological materials see 55 Space Biology.

31 Engineering (General)  
Includes vacuum technology; control engineering; display engineering; cryogenics; and fire prevention.

32 Communications and Radar  
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<td>Includes remote sensors; measuring instruments and gauges; detectors; cameras and photographic supplies; and holography. For aerial photography see 43 Earth Resources and Remote Sensing. For related information see also 06 Aircraft Instrumentation and 19 Spacecraft Instrumentation.</td>
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<td>36</td>
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<td>Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography. For instrumentation see 35 Instrumentation and Photography.</td>
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<td>Includes specific energy conversion systems, e.g., fuel cells; global sources of energy; geophysical conversion; and windpower. For related information see also 07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, and 28 Propellants and Fuels.</td>
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93  Space Radiation  N.A.
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99  General  N.A.
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(Select STI Program Bibliographic Announcements)

Explore the Universe!
A set of serrated-planform lifting surfaces is provided which produces unexpectedly high lift coefficients at moderate to high angles-of-attack. Each serration, or tooth, is designed to shed a vortex. The interaction of the vortices greatly enhances the lifting capability over an extremely large operating range. Variations of the invention use serrated-planform lifting surfaces in planes different than that of a primary lifting surface. In an alternate embodiment, the individual teeth are controllably retractable and deployable to provide for active control of the vortex system and hence lift coefficient. Differential lift on multiple serrated-planform lifting surfaces provides a means for vehicle control. The important aerodynamic advantages of the serrated-planform lifting surfaces are not limited to aircraft applications but can be used to establish desirable performance characteristics for missiles, land vehicles, and/or watercraft.
Aircraft Propulsion and Power

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and onboard auxiliary power plants for aircraft. For related information see also 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels, and 44 Energy Production and Conversion.

2000090563 NASA Langley Research Center, Hampton, VA USA
Undulated Nozzle for Enhanced Exit Area Mixing

A nozzle having an undulating surface for enhancing the mixing of a primary flow with a secondary flow or ambient air, without requiring an ejector. The nozzle includes a nozzle structure and design for introducing counter-rotating vorticity into the primary flow either through (i) internal surface corrugations where an axisymmetric line through each corrugation is coincident with an axisymmetric line through the center of the flow passageway or (ii) through one or more sets of alternating convexities and cavities in the internal surface of the nozzle where an axisymmetric line through each convexity and cavity is coincident with an axisymmetric line through the center of the flow passageway, and where the convexities contract from the entrance end towards the exit end. Exit area mixing is also enhanced by one or more chevrons attached to the exit edge of the nozzle. The nozzle is ideally suited for application as a jet engine nozzle. When used as a jet engine nozzle, noise suppression with simultaneous thrust augmentation/minimal thrust loss is achieved.

Official Gazette of the U.S. Patent and Trademark Office
Engine Noise; Jet Engines; Nozzle Design; Nozzle Geometry
Jet Nozzle Having Centerbody for Enhanced Exit Area Mixing

Seiner, John M., Inventor, NASA Langley Research Center, USA; Gilinsky, Mikhail M., Inventor, NASA Langley Research Center, USA; Jul. 20, 1999; 10p; In English; Provisional US-Patent-Appi-SN-016741, filed 2 May 1996


A nozzle arrangement includes a nozzle and a centerbody. The longitudinal axis of the centerbody is coaxially aligned with the nozzle. The centerbody has a free end portion shaped to create vortices in exhaust exiting the exit area. The vortices enhance mixing action in the exhaust and reduce exhaust noise while augmenting thrust.

Official Gazette of the U.S. Patent and Trademark Office

Jet Engines; Exhaust Nozzles; Fuel Injection; Patents; Inventions

20000091028 NASA Langley Research Center, Hampton, VA USA

Jet Nozzle Having Centerbody for Enhanced Exit Area Mixing

Seiner, John M., Inventor, NASA Langley Research Center, USA; Gilinsky, Mikhail M., Inventor, NASA Langley Research Center, USA; Jul. 20, 1999; 10p; In English; Provisional US-Patent-Appi-SN-016741, filed 2 May 1996


A nozzle arrangement includes a nozzle and a centerbody. The longitudinal axis of the centerbody is coaxially aligned with the nozzle. The centerbody has a free end portion shaped to create vortices in exhaust exiting the exit area. The vortices enhance mixing action in the exhaust and reduce exhaust noise while augmenting thrust.

Official Gazette of the U.S. Patent and Trademark Office

Jet Engines; Exhaust Nozzles; Fuel Injection; Patents; Inventions

CHEMISTRY AND MATERIALS (GENERAL)

20000091023 NASA Lewis Research Center, Cleveland, OH USA

Aromatic Diamines and Polyimides Based on 4,4'-Bis-(4-Aminophenoxy)-2,2' or 2,2',6,6'-Substituted Biphenyl


This invention relates the novel diamines, the polyimide oligomers and the polyimides derived therefrom and to the method of preparing the diamines, oligomers and the polyimides. The thermoplastic polyimides derived from the aromatic diamines of this invention are characterized as having a high glass transition temperature, good mechanical properties and improved processability in the manufacture of adhesives, electronic and composite materials for use in the automotive and aerospace industry. The distinction of the novel aromatic diamines of this invention is the 2,2',6,6'-substituted biphenyl radicals which exhibit noncopla-
nar conformation that enhances the solubility of the diamine as well as the processability of the polyimides, while retaining a relatively high glass transition temperature and improved mechanical properties at useful temperature ranges.

Official Gazette of the U.S. Patent and Trademark Office

**Diamines; Polyimides; Oligomers; Patents; Inventions**

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**COMPOSITE MATERIALS**

Includes physical, chemical, and mechanical properties of laminates and other composite materials. For ceramic materials see 27 Nonmetallic Materials.

20000090561 NASA Langley Research Center, Hampton, VA USA

Carbon Fiber Reinforced Carbon Composite Rotary Valve for an Internal Combustion Engine

Northam, G. Burton, Inventor, NASA Langley Research Center, USA; Ransone, Philip O., Inventor, NASA Langley Research Center, USA; Rivers, H. Kevin, Inventor, NASA Langley Research Center, USA; Aug. 08, 2000; 12p; In English; Division of US-Patent-Appl-SN-812826, filed 6 Mar. 1997


Carbon fiber reinforced carbon composite rotary sleeve, and disc valves for internal combustion engines and the like are disclosed. The valves are formed from knitted or braided or wrap-locked carbon fiber shapes. Also disclosed are valves fabricated from woven carbon fibers and from molded carbon matrix material. The valves of the present invention with their very low coefficient of thermal expansion and excellent thermal and self-lubrication properties do not present the sealing and lubrication problems that have prevented rotary sleeve and disc valves from operating efficiently and reliably in the past. Also disclosed are a sealing tang to further improve sealing capabilities and anti-oxidation treatments.

**Author**

Carbon Fibers; Carbon-Carbon Composites; Fiber Composites; Matrix Materials; Valves

20000091026 NASA Langley Research Center, Hampton, VA USA

Advanced Layered Composite Polyimide Electroactive Actuator and Sensor

Fox, Robert L., Inventor, NASA Langley Research Center, USA; Hellbaum, Richard F., Inventor, NASA Langley Research Center, USA; Copeland, Benjamin M., Jr., Inventor, NASA Langley Research Center, USA; Bryant, Robert G., Inventor, NASA Langley Research Center, USA; May 09, 2000; 14p; In English


The present invention relates to the mounting of pre-stressed electroactive material in such a manner that large displacement actuators or sensors result. The invention comprises mounting the pre-stressed electroactive material to a support layer. This combination of a pre-stressed electroactive material and support layer may in turn be attached to a mounting surface. The pre-stressed
electroactive material may be a ferroelectric, pyroelectric, piezoelectric, or magnetostrictive material. The size, stiffness, mass, and material of the support layer is selected to result in the electroactive device having dynamic response properties, environmental capability characteristics, and the required resilience optimized for a given application. The capacity to connect the support layer to a surface expands the arenas in which the prestressed electroactive device may be used. Application for which the invention may be used include actuators, sensors, or as a component in a pumps, switches, relays, pressure transducers and acoustic devices.

Author
Composite Materials; Laminates; Actuators; Pressure Sensors; Audio Equipment; Pumps; Switches; Patents; Inventions

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METALS AND METALLIC MATERIALS

20000090553 NASA Lewis Research Center, Cleveland, OH USA
Substrate With Low Secondary Emissions
Jensen, Kenneth A., Inventor, NASA Lewis Research Center, USA; Curren, Arthur N., Inventor, NASA Lewis Research Center, USA; Roman, Robert F., Inventor, NASA Lewis Research Center, USA; Jun. 06, 2000; 8p; In English; Division of abandoned US-Patent-Appl-SN-331392, filed 26 Oct. 1994

The present invention is directed to a method and apparatus for producing a highly -textured surface on a copper substrate -with only extremely small amounts of texture-inducing seeding or masking material. The texture-inducing seeding material is delivered to the copper substrate electrically switching the seeding material in and out of a circuit loop.

Official Gazette of the U.S. Patent and Trademark Office
Procedures; Copper; Substrates; Textures
A process for providing elemental metals or metal oxides distributed on a carbon substrate or self-supported utilizing graphite oxide as a precursor. The graphite oxide is exposed to one or more metal chlorides to form an intermediary product comprising carbon, metal, chloride, and oxygen. This intermediary product can be fiber processed by direct exposure to carbonate solutions to form a second intermediary product comprising carbon, metal carbonate, and oxygen. Either intermediary product may be further processed: a) in air to produce metal oxide b) in an inert environment to produce metal oxide on carbon substrate; c) in a reducing environment to produce elemental metal distributed on carbon substrate. The product generally takes the shape of the carbon precursor.

Official Gazette of the U.S. Patent and Trademark Office

Graphite; Metal Oxides; Substrates; Carbon Compounds; Oxygen Compounds

27

NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials. For composite materials see 24 Composite Materials.
layer of MCrA1X with particles of a particulate dispersed throughout the MCrA1X and the preferred particulate is Al2O3. The particles of the particulate dispersed throughout the second bond coat layer preferably have a diameter of less than the height of the peaks of the second bond coat layer or a diameter of less than 5 micron. The method of producing the second bond coat layer may either include the steps of mechanical alloying of particles throughout the second bond coat layer, attrition milling the particles of the particulate throughout the second bond coat layer, or using electrophoresis to disperse the particles throughout the second bond coat layer. In the preferred embodiment of the invention the first bond coat layer is applied to the substrate, and then the second bond coat layer is thermally sprayed onto the first bond coat layer. Further, in a preferred embodiment of the invention a ceramic insulating layer covers the second bond coat layer.

Official Gazette of the U.S. Patent and Trademark Office

High Temperature; Particulates; Substrates; Thermal Control Coatings; Temperature Control; Thermal Insulation

A method for making a biocompatible polymer article using a uniform atomic oxygen treatment is disclosed. The substrate may be subsequently optionally grated with a compatibilizing compound. Compatibilizing compounds may include proteins, phosphorylcholine groups, platelet adhesion preventing polymers, albumin adhesion promoters, and the like. The compatibilized substrate may also have a living cell layer adhered thereto. The atomic oxygen is preferably produced by a flowing afterglow microwave discharge, wherein the substrate resides in a sidearm out of the plasma. Also, methods for culturing cells for various purposes using the various membranes are disclosed as well. Also disclosed are porous organic polymers having a distributed pore
chemistry (DPC) comprising hydrophilic and hydrophobic regions, and a method for making the DPC by exposing the polymer to atomic oxygen wherein the rate of hydrophilization is greater than the rate of mass loss.

Official Gazette of the U.S. Patent and Trademark Office

Culture Techniques; Membranes; Oxygen Atoms; Substrates; Biopolymers

20000091031 NASA Langley Research Center, Hampton, VA USA

Hollow Polyimide Microspheres

Weiser, Erik S., Inventor, NASA Langley Research Center, USA; St.Clair, Terry L., Inventor, NASA Langley Research Center, USA; Echigo, Yoshiaki, Inventor, NASA Langley Research Center, USA; Kaneshiro, Hisayasu, Inventor, NASA Langley Research Center, USA; Jul. 04, 2000; 8p; In English; Division of US-Patent-Appl-SN-316865, filed 21 May 1999


A shaped article composed of an aromatic polyimide has a hollow, essentially spherical structure and a particle size of about 100 to about 1500 microns a density of about 1 to about 6 pounds/cubic ft and a volume change of 1 to about 20 percent by a pressure treatment of 30 psi for 10 minutes at room temperature. A syntactic foam, made of a multiplicity of the shaped articles which are bonded together by a matrix resin to form an integral composite structure, has a density of about 3 to about 30 pounds/cubic ft and a compression strength 2 of about 100 to about 1400 pounds/sq in.

Official Gazette of the U.S. Patent and Trademark Office

Polyimides; Polyimide Resins; Spherical Shells; Patents; Patent Applications; Inventions

Diamine + Dianhydride → Polyamic Acid

Solvent = Polar Aprotic Materials

Water → Heat

Polyimide

By-Product
A portable system is provided that is operational for determining, with three dimensional resolution, the position of a buried object or approximately positioned object that may move in space or air or gas. The system has a plurality of receivers for detecting the signal from a target antenna and measuring the phase thereof with respect to a reference signal. The relative permittivity and conductivity of the medium in which the object is located is used along with the measured phase signal to determine a distance between the object and each of the plurality of receivers. Knowing these distances, an iteration technique is provided for solving equations simultaneously to provide position coordinates. The system may also be used for tracking movement of an object within close range of the system by sampling and recording subsequent position of the object. A dipole target antenna, when positioned adjacent to a buried object, may be energized using a separate transmitter which couples energy to the target antenna through the medium. The target antenna then preferably resonates at a different frequency, such as a second harmonic of the transmitter frequency.

Official Gazette of the U.S. Patent and Trademark Office

Detection; Targets
The present invention provides a High Resolution Scanning Reflectarray Antenna (HRSRA) for the purpose of tracking ground terminals and space craft communication applications. The present invention provides an alternative to using gimbaled parabolic dish antennas and direct radiating phased arrays. When compared to a gimbaled parabolic dish, the HRSRA offers the advantages of vibration free steering without incurring appreciable cost or prime power penalties. In addition, it offers full beam steering at a fraction of the cost of direct radiating arrays and is more efficient.

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High Resolution; Scanning; Reflectarray Antennas; Antenna Arrays; Patents; Inventions
for inputting the sampled signals into a differential operational amplifier. The amplifier compares the sampled signals and emits an output signal if there is a difference between the resonant and crossover frequencies. Based on the sampled signal, a bias supplied to the ring resonator is either increased or decreased for raising or lowering the resonant frequency by decreasing or increasing, respectively, the dielectric constant of the ferroelectric.

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Discriminators; Ferroelectricity; Oscillators; Resonators; Superconductors (Materials); Thin Films; Transistors; Tunable Filters

20000091024 NASA Lewis Research Center, Cleveland, OH USA
Process for Ignition of Gaseous Electrical Discharge Between Electrodes of a Hollow Cathode Assembly
Patterson, Michael J., Inventor, NASA Lewis Research Center, USA; Verhey, Timothy R. R., Inventor, NASA Lewis Research Center, USA; Soulas, George C., Inventor, NASA Lewis Research Center, USA; May 16, 2000; 17p; In English Patent Info.: Filed 14 Sep. 1998; NASA-Case-LEW-16056-1; US-Patent-6,064,156; US-Patent-Appl-SN-152407; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

The design and manufacturing processes for Hollow Cathode Assemblies (HCA's) that operate over a broad range of emission currents up to 30 Amperes, at low potentials, with lifetimes in excess of 17,500 hours. The processes include contamination control procedures which cover hollow cathode component cleaning procedures, gas feed system designs and specifications, and hollow cathode activation and operating procedures to thereby produce cathode assemblies that have demonstrated stable and repeatable operating conditions, for both the discharge current and voltage. The HCA of this invention provides lifetimes of greater than 10,000 hours, and expected lifetimes of greater than 17,500 hours, whereas the present state-of-the-art is less than 500 hours at emission currents in excess of 1 Ampere. Stable operation is provided over a large range of operating emission currents, up to a
6:1 ratio, and this HCA can emit electron currents of up to 30 Amperes in magnitude to an external anode that simulates the current drawn to a space plasma, at voltages of less than 20 Volts.

Official Gazette of the U.S. Patent and Trademark Office

*Patents; Inventions; Ignition; Gas Discharges; Electric Discharges*

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**LASERS AND MASERS**

*Includes parametric amplifiers. For related information see also 76 Solid-State Physics.*

20000091029 NASA Langley Research Center, Hampton, VA USA

Apparatus For Linewidth Reduction in Distributed Feedback or Distributed Bragg Reflector Semiconductor Lasers Using Vertical Emission


The linewidth of a distributed feedback semiconductor laser or a distributed Bragg reflector laser having one or more second order gratings is reduced by using an external cavity to couple the vertical emission back into the laser. This method and device prevent disturbance of the main laser beam, provide unobstructed access to laser emission for the formation of the external cavity, and do not require a very narrow heat sink. Any distributed Bragg reflector semiconductor laser or distributed feedback semicon-
ductor laser that can produce a vertical emission through the epitaxial material and through a window in the top metallization can be used. The external cavity can be formed with an optical fiber or with a lens and a mirror or grating.

MECHANICAL ENGINEERING

Includes auxiliary systems (nonpower); machine elements and processes; and mechanical equipment.

20000085976 NASA Langley Research Center, Hampton, VA USA

Ferroelectric Pump
Jalink, Antony, Jr., Inventor, NASA Langley Research Center, USA; Hellbaum, Richard F., Inventor, NASA Langley Research Center, USA; Rohrbach, Wayne W., Inventor, NASA Langley Research Center, USA; Jun. 06, 2000; 14p; In English; Provisional of US-Patent-Appl-SN-015969, filed 3 Apr. 1996

A ferroelectric pump has one or more variable volume pumping chambers internal to a housing. Each chamber has at least one wall comprising a dome shaped internally prestressed ferroelectric actuator having a curvature and a dome height that varies with an electric voltage applied between an inside and outside surface of the actuator. A pumped medium flows into and out of each pumping chamber in response to displacement of the ferroelectric actuator. The ferroelectric actuator is mounted within each wall and isolates each ferroelectric actuator from the pumped medium, supplies a path for voltage to be applied to each ferroelectric
The present invention provides for in vivo measurements of the principal strain magnitudes and directions, and maximum shear strain that occurs in a material, such as human bone, when it is loaded (or subjected to a load). In one embodiment the inven-
tion includes a capacitive delta extensometer arranged with six sensors in a three piece configuration, with each sensor of each pair spaced apart from each other by 120 degrees.

Official Gazette of the U.S. Patent and Trademark Office

Extensometers; Magnitude; Measure and Integration; Shear Strain

In Situ Activation of Microcapsules

Morrison, Dennis R., Inventor, NASA Johnson Space Center, USA; Mosier, Benjamin, Inventor, NASA Johnson Space Center, USA; Aug. 08, 2000; 28p; In English; Continuation-in-part of US-Patent-Appi-SN-349169, filed 2 Dec. 1994


Disclosed are microcapsules comprising a polymer shell enclosing two or more immiscible liquid phases in which a drug, or a prodrug and a drug activator are partitioned into separate phases, or prevented from diffusing out of the microcapsule by a
liquid phase in which the drug is poorly soluble. Also disclosed are methods of using the microcapsules for in situ activation of drugs where upon exposure to an appropriate energy source the internal phases mix and the drug is activated in situ.

Author

Activation; Drugs; Capsules; Polymers; Pharmacology

Includes light phenomena; and optical devices. For lasers see 36 Lasers and Masers.

20000090560 NASA Langley Research Center, Hampton, VA USA

Optical Path Switching Based Differential Absorption Radiometry for Substance Detection

Sachse, Glen W., Inventor, NASA Langley Research Center, USA; May 02, 2000; 16p; In English; Provisional application of US-Patent-Appl-SN-082355, filed 20 Apr. 1998


A system and method are provided for detecting one or more substances. An optical path switch divides sample path radiation into a time series of alternating first polarized components and second polarized components. The first polarized components are transmitted along a first optical path and the second polarized components along a second optical path. A first gasless optical filter train filters the first polarized components to isolate at least a first wavelength band thereby generating first filtered radiation. A second gasless optical filter train filters the second polarized components to isolate at least a second wavelength band thereby generating second filtered radiation. The first wavelength band and second wavelength band are unique. Further, spectral absorption of a substance of interest is different at the first wavelength band as compared to the second wavelength band. A beam combiner combines the first and second filtered radiation to form a combined beam of radiation. A detector is disposed to monitor magnitude of at least
a portion of the combined beam alternately at the first wavelength band and the second wavelength band as an indication of the concentration of the substance in the sample path.

Official Gazette of the U.S. Patent and Trademark Office

*Optical Paths; Procedures; Switching; Radiometers*

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20000091025 NASA Langley Research Center, Hampton, VA USA

Modulated Fourier Transform Raman Fiber-Optic Spectroscopy

Jensen, Brian J., Inventor, NASA Langley Research Center, USA; Cooper, John B., Inventor, NASA Langley Research Center, USA; Wise, Kent L., Inventor, NASA Langley Research Center, USA; May 09, 2000; 18p; In English; Provisional application


A modification to a commercial Fourier Transform (FT) Raman spectrometer is presented for the elimination of thermal backgrounds in the FT Raman spectra. The modification involves the use of a mechanical optical chopper to modulate the continuous wave laser, remote collection of the signal via fiber optics, and connection of a dual-phase digital-signal-processor (DSP) lock-in amplifier between the detector and the spectrometer’s collection electronics to demodulate and filter the optical signals. The resulting Modulated Fourier Transform Raman Fiber-Optic Spectrometer is capable of completely eliminating thermal backgrounds at temperatures exceeding 300°C.

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*Fourier Transformation; Raman Spectroscopy; Fiber Optics; Spectroscopic Analysis; Spectrometers; Patents; Patent Applications; Inventions*
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LICENSES FOR COMMERCIAL USE:
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NASA inventions, abstracted in this bibliography, are available for nonexclusive or exclusive licensing in accordance the Department of Commerce Patent License Regulations (37 CFR Part 404). It is significant that all licenses for NASA inventions shall be by express written instruments and that no license will be granted or implied in a NASA invention except as provided in the Department of Commerce Patent License Regulations (37 CFR Part 404).

Inquiries concerning the NASA Patent Licensing Program or the availability of licenses for the commercial use of NASA–owned inventions covered by U.S. patents or pending applications for patent should be forwarded to the NASA Patent Counsel of the NASA installation having cognizance of the specific invention, or the Associate General Counsel for Intellectual Property, code GP, National Aeronautics and Space Administration, Washington, D.C. 20546. Inquiries should refer to the NASA Case Number, the Title of the Invention, and the U.S. Patent Number or the U.S. Application Serial Number assigned to the invention as shown in this bibliography.

The NASA Patent Counsel having cognizance of the invention is determined by the first three letters or prefix of the NASA Case Number assigned to the invention. The addresses of NASA Patent Counsels are listed alongside the NASA Case Number prefix letters in the following table.

APP–1
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PATENT LICENSING REGULATIONS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
14 CFR Part 1245
Patents and Other Intellectual Property Rights
AGENCY: National Aeronautics and Space Administration (NASA).
Action: Final rule.

SUMMARY: NASA is amending 14 CFR Part 1245 by removing Subpart 2, “Licensing of NASA Inventions.” The Department of Commerce has issued similar regulations which prescribe the terms, conditions, and procedures upon which a federally owned invention may be licensed. These regulations are codified at 37 CFR Part 404, “Licensing of Government Owned Inventions.” NASA began granting licenses in accordance with the Department of Commerce regulations on March 13, 1995. All licenses agreements executed prior to this date will operate under the previous regulations.


FOR FURTHER INFORMATION CONTACT:
John G. Mannix, (202) 358-2424.

List of Subjects in 14 CFR Part 1245
Authority delegations (Government agencies), Inventions and patents.

PART 1245 — [AMENDED]
Subpart 2 — [Removed and Reserved]
In 14 CFR Part 1245, Subpart 2 (consisting of §§ 1245.200 through 1245.214) is removed and reserved.

Edward A. Frankle,
General Counsel.

[FR Doc. 95-10583 Filed 4-28-95, 8:45 am]
BILLING CODE 7510-01-M

Sec. 404.1 Scope of part.
This part prescribes the terms, conditions, and procedures upon which a federally owned invention, other than an invention in the custody of the Tennessee Valley Authority, may be licensed. It supersedes the regulations at 41 CFR Subpart 101-4.1. This part does not affect licenses which (a) were in effect prior to July 1, 1981; (b) may exist at the time of the Government’s acquisition of title to the invention, including those resulting from the allocation of rights to inventions made under Government research and development contracts; (c) are the result of an authorized exchange of rights in the settlement of patent disputes; or (d) are otherwise authorized by law or treaty.

Sec. 404.2 Policy and objective.
It is the policy and objective of this subpart to promote the utilization of inventions arising from federally supported research or development.

Sec. 404.3 Definitions.
(a) 'Federally owned invention' means an invention, plant, or design which is covered by a patent, or patent application in the United States, or a patent, patent application, plant variety protection, or other form of protection, in a foreign country, title to which has been assigned to or otherwise vested in the United States Government.
(b) 'Federal agency' means an executive department, military department, Government corporation, or independent establishment, except the Tennessee Valley Authority, which has custody of a federally owned invention.
(c) 'Small business firm' means a small business concern as defined in section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration.
(d) 'Practical application' means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are to the extent permitted by law or Government regulations available to the public on reasonable terms.
(e) 'United States' means the United States of America, its territories and possessions, the District of Columbia, and the Commonwealth of Puerto Rico.

Sec. 404.4 Authority to grant licenses.
Federally owned inventions shall be made available for licensing as deemed appropriate in the public interest. Federal agencies having custody of federally owned inventions may grant nonexclusive, partially exclusive, or exclusive licenses thereto under this part.

Sec. 404.5 Restrictions and conditions on all licenses granted under this part.
(a) (1) A license may be granted only if the applicant has supplied the Federal agency with a satisfactory plan for development or marketing of the invention, or both, and with information about the applicant’s capability to fulfill the plan.
(2) A license granting rights to use or sell under a federally owned invention in the United States shall normally be granted only to a licensee who agrees that any products embodying the invention or produced through the use of the invention will be manufactured substantially in the United States.
(b) Licenses shall contain such terms and conditions as the Federal agency determines are appropriate for the protection of the interests of the Federal Government and the public and are not in conflict with law or this part. The following terms and conditions apply to any license:
(1) The duration of the license shall be for a period specified in the license agreement unless sooner terminated in accordance with this part.
(2) The license may be granted for all or less than all fields of use of the invention or in specified geographical areas, or both.

(3) The license may extend to subsidiaries of the licensee or other parties if provided for in the license but shall be nonassignable without approval of the Federal agency, except to the successor of that part of the licensee's business to which the invention pertains.

(4) The licensee may provide the license the right to grant sublicenses under the license, subject to the approval of the Federal agency. Each sublicensee shall make reference to the license, including the rights retained by the Government, and a copy of such sublicense shall be furnished to the Federal agency.

(5) The license shall require the licensee to carry out the plan for development or marketing of the invention, or both, to bring the invention to practical application within a period specified in the license, and to continue to make the benefits of the invention reasonably accessible to the public.

(6) The license shall require the licensee to report periodically on the utilization or efforts at obtaining utilization that are being made by the licensee, with particular reference to the plan submitted.

(7) Licenses may be royalty-free or for royalties or other consideration.

(8) Where an agreement is obtained pursuant to Sec. 404.5(a)(2) that any products embodying the invention or produced through use of the invention will be manufactured substantially in the United States, the license shall require such agreement.

(9) The license shall provide for the right of the Federal agency to terminate the license, in whole or in part, if:

(i) The Federal agency determines that the licensee is not executing the plan submitted with its request for a license and the licensee cannot otherwise demonstrate to the satisfaction of the Federal agency that it has taken or can be expected to take within a reasonable time effective steps to achieve practical application of the invention;

(ii) The Federal agency determines that such action is necessary to meet requirements for public use specified by Federal regulations issued after the date of the license and such requirements are not reasonably satisfied by the licensee;

(iii) The licensee has willfully made a false statement of or willfully omitted a material fact in the license application or in any report required by the license agreement; or

(iv) The licensee commits a substantial breach of a covenant or agreement contained in the license.

(10) The license may be modified or terminated, consistent with this part, upon mutual agreement of the Federal agency and the licensee.

(11) Nothing relating to the grant of a license, nor the grant itself, shall be construed to confer upon any person any immunity from or defenses under the antitrust laws or from a charge of patent misuse, and the acquisition and use of rights pursuant to this part shall not be immunized from the operation of state or Federal law by reason of the source of the grant.

Sec. 404.7 Exclusive and partially exclusive licenses.
(a) (1) Exclusive or partially exclusive domestic licenses may be granted on federally owned inventions three months after notice of the invention's availability has been announced in the Federal Register, or without such notice where the Federal agency determines that expeditious granting of such a license will best serve the interest of the Federal Government and the public; and in either situation, only if;

(i) Notice of a prospective license, identifying the invention and the prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60-day period;

(ii) After expiration of the period in Sec. 404.7(a)(1)(i) and consideration of any written objections received during the period, the Federal agency has determined that;

(A) The interests of the Federal Government and the public will best be served by the proposed license, in view of the applicant's intentions, plans, and ability to bring the invention to practical application or otherwise promote the invention's utilization by the public;

(B) The desired practical application has not been achieved, or is not likely expeditiously to be achieved, under any nonexclusive license which has been granted, or which may be granted, on the invention;

(C) Exclusive or partially exclusive licensing is a reasonable and necessary incentive to call forth the investment of risk capital and expenditures to bring the invention to practical application or otherwise promote the invention's utilization by the public; and

(D) The proposed terms and scope of exclusivity are not greater than reasonably necessary to provide the incentive for bringing the invention to practical application or otherwise promote the invention's utilization by the public;

(iii) The Federal agency has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the country in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with the antitrust laws; and

(iv) The Federal agency has given first preference to any small business firms submitting plans that are determined by the agency to be within the capabilities of the firms and as equally likely, if executed, to bring the invention to practical application as any plans submitted by applicants that are not small business firms.

(2) In addition to the provisions of Sec. 404.5, the following terms and conditions apply to domestic exclusive and partially exclusive licenses;

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall reserve to the Federal agency the right to require the licensee to grant sublicenses to responsible applicants, on reasonable terms, when necessary to fulfill health or safety needs.

(iii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iv) The license may grant the licensee the right of enforcement of the licensed patent pursuant to the provisions of Chapter 29 of Title 35, United States Code, or other statutes, as determined appropriate in the public interest.

(b) (1) Exclusive or partially exclusive licenses may be granted on a federally owned invention covered by a foreign patent, patent application, or other form of protection, provided that;

(i) Notice of a prospective license, identifying the invention and prospective licensee, has been published in the Federal Register, providing opportunity for filing written objections within a 60-day period and following consideration of such objections;
(ii) The agency has considered whether the interests of the Federal Government or United States industry in foreign commerce will be enhanced; and

(iii) The Federal agency has not determined that the grant of such license will tend substantially to lessen competition or result in undue concentration in any section of the United States in any line of commerce to which the technology to be licensed relates, or to create or maintain other situations inconsistent with antitrust laws.

(2) In addition to the provisions of Sec. 404.5 the following terms and conditions apply to foreign exclusive and partially exclusive licenses:

(i) The license shall be subject to the irrevocable, royalty-free right of the Government of the United States to practice and have practiced the invention on behalf of the United States and on behalf of any foreign government or international organization pursuant to any existing or future treaty or agreement with the United States.

(ii) The license shall be subject to any licenses in force at the time of the grant of the exclusive or partially exclusive license.

(iii) The license may grant the licensee the right to take any suitable and necessary actions to protect the licensed property, on behalf of the Federal Government.

(c) Federal agencies shall maintain a record of determinations to grant exclusive or partially exclusive licenses.

Sec. 404.8 Application for a license.

An application for a license shall be addressed to the Federal agency having custody of the invention and shall normally include:

(a) Identification of the invention for which the license is desired including the patent application serial number or patent number, title, and date, if known;

(b) Identification of the type of license for which the application is submitted;

(c) Name and address of the person, company, or organization applying for the license and the citizenship or place of incorporation of the applicant;

(d) Name, address, and telephone number of the representative of the applicant to whom correspondence should be sent;

(e) Nature and type of applicant's business, identifying products or services which the applicant has successfully commercialized, and approximate number of applicant's employees;

(f) Source of information concerning the availability of a license on the invention;

(g) A statement indicating whether the applicant is a small business firm as defined in Sec. 404.3(c);

(h) A detailed description of applicant's plan for development or marketing of the invention, or both, which should include:

(1) A statement of the time, nature and amount of anticipated investment of capital and other resources which applicant believes will be required to bring the invention to practical application;

(2) A statement as to applicant's capability and intention to fulfill the plan, including information regarding manufacturing, marketing, financial, and technical resources;

(3) A statement of the fields of use for which applicant intends to practice the invention; and

(4) A statement of the geographic areas in which applicant intends to manufacture any products embodying the invention and geographic areas where applicant intends to use or sell the invention, or both;

(i) Identification of licenses previously granted to applicant under federally owned inventions;

(j) A statement containing applicant's best knowledge of the extent to which the invention is being practiced by private industry or Government, or both, or is otherwise available commercially; and

(k) Any other information which applicant believes will support a determination to grant the license to applicant.

Sec. 404.9 Notice to Attorney General.

A copy of the notice provided for in Sec. 404.7(a)(1)(i) and (b)(1)(i) will be sent to the Attorney General.

Sec. 404.10 Modification and termination of licenses.

Before modifying or terminating a license, other than by mutual agreement, the Federal agency shall furnish the licensee and any sublicensee of record a written notice of intention to modify or terminate the license, and the licensee and any sublicensee shall be allowed 30 days after such notice to remedy any breach of the license or show cause why the license shall not be modified or terminated.

Sec. 404.11 Appeals.

In accordance with procedures prescribed by the Federal agency, the following parties may appeal to the agency head or designee any decision or determination concerning the grant, denial, interpretation, modification, or termination of a license:

(a) A person whose application for a license has been denied.

(b) A licensee whose license has been modified or terminated, in whole or in part; or

(c) A person who timely filed a written objection in response to the notice required by Sec. 404.7(a)(1)(i) or Sec. 404.7(b)(1)(i) and who can demonstrate to the satisfaction of the Federal agency that such person may be damaged by the agency action.

Sec. 404.12 Protection and administration of inventions.

A Federal agency may take any suitable and necessary steps to protect and administer rights to federally owner inventions, either directly or through contract.

Sec. 404.13 Transfer of custody.

A Federal agency having custody of a federally owned invention may transfer custody and administration, in whole or in part, to another Federal agency, of the right, title, or interest in such invention.

Sec. 404.14 Confidentiality of information.

Title 35, United States Code, section 209, provides that any plan submitted pursuant to Sec. 404.8 (f) and any report required by Sec. 404.5(b)(6) may be treated by the Federal agency as commercial and financial information obtained from a person and privileged and confidential and not subject to disclosure under section 552 of Title 5 of the United States Code.
### Abstract

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<td>(606) 257-3139 Fax: (606) 257-3139</td>
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<td>LOUISIANA</td>
<td>Louisiana State University Louisiana</td>
<td>Middleton Library</td>
<td>(504) 388-2570 Fax: (504) 386-6992</td>
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<td>MAINE</td>
<td>Maine Un. Of Maine Library</td>
<td>Afton, LA 70803-3312</td>
<td>(318) 257-0402 Fax: (318) 257-2447</td>
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<td>MARYLAND</td>
<td>Maryland Un. Of Maryland – College Park Library</td>
<td>McKeldin Library</td>
<td>(505) 277-5441 Fax: (505) 277-6019</td>
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<td>MASSACHUSETTS</td>
<td>Boston Public Library</td>
<td>660 Boeing Street</td>
<td>(508) 581-1678 Fax: (508) 581-1653</td>
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<td>MICHIGAN</td>
<td>Michigan Public Library</td>
<td>5021 Woodward Avenue</td>
<td>(313) 832-1055 Fax: (313) 833-0156</td>
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<td>MINNESOTA</td>
<td>Minnesota Library</td>
<td>140 North Senate Avenue</td>
<td>(612) 284-5073 Fax: (612) 284-9353</td>
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<td>MISSISSIPPI</td>
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<td>J.D. Williams Library</td>
<td>(601) 232-5857 Fax: (601) 232-7465</td>
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<td>MISSOURI</td>
<td>Missouri Un. Of Missouri – Columbia</td>
<td>1068 Ellis Library</td>
<td>(314) 882-6733 Fax: (314) 882-6044</td>
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<td>MONTANA</td>
<td>University of Montana</td>
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<td>(406) 242-6070 Fax: (406) 242-2020</td>
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<td>NEBRASKA</td>
<td>University Of Nebraska – Lincoln Library</td>
<td>L.D. Lowe Memorial Library</td>
<td>(402) 472-2262 Fax: (402) 472-5131</td>
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<td>NEVADA</td>
<td>Nevada Un. Of Nevada Libraries Libraries</td>
<td>Business and Gov. Information Center</td>
<td>(702) 784-6576 Fax: (702) 784-1751</td>
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<td>NEW JERSEY</td>
<td>New Jersey Public Library</td>
<td>Newark, NJ 07101-7812</td>
<td>(212) 733-7822 Fax: (212) 733-5648</td>
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<td>NEW MEXICO</td>
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<td>Albuquerque, NM 87131-1466</td>
<td>(505) 277-5441 Fax: (505) 277-6019</td>
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<td>NEW YORK</td>
<td>New York State Library</td>
<td>Santa Fe, NM 87503</td>
<td>(505) 827-3824 Fax: (505) 827-3888</td>
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<td>NORTH CAROLINA</td>
<td>Univ. Of North Carolina – Chapel Hill</td>
<td>Walter Royal Davis Library</td>
<td>(518) 474-5285 Fax: (518) 474-5786</td>
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<td>NORTH DAKOTA</td>
<td>North Dakota State Un. Lib. Libraries</td>
<td>106 Old Gym Bldg.</td>
<td>(919) 962-1151 Fax: (919) 962-4451</td>
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<td>OHIO</td>
<td>State Library of Ohio</td>
<td>140 North Senate Avenue</td>
<td>(612) 284-5073 Fax: (612) 284-9353</td>
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<td>OKLAHOMA</td>
<td>Oklahoma Dept. Of Libraries</td>
<td>1068 Ellis Library</td>
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<td>OREGON</td>
<td>Portland State Univ. Library</td>
<td>934 Southeast Harrison</td>
<td>(503) 725-4123 Fax: (503) 725-4524</td>
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<td>PENNSYLVANIA</td>
<td>State Library of Penn.</td>
<td>116 Walnut &amp; Commonwealth Ave. Harrisburg, PA</td>
<td>(717) 787-3752 Fax: (717) 783-2070</td>
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<td>SOUTH CAROLINA</td>
<td>Clemson Univ. Library</td>
<td>Sarasota, FL 34244-2353</td>
<td>(601) 542-3701 Fax: (601) 542-4400</td>
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<td>TEXAS</td>
<td>Texas State Library</td>
<td>1061 West Washington</td>
<td>(205) 348-2303 Fax: (205) 348-2304</td>
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<td>TEXAS</td>
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<td>Austin, TX 78701-0001</td>
<td>(512) 463-5455 Fax: (512) 463-5436</td>
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<td>UTAH</td>
<td>Utah State Univ. Library</td>
<td>16th and Water Streets</td>
<td>(808) 742-2282 Fax: (808) 742-1920</td>
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<td>VIRGINIA</td>
<td>Virginia Un. Of Virginia Libraries</td>
<td>Ball State University</td>
<td>(804) 854-3133 Fax: (804) 924-4337</td>
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<td>WASHINGTON</td>
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<td>18th and Water Streets</td>
<td>(206) 753-4027 Fax: (206) 586-7575</td>
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<td>WEST VIRGINIA</td>
<td>West Virginia Un. Library</td>
<td>University of Oregon - Morgantown</td>
<td>(304) 293-3051 Fax: (304) 293-6638</td>
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<td>WISCONSIN</td>
<td>St. Hist. Soc. Of Wisconsin Library</td>
<td>157 Park Avenue</td>
<td>(608) 264-6525 Fax: (608) 264-6520</td>
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<td>MILWAUKEE</td>
<td>Milwaukee Public Library</td>
<td>814 West Wisconsin Avenue</td>
<td>(414) 286-3073 Fax: (414) 286-6074</td>
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