

[https://patents.google.com/?](https://patents.google.com/?inventor=Lieber%2c+Charles+M&num=100&oq=Lieber%2c+Charles+M)

[inventor=Lieber%2c+Charles+M&num=100&oq=Lieber%2c+Charles+M](https://patents.google.com/?inventor=Lieber%2c+Charles+M&num=100&oq=Lieber%2c+Charles+M)

73 Studies on Nano Wires, Nano Sensors, Nano Devices, Nano Electronics and Human Brain Interface, Many of Which Were Authored or Co-Authored by Charles M. Lieber, Found Guilty of Concealing Affiliation with China

High-sensitivity nanoscale wire sensors

WO EP US US9535063B2 Charles M. Lieber President And Fellows Of Harvard College
Priority 2006-11-22 • Filed 2013-09-18 • Granted 2017-01-03 • Published 2017-01-03

One aspect of the invention provides a nanoscale wire that has improved sensitivity, for example, as the carrier concentration in the wire is controlled by an external gate voltage. In one set of embodiments, the nanoscale wire has a Debye screening length that is greater than the average cross- ...

Nanopore Sensing By Local Electrical Potential Measurement

WO EP US CN US20210310987A1 Ping Xie President And Fellows Of Harvard College
Priority 2011-04-04 • Filed 2021-06-14 • Published 2021-10-07

There is provided a nanopore sensor including cis and trans fluidic reservoirs. A nanopore is provided in a support structure separating the cis and trans reservoirs. The nanopore has an inlet in fluidic connection with the cis fluidic reservoir and an outlet in fluidic connection with the trans ...

High-resolution molecular sensor

WO EP US US10119955B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2007-09-12 • Filed 2014-02-21 • Granted 2018-11-06 • Published 2018-11-06

A solid state molecular sensor having an aperture extending through a thickness of a sensing material is configured with a continuous electrically-conducting path extending in the sensing material around the aperture. A supply reservoir is connected to provide a molecular species, having a ...

Nanosensors and related technologies

WO EP US JP AT AU CA DE US9903862B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2006-06-12 • Filed 2015-06-30 • Granted 2018-02-27 • Published 2018-02-27

The present invention generally relates to nanotechnology and sub-microelectronic circuitry, as well as associated methods and devices, for example, nanoscale wire devices and methods for use in determining nucleic acids or other analytes suspected to be present in a sample. For example, a ...

Nanosensors

WO EP US JP KR AT AU CA DE ES US7619290B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2000-12-11 • Filed 2008-02-27 • Granted 2009-11-17 • Published 2009-11-17

Electrical devices comprised of nanowires are described, along with methods of their manufacture and use. The nanowires can be nanotubes and nanowires. The surface of the nanowires may be selectively functionalized. Nanodetector devices are described. Nanoscopic wire-based devices and arrays

WO EP US JP AT AU CA DE US8471298B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 1999-07-02 • Filed 2012-04-11 • Granted 2013-06-25 • Published 2013-06-25

Electrical devices comprised of nanoscopic wires are described, along with methods of their manufacture and use. The nanoscopic wires can be nanotubes, preferably single-walled carbon nanotubes. They can be arranged in crossbar arrays using chemically patterned surfaces for direction, via chemical ...

Transition metal oxide nanowires

WO EP US CN JP KR AT AU CA DE US7918935B2 Hongkun Park President And Fellows Of Harvard College

Priority 2001-07-20 • Filed 2007-06-19 • Granted 2011-04-05 • Published 2011-04-05

Nanowires are disclosed which comprise transition metal oxides. The transition metal oxides may include oxides of group II, group III, group IV and lanthanide metals. Also disclosed are methods for making nanowires which comprise injecting decomposition agents into a solution comprising solvents ...

Nanoscale sensors

US US8232584B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2005-05-25 • Filed 2009-08-05 • Granted 2012-07-31 • Published 2012-07-31

Various aspects of the invention relate to nanoscale wire devices and methods of use for detecting analytes. In one aspect, the invention relates to a nanoscale electrical sensor array device, comprising at least one n-doped semiconductor nanoscale wire and at least one p-doped semiconductor ...

Nanowire heterostructures

WO US US7858965B2 Wei Lu President And Fellows Of Harvard College

Priority 2005-06-06 • Filed 2007-05-25 • Granted 2010-12-28 • Published 2010-12-28

The present invention generally relates to nanoscale heterostructures and, in some cases, to nanowire heterostructures exhibiting ballistic transport, and/or to metal-semiconductor junctions that exhibit no or reduced Schottky barriers. One aspect of the invention provides a solid nanowire ...

Methods and systems for scaffolds comprising nanoelectronic components

US US10355229B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2012-09-07 • Filed 2016-07-08 • Granted 2019-07-16 • Published 2019-07-16

The present invention generally relates to nanoscale wires and tissue engineering. Systems and methods are provided in various embodiments for preparing cell scaffolds

that can be used for growing cells or tissues, where the cell scaffolds comprise nanoscale wires. In some cases, the nanoscale ...

Controlled synthesis of monolithically-integrated graphene structure

WO US US9029836B2 Jung-Ung Park President And Fellows Of Harvard College

Priority 2010-09-08 • Filed 2011-09-08 • Granted 2015-05-12 • Published 2015-05-12

In a method for fabricating a graphene structure, there is formed on a fabrication substrate a pattern of a plurality of distinct graphene catalyst materials. In one graphene synthesis step, different numbers of graphene layers are formed on the catalyst materials in the formed pattern. In a ...

Branched nanoscale wires

WO US US8058640B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2006-09-11 • Filed 2007-09-11 • Granted 2011-11-15 • Published 2011-11-15

The present invention generally relates to nanotechnology and, in particular, to branched nanoscale wires. In some cases, the branched nanoscale wires may be produced using vapor-phase and/or solution-phase synthesis. Branched nanoscale wires may be grown by depositing nanoparticles onto a ...

Nanoscale wires and related devices

US US20090057650A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2000-08-22 • Filed 2008-02-27 • Published 2009-03-05

The present invention relates generally to sub-microelectronic circuitry, and more particularly to nanometer-scale articles, including nanoscale wires which can be selectively doped at various locations and at various levels. In some cases, the articles may be single crystals. The nanoscale wires ...

Bent nanowires and related probing of species

WO US US9297796B2 Bozhi Tian President And Fellows Of Harvard College

Priority 2009-09-24 • Filed 2010-09-24 • Granted 2016-03-29 • Published 2016-03-29

Kinked nanowires are used for measuring electrical potentials inside simple cells. An improved intracellular entrance is achieved by modifying the kinked nanowires with phospholipids.

Nanoscale wires, nanoscale wire FET devices, and nanotube-electronic hybrid ...

WO US US9595685B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2011-06-10 • Filed 2012-06-07 • Granted 2017-03-14 • Published 2017-03-14

The present invention generally relates to nanotechnology, including field effect transistors and other devices used as sensors (for example, for electrophysiological studies), nanotube structures, and applications. Certain aspects of the present invention are generally directed to transistors ...

Nanoscale field-effect transistors for biomolecular sensors and other ...

WO EP US CN JP BR IN US9541522B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2012-09-12 • Filed 2013-09-12 • Granted 2017-01-10 • Published 2017-01-10

The present invention generally relates to nanoscale wires, including to nanoscale wires

used as sensors. In some cases, the nanoscale wires may be used to directly determine analytes, even within relatively complicated environments such as blood, unlike many prior art techniques. In some aspects, ...

Scaffolds comprising nanoelectronic components for cells, tissues, and other ...

US US10369255B2 Charles M. Lieber President And Fellows Of Harvard College
Priority 2012-09-07 • Filed 2016-07-21 • Granted 2019-08-06 • Published 2019-08-06

The present invention generally relates to nanoscale wires and tissue engineering. In various embodiments, cell scaffolds for growing cells or tissues can be formed that include nanoscale wires that can be connected to electronic circuits extending externally of the cell scaffold. The nanoscale ...

Doped elongated semiconductors, growing such semiconductors, devices including ...

WO EP US CN JP KR AU CA MX TW US20120329251A1 Charles M. Lieber President
And Fellows Of Harvard College

Priority 2000-08-22 • Filed 2012-06-06 • Published 2012-12-27

A bulk-doped semiconductor that is at least one of the following: a single crystal, an elongated and bulk-doped semiconductor that, at any point along its longitudinal axis, has a largest cross-sectional dimension less than 500 nanometers, and a free-standing and bulk-doped semiconductor with at ...

Nanobioelectronics

WO EP US JP AU CA US20090299213A1 Fernando Patolsky President And Fellows Of
Harvard College

Priority 2006-03-15 • Filed 2007-03-15 • Published 2009-12-03

The present invention generally relates to nanobioelectronics and, in some cases, to circuits comprising nanoelectronic elements, such as nanotubes and/or nanowires, and biological components, such as neurons. In one aspect, cells, such as neurons, are positioned in electrical communication with ...

Nanoscale wires and related devices

WO EP JP CA JP2008300848A Charles M Lieber President & Fellows Of Harvard
College

Priority 2001-05-18 • Filed 2008-06-16 • Published 2008-12-11

<P>PROBLEM TO BE SOLVED: To provide nanoscale wires and related devices that are suitable for nano technology, especially for electronics purposes of nanoscale.

<P>SOLUTION: A device is used which includes a memory element array having density of at least 10<SP>12</SP>byte/cm<SP>2</SP>. At least ...

Three-dimensional networks comprising nanoelectronics

WO US US20160027846A1 Charles M. Lieber President And Fellow Of Harvard
College

Priority 2013-04-05 • Filed 2014-04-03 • Published 2016-01-28

The present invention generally relates to nanoscale wires and three-dimensional networks or structures comprising nanoscale wires. For example, certain embodiments are directed to three-dimensional structures comprising nanoscale wires. The structures may be porous and define electrical networks ...

Nanoscale wires with external layers for sensors and other applications

WO US US20180088079A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2015-04-03 • Filed 2016-04-01 • Published 2018-03-29

The present invention generally relates to nanoscale wires and other nanomaterials, including nanoscale wires used as sensors, including nanoscale wires comprising semiconductor nanowires, carbon nanotubes, graphene, or metal oxide nanomaterials. Certain aspects of the invention are generally ...

Nanoscale wire probes for the brain and other applications

WO US US20160302682A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2013-12-03 • Filed 2014-12-02 • Published 2016-10-20

The present invention generally relates to nanoscale wires and, in particular, to probes comprising nanoscale wires for use in determining properties such as electrical and/or chemical properties, e.g., for insertion into biological tissue, such as the brain. The probe may be formed from ...

Nanoscale wire probes

WO US US20150351691A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2012-08-24 • Filed 2013-08-21 • Published 2015-12-10

What is claimed is: 1 . An article for insertion into a tissue, comprising: a substrate constructed and arranged for insertion into tissue, a plurality of nanoscale wires, and a plurality of electrical connectors in electrical communication with the plurality of nanoscale wires. 2 . The article of

Nanoscale sensors for intracellular and other applications

WO US US9638717B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2012-05-03 • Filed 2013-05-02 • Granted 2017-05-02 • Published 2017-05-02

The present invention generally relates to nanoscale wires for use in sensors and other applications. In various embodiments, a probe comprising a nanotube (or other nanoscale wire) is provided that can be directly inserted into a cell to determine a property of the cell, e.g., an electrical ...

Method of producing metal oxide nano-rod

WO EP US JP AU JP2010018520A Charles M Lieber President & Fellows Of Harvard College

Priority 1996-02-26 • Filed 2009-10-27 • Published 2010-01-28

The present invention provides a method capable of manufacturing a large number of nanorods and nanorods aligned on a substrate surface. A method for producing a metal oxide nanorod includes a step of generating a metal vapor in a furnace 6 and a metal oxide nanorod formed on a surface of a ...

Nanoscale wire methods and devices

WO WO2007145701A3 Sung Woo Nam Harvard College

Priority 2006-04-07 • Filed 2007-04-06 • Published 2008-05-29

The present invention generally relates to nanoscale wire methods and devices, including systems and methods for positioning nanoscale wires on a surface, and articles made therefrom. One aspect of the invention is generally directed to aligned nanoscale wires on a surface of a substrate, and ...

Systems and methods for injectable devices

WO US US20170172438A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2014-04-04 • Filed 2015-04-03 • Published 2017-06-22

1 . A method, comprising: passing a device comprising one or more nanoscale wires through an opening of a tube. 2 - 108 . (canceled)

Facet-selective growth of nanoscale wires

WO US WO2015191847A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2014-06-13 • Filed 2015-06-11 • Published 2015-12-17

Nanoscale wires, and to systems and methods of producing nanoscale wires comprising facet-specific deposition on semiconductor surfaces. A first surface of a nanoscale wire, or a semiconductor, is preferentially oxidized relative to a second surface, and material is preferentially deposited on the ...

Nanoscale wire-based memory devices

WO US WO2009134291A2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2008-01-21 • Filed 2009-01-21 • Published 2009-11-05

The present invention generally relates to nanotechnology and sub- microelectronic devices that can be used in circuitry and, in particular, to nanoscale wires and other nanostructures able to encode data. One aspect of the present invention is directed to a device comprising an electrical ...

Techniques and systems for injection and/or connection of electrical devices

WO US US20180224433A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2015-08-04 • Filed 2016-08-04 • Published 2018-08-09

The present invention generally relates to nanoscale wires, nanoscale sensing elements, and/or injectable devices. In some embodiments, the present invention is directed to electronic devices that can be injected or inserted into soft matter, such as biological tissue or polymeric matrixes. For ...

Methods for nano and micro-patterning

WO WO2016130672A1 Daniel G. Nocera President And Fellows Of Harvard College

Priority 2015-02-11 • Filed 2016-02-10 • Published 2016-08-18

Nano-patterned devices and their method of manufacture are described. In one embodiment, a method for forming a device includes: electrochemically etching a first material layer comprising a first material disposed on a substrate, wherein electrochemically etching the first material layer ...

Nanoscale wires with tip-localized junctions

WO US US20170352542A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2014-10-30 • Filed 2015-10-29 • Published 2017-12-07

The present invention generally relates to nanoscale wires and, in particular, to nanoscale wires with heterojunctions, such as tip-localized homo- or heterojunctions. In one aspect, the nanoscale wire may include a core, an inner shell surrounding the core, and an outer shell surrounding the ...

Controlled growth of nanoscale wires

WO US US10435817B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2014-05-07 • Filed 2015-05-06 • Granted 2019-10-08 • Published 2019-10-08

The present invention generally relates to nanoscale wires, and to methods of producing nanoscale wires. In some aspects, the nanoscale wires are nanowires comprising a core which is continuous and a shell which may be continuous or discontinuous, and/or may have regions having different cross- ...

Millimeter-long nanowires

WO WO2008123869A2 Won Il Park President And Fellows Of Harvard College

Priority 2006-11-21 • Filed 2007-11-20 • Published 2008-10-16

The present invention generally relates to wires, including nanowires such as semiconductor nanowires, which may be a single crystal in some cases. In one aspect, the present invention is generally directed to a relatively long semiconductor wire. The semiconductor wire may have a length of at ...

Interfaces for syringe-injectable electronics

US US20180328884A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2017-05-12 • Filed 2018-05-11 • Published 2018-11-15

The present invention generally relates to injectable electronics. In some aspects, the present invention is generally directed to systems and methods for interfacing an electrical cable with electrical elements, such as nanoscale wires, that are injected or otherwise introduced into a subject.

Anisotropic deposition in nanoscale wires

WO US US10049871B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2013-02-06 • Filed 2014-02-04 • Granted 2018-08-14 • Published 2018-08-14

The present invention generally relates to nanoscale wires, including anisotropic deposition in nanoscale wires. In one set of embodiments, material may be deposited on certain portions of a nanoscale wire, e.g., anisotropically. For example, material may be deposited on a first facet of a ...

Systems and methods for flexible micrometer-scale endovascular probes for ...

WO WO2022036050A1 Anqi Zhang President And Fellows Of Harvard College

Priority 2020-08-14 • Filed 2021-08-12 • Published 2022-02-17

The present disclosure generally relates to injectable electronics that can be inserted into a subject, e.g., into a blood vessel. Some embodiments include a device comprising electrical elements that is injected into a subject, e.g., to allow for sensing of neurons

and/or stimulating a response.

Apparatus, method and computer program product providing radial addressing of ...

US US20150108423A1 Andre DeHon Brown University Research Foundation

Priority 2005-02-04 • Filed 2014-10-22 • Published 2015-04-23

Disclosed is a method to construct a device that includes a plurality of nanowires (NWs) each having a core and at least one shell. The method includes providing a plurality of radially encoded NWs where each shell contains one of a plurality of different shell materials; and differentiating ...

Liquid films containing nanostructured materials

WO US WO2008130375A3 Charles M Lieber Harvard College

Priority 2006-10-10 • Filed 2007-10-10 • Published 2009-04-02

The present invention generally relates to liquid films containing nanostructured materials, and, optionally, the use of this arrangement to organize nanostructures and to transfer the nanostructures to a surface. Liquid films containing nanostructures, such as nanoscale wires, can be formed in a ...

Nanoscale wires and related devices

AU AU2007211919A1 Yi Cui President And Fellows Of Harvard College

Priority 2000-08-22 • Filed 2007-08-24 • Published 2007-09-13

126- SWhat is claimed is: (N S1. An article comprising: a nanowire comprising a first region having a composition and a second region having a composition different from the composition of the first region; and a chemical or biological reaction moiety positioned proximal to or attached to the ...

Nanoscale wires and related devices

WO US AU US7301199B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2000-08-22 • Filed 2002-07-16 • Granted 2007-11-27 • Published 2007-11-27

The present invention relates generally to sub-microelectronic circuitry, and more particularly to nanometer-scale articles, including nanoscale wires which can be selectively doped at various locations and at various levels. In some cases, the articles may be single crystals. The nanoscale wires ...

Array-based architecture for molecular electronics

WO EP US AU US7073157B2 André DeHon California Institute Of Technology

Priority 2002-01-18 • Filed 2003-01-17 • Granted 2006-07-04 • Published 2006-07-04

An architecture for nanoscale electronics is disclosed. The architecture comprises arrays of crossed nanoscale wires having selectively programmable crosspoints. Nanoscale wires of one array are shared by other arrays, thus providing signal propagation between the arrays. Nanoscale signal ...

Carbide nanomaterials

WO US US6190634B1 Charles M. Lieber President And Fellows Of Harvard College

Priority 1995-06-07 • Filed 1995-06-07 • Granted 2001-02-20 • Published 2001-02-20

A nanoscale carbide article consisting essentially of covalently bounded elements M₁, M₂, and C having the molar ratio M₁:M₂:C::1:y:x, wherein the article has an aspect

ratio of between 10 and 1000 and has a shorter axis of between 1 and 40 nanometers.

Direct growth of nanotubes, and their use in nanotweezers

WO US AU US6743408B2 Charles M. Lieber President And Fellows Of Harvard College
Priority 2000-09-29 • Filed 2001-09-28 • Granted 2004-06-01 • Published 2004-06-01

A method of producing carbon single wall nanotubes (SWNT) by CVD is disclosed. The SWNTs are grown on a metal-catalyzed support surface, such as a commercially available silicon tips for atomic force microscopes (AFM). The growth characteristics of the SWNTs can be controlled by adjusting the ...

Nanometer-scale microscopy probes

US US6159742A Charles M. Lieber President And Fellows Of Harvard College
Priority 1998-06-05 • Filed 1999-06-04 • Granted 2000-12-12 • Published 2000-12-12

A carbon-based tip for scanning probe microscopy. The tip used in microscopy to reveal chemical characteristics of a sample includes a structure of the formula: $X-(L-M)_{sub.n}$ in which n is 1 to 100, X is a carbon-based nanotube, L is a linking group bonded at an end of the carbon-based nanotube, ...

Nanoscale coherent optical components

WO US AU US7254151B2 Charles M. Lieber President & Fellows Of Harvard College
Priority 2002-07-19 • Filed 2003-12-11 • Granted 2007-08-07 • Published 2007-08-07

This invention generally relates to nanotechnology and nanoelectronics as well as associated methods and devices. In particular, the invention relates to nanoscale optical components such as electroluminescence devices (e.g., LEDs), amplified stimulated emission devices (e.g., lasers), waveguides, ...

Metal oxide nanorods

US US5897945A Charles M. Lieber President And Fellows Of Harvard College
Priority 1996-02-26 • Filed 1996-02-26 • Granted 1999-04-27 • Published 1999-04-27

Metal oxide nanorods and composite materials containing such nanorods. The metal oxide nanorods have diameters between 1 and 200 nm and aspect ratios between 5 and 2000.

Preparation of carbide nanorods

WO US AU US5997832A Charles M. Lieber President And Fellows Of Harvard College
Priority 1997-03-07 • Filed 1997-03-07 • Granted 1999-12-07 • Published 1999-12-07

A process utilizing a supported metal catalyst, a volatile species source, and a carbon source has been developed to produce carbide nanorods with diameters of less than about 100 nm and aspect ratios of 10 to 1000. The volatile species source, carbon source, and supported metal catalyst can be ...

Machining oxide thin-films with an atomic force microscope: pattern and object ...

US US5252835A Charles M. Lieber President And Trustees Of Harvard College
Priority 1992-07-17 • Filed 1992-07-17 • Granted 1993-10-12 • Published 1993-10-12

We claim: 1. A method for machining oxide thin-films, comprising the steps of: a) employing an atomic force microscope to pattern lines on the oxide thin film; and b) imaging a resulting structure by controlling an applied load of a tip of the atomic force microscope.

Fabrication of nanotube microscopy tips

WO US AU US6716409B2 Jason H. Hafner President And Fellows Of The Harvard College

Priority 2000-09-18 • Filed 2001-09-18 • Granted 2004-04-06 • Published 2004-04-06

A method of fabricating SWNT probes for use in atomic force microscopy is disclosed.

In one embodiment, the SWNT's are fabricated using a metallic salt solution. In another embodiment, the SWNT's are fabricated using metallic colloids.

Covalent carbon nitride material comprising C₂N and formation method

WO US AU US5840435A Charles M. Lieber President And Fellows Of Harvard College

Priority 1993-07-15 • Filed 1995-06-07 • Granted 1998-11-24 • Published 1998-11-24

A nitride material comprises C₂N. A method of forming a covalent carbon material includes forming an atomic nitrogen source, forming an elemental reagent source and combining the atomic nitrogen, elemental reagent to form the covalent carbon material and annealing the covalent carbon material.

Method of making a superconducting fullerene composition by reacting a ...

US US5196396A Charles M. Lieber The President And Fellows Of Harvard College

Priority 1991-07-16 • Filed 1991-07-16 • Granted 1993-03-23 • Published 1993-03-23

A method for making a superconducting fullerene composition, includes reacting a fullerene with an alloy, and particularly reacting C₆₀ with a binary alloy including an alkali metal or a tertiary alloy including two alkali metals in the vapor phase. Also, a Cesium-doped fullerene high T_c ...

Stochastic assembly of sublithographic nanoscale interfaces

WO EP US JP AT AU DE US6900479B2 André DeHon California Institute Of Technology

Priority 2002-07-25 • Filed 2003-07-24 • Granted 2005-05-31 • Published 2005-05-31

A method for controlling electric conduction on nanoscale wires is disclosed. The nanoscale wires are provided with controllable regions axially and/or radially distributed. Controlling those regions by means of microscale wires or additional nanoscale wires allows or prevents electric conduction ...

Nanoscale wire-based data storage

WO EP US CN JP KR US8154002B2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2004-12-06 • Filed 2005-12-06 • Granted 2012-04-10 • Published 2012-04-10

The present invention generally relates to nanotechnology and submicroelectronic devices that can be used in circuitry and, in some cases, to nanoscale wires and other nanostructures able to encode data. One aspect of the invention provides a nanoscale wire or other nanostructure having a region ...

Nanosensors

WO EP US JP KR AT AU CA DE ES AU2002229046A1 Yi Cui President And Fellows Of Harvard College

Priority 2000-12-11 • Filed 2001-12-11 • Published 2002-08-29

1. An article comprising: a sample exposure region, and a nanowire, at least a portion of which is addressable by a sample in the sample exposure region. 2. The article as in claim 1, further comprising: a detector constructed and arranged to determine a

property associated with the nanowire. 3. ...

Nanoscale wires and related devices

AU AU2002324426B2 Yi Cui President And Fellows Of Harvard College

Priority 2000-08-22 • Filed 2002-05-20 • Granted 2007-07-26 • Published 2007-07-26

1. An electrical component comprising a plurality of field-effect transistors each comprising first and second electrodes and a non-nanotube semiconductor nanoscale wire electrically coupling the first and second electrodes, wherein ID each nanoscale wire of the component comprises at least one ...

Nanoscale wire-based sublithographic programmable logic arrays

WO US US7274208B2 André DeHon California Institute Of Technology

Priority 2003-06-02 • Filed 2004-05-28 • Granted 2007-09-25 • Published 2007-09-25

An apparatus and methods for a sublithographic programmable logic array (PLA) are disclosed. The apparatus allows combination of non-restoring, programmable junctions and fixed (non-programmable) restoration logic to implement any logic function or any finite-state machine. The methods disclosed ...

Nanoscale wires and related devices

AU AU2002324426A1 Yi Cui President And Fellows Of Harvard College

Priority 2000-08-22 • Filed 2002-05-20 • Published 2003-05-22

1. An article comprising a free-standing and bulk-doped semiconductor comprising at least one portion having a smallest width of less than 500 nanometers. 2. The article of claim 1, wherein the at least one portion has a maximum width of less than 500 nm. 3. The article of claim 1, comprising: a ...

Doped elongated semiconductors, growing such semiconductors, devices including ...

WO EP US CN JP KR AU CA MX TW AU2001286649A1 Ying Cui President And Fellows Of Harvard College

Priority 2000-08-22 • Filed 2001-08-22 • Published 2002-05-30

Doped elongated semiconductors, their growth and applications

HK1057819A M. Lieber Charles President And Fellows Of Harvard College

Priority 2000-08-22 • Filed 2001-08-22 • Published 2004-04-16

Nanowire photonic circuits, components thereof, and related methods

WO WO2006015105A3 Charles M Lieber Harvard College

Priority 2004-07-28 • Filed 2005-07-28 • Published 2006-07-27

The present invention generally relates to energy transmission in materials, specifically, electromagnetic (e.g., photonic) pathways and circuits, including various components for use in such pathways and circuits, for example, nanoscale wires such as semiconductor nanowires. One aspect of the ...

Three-dimensional memory array

EP EP1630819A2 André Dehon California Institute of Technology

Priority 2002-07-25 • Filed 2003-07-24 • Published 2006-03-01

A three-dimensional memory array is disclosed, comprising layers of nanoscale wires and microscale contacts. The microscale contacts are shared by nanowires on different layers of the memory. A set of uniquely coded wires is assembled for each common

group of microwire contacts, allowing each wire ...

Nanostructures Containing Metal Semiconductor Compounds

US US20090004852A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2004-02-13 • Filed 2005-12-09 • Published 2009-01-01

1 - 125 . (canceled) 126 . A method, comprising: providing a semiconductor nanoscale wire; patterning a mask on the nanoscale wire to define at least a first portion not covered by the mask and a second portion covered by the mask; exposing the first portion but not the second portion to a bulk metal;

Direct haplotyping using carbon nanotube probes

WO US AU WO2002022889A2 Charles M. Lieber President And Fellows Of Harvard College

Priority 2000-09-11 • Filed 2001-09-12 • Published 2002-03-21

A method is described for multiplexed detection of polymorphic sites and direct determination of haplotypes in DNA fragments, DNA, and genomic DNA, using single-walled carbon nanotube (SWNT) atomic force microscopy (AFM) probes. This technique has applications for haplotyping in population-based ...

System and method for processing nanowires with holographic optical tweezers

WO EP US CN JP WO2007084114A2 David G. Grier New York University

Priority 2005-01-12 • Filed 2006-01-11 • Published 2007-07-26

A system and method for manipulating and processing nanowires in solution with arrays of holographic optical traps. The system and method of the present invention is capable of creating hundreds of individually controlled optical traps with the ability to manipulate objects in three dimensions.

Nanoscopic wire-based devices, arrays, and methods of their manufacture

AU AU2006202493B2 Ernesto Joselevich President And Fellows Of Harvard College

Priority 1999-07-02 • Filed 2006-06-13 • Granted 2008-05-22 • Published 2008-05-22

1. A method comprising: forming a nanoscopic wire on a surface in a pattern dictated by a chemically patterned surface, wherein the nanoscopic wire is a preformed wire and the chemically Spatterned surface comprises at least first and second portions which attract the nanoscopic wire and at which ...

Doped elongated semiconductors, growing such semiconductors, devices including ...

AU AU2007202897B2 Ying Cui President And Fellows Of Harvard College

Priority 2000-08-22 • Filed 2007-06-22 • Granted 2009-10-01 • Published 2009-10-01

1. A method for selectively aligning and positioning one or more semiconductor nanowires on a substrate comprising the steps of: 5 providing a substrate; patterning two or more electrodes on a surface of the substrate; providing an environment in contact with the two or more electrodes, the ...

Apparatus, method and computer program product providing radial addressing of ...

WO US WO2006084128A2 Andre Dehon Brown University

Priority 2005-02-04 • Filed 2006-02-02 • Published 2006-08-10

Disclosed is a method to construct a device that includes a plurality of nanowires (NWs) each having a core and at least one shell. The method includes providing a plurality of

radially encoded NWs where each shell contains one of a plurality of different shell materials; and differentiating ...

Nanosensors

WO US WO2006107312A8 Wayne Wang Harvard College

Priority 2004-06-15 • Filed 2005-06-15 • Published 2007-02-15

The present invention generally relates to nanoscale wires for use in determining analytes suspected to be present in a sample, especially in connection with determining information about a sample containing, or suspected of containing, two or more analytes. For example, the invention can involve ...

Nanoscopic wire-based devices, arrays, and methods of their manufacture

AU AU2005201840A1 Ernesto Joselevich President And Fellows Of Harvard College

Priority 1999-07-02 • Filed 2005-05-02 • Published 2005-05-26

1. An article comprising:. an electrical crossbar array comprising at least two crossed wires, at least one of which is a nanoscopic wire. 2. An article as in claim 1, wherein the at least two wires are in contact with each other. 3. An article as in claim 2, wherein the at least two wires are in ...

Nanostructures containing metal-semiconductor compounds

WO WO2005093831A1 Charles M. Lieber President And Fellows Of Harvard College

Priority 2004-02-13 • Filed 2005-02-14 • Published 2005-10-06

The present invention generally relates to devices and components for use in nanotechnology and sub-microelectronic circuitry that include metal-semiconductor compounds such as metal silicides. The present invention also, in some embodiments, provides methods of forming such devices and components ...

参杂质的细长的半导体、其生长及应用

HK1057819A M. Lieber Charles President And Fellows Of Harvard College

Priority 2000-08-22 • Filed 2001-08-22 • Published 2004-04-16