Patent Searching,
ECE 3991

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Federal Government Information, Patents & Trademarks
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What is Intellectual Property (IP)?!

Property rights for intellectual creations that have been put into fixed, tangible format
Four types of intellectual property

- **Patents** – protects new inventions
- **Trademarks** – anything that identifies the source of a product or service offered in commerce
- **Copyrights** – protect the *specific expression of an idea* in text, music, choreography, graphic arts
- **Trade Secrets** – any secret formula, process, or business method that offers a commercial advantage to the holder
What is a patent?

A Patent is a property right granted by the United States to the original inventor(s) for a limited time in exchange for public disclosure of the invention.

The Patent gives the inventor the [negative] right “to exclude others from making, using, offering for sale, or selling” the invention in the United States, or importing the invention into the United States.

*Article I, Section 8, Clause 8 of the United States Constitution, known as the ‘Copyright Clause’*
Three types of patents

- **Utility Patents** – Granted for a process; machine or manufacture; composition of matter; or an improvement thereof. Utility patents have sequential numbers.

- **Design Patents** – Protects the new, ornamental design (i.e. “outward appearance”) for an article of manufacture. Design patent numbers are preceded by the letter “D.”

- **Plant Patents** – granted on any distinct and new variety of an asexually reproduced plant. Plant patent numbers are preceded by “PP.”
Patent Terms

- Utility patent – twenty years from the non-provisional patent filing date
- Design patent – fourteen years from issue date
- Plant patent – twenty years from filing date

Once these terms expire, the invention is now ‘public domain,’ and may be made, used or sold by anyone without licensing!
Trademarks
Trademarks

• Any word, phrase, symbol, logo, color, sound, or scent used to:
  – Distinguish product or service from others in the marketplace
  – Identify the source of commercial origin
  – Certify quality, standards, or geographic origin
• A service mark is the same as a trademark except that it identifies and distinguishes the source of a service rather than a product.

Federal trademarks once registered remain in effect for ten years, and may be renewed indefinitely once they expire.
Obtaining Trademark Rights

Three sources:

• *Common-law* use of the mark in commerce without registration; or

• Registration with the Utah (or other) State Dept. of Commerce as a *state trademark*; or

• *Federal registration* of a mark in actual use or with an ‘intent to use’ with the U.S. Patent and Trademark Office.
Trademark Symbols

- ™ and SM (either superscript or subscript)
  - The letters SM may be used in place of TM to indicate a service mark.
  - These two symbols indicate the owner considers this to be their common-law (i.e., unregistered) trademark.
  - May also be used with State-registered trademarks

- ®
  - This symbol indicates that the mark has been registered with the USPTO, and may only be used when such registration has been granted.
Trademarks may become generic

Trademark rights may be lost if the trademark becomes the *common term* for the product, even when produced by other companies, *e.g.*

- Aspirin
- Raisin Bran
- Kerosene
- Thermos
- Elevator, escalator

*So, be careful when using the words ‘Kleenex’ and ‘Xerox!’*
State & Common Law Marks

There’s no legal requirement to search state or common law marks in order to apply for a federal trademark registration. However, doing so may save you time, and MONEY!
Why Apply for a Federal Trademark?

- constructive notice to the public of claim of ownership;
- legal presumption of the registrant's ownership of the mark and exclusive right to use the mark nationwide on or in connection with the goods and/or services listed in the registration;
- use of the U.S registration as a basis to obtain registration in foreign countries;
- ability to bring an action concerning the mark in federal court;
- ability to file the U.S. registration with the U.S. Customs Service to prevent importation of infringing foreign goods.

http://www.uspto.gov/trademarks/basics/register.jsp
Searching Federal Trademarks

Start your search for federal trademarks at the USPTO Trademarks Home web page:

http://www.uspto.gov/trademarks/index.jsp
Trademarks Home

What is a trademark or service mark?

A trademark is a brand name. A trademark or service mark includes any word, name, symbol, device, or any combination, used or intended to be used to identify and distinguish the goods/services of one seller or provider from those of others, and to indicate the source of the goods/services. Although federal registration of a mark is not mandatory, it has several advantages, including notice to the public of the registrant's claim of ownership of the mark, legal presumption of ownership nationwide, and exclusive right to use the mark on or in connection with the goods/services listed in the registration.

WARNING: NON-USPTO SOLICITATIONS MAY RESEMBLE OFFICIAL USPTO COMMUNICATIONS: Be aware that private companies not associated with the USPTO often use trademark application and registration information from the USPTO’s databases to mail or e-mail trademark-related solicitations.

First-Time Filers, Start Here

View How-To Videos, FAQs, the Basic Facts Booklet, processing timelines and the ID Manual.

Tools

Search pending and registered marks using the Trademark Electronic Search System (TESS).
**Trademarks Home**

**What is a trademark or service mark?**

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**First-Time Filers, Start Here**

- **FACTS**
  - Basic facts about trademarks
- **TMIN**
  - Trademark Information Network
- **TMRTO**
  - Trademark Registration Timelines
- **TMFAQS**
  - Trademark Frequently Asked Questions
- **TEASFAQS**
  - Trademark Electronic Application System (TEAS) FAQs
- **TRADEMARK BASICS**
  - View How-To Videos, FAQs, the Basic Facts Booklet, processing timelines and the ID Manual.
- **TESS**
  - Search trademarks
- **TEAS**
  - File forms online
- **TSDR**
  - Check status & view documents
- **ASSIGN**
  - Assignments database

**Tools**

- **Search pending and registered marks using the Trademark Electronic Search System (TESS).**
- **File applications and other documents online using the Trademark Electronic Application System (TEAS).**
- **Check the status of an application and view and download application and registration records using Trademark Status and Document Retrieval (TSDR) (combining TARR and TDR).**
- **Transfer (assign) ownership of a mark to another entity or change the owner name and search the assignments database.**
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ASSIGN assignments
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TTAB trademark trial & appeal board
Visit the Trademark Trial and Appeal Board (TTAB) online.

DASHBOARD
Visit the Trademark Dashboard for Trademark Operation performance measurements.

Popular Links
- Documents for Prosecutors
- Fee Information
- International Registration/Madrid Protocol
- Maintain or Renew Registrations
- Trademark Manual of Examining Procedure (TMMP)
- User Feedback
- Initiatives and Events
Searching Utah State Trademarks

Utah State Trademarks may be searched at:
https://secure.utah.gov/trademark/search/index.html
and Business Names at:
https://secure.utah.gov/bes/

Business services are also available in person at:
Department of Commerce
Division of Corporations and Commercial Code
160 East 300 South, P.O. Box 45802
Salt Lake City, Utah 84145-0802
(801) 530-4849
What is copyright?

- A form of protection provided to the creators of “original works of authorship.”
- Includes literary, dramatic, musical, artistic, and certain other intellectual works, both published and unpublished.
- Registered by the U.S. Copyright Office at the Library of Congress.
- Current registration fee – $65.00 for paper filing, $35.00 for online filing
- Copyright term – your lifetime plus 70 years.
What kinds of work are protected under copyright?

- Literary works
- Serials/Periodicals
- Musical and Dramatic works, with accompanying words or music
- Sound and video recordings
- Pictorial, Graphic and Sculptural works
- Architectural works
- Computer software
- Mask works fixed in semiconductor chips

http://www.copyright.gov/circs/circ01.pdf
What kinds of work are not protected?

- Works not fixed in a tangible form of expression
- Titles, names, slogans, short phrases, familiar designs or symbols, mere variations of typographic ornamentation, lettering, or coloring, mere listings of contents or ingredients
- Ideas, procedures, methods, systems, processes, concepts, principles, discoveries, or devices, as distinguished from a description, explanation, or illustration.
- Works consisting entirely of common property information and containing no original authorship.
Rights Under Copyright Law

Section 106 of the 1976 Copyright Act gives the owner of copyright, and others authorized by the owner, certain exclusive rights, including the right:

- To reproduce the work
- To prepare derivative works
- To distribute copies or phonorecords of the work through transfer of ownership such as through sale, or lease
- To display the work publicly
- To publicly perform the work by means of a digital audio transmission (for sound recordings)
- To authorize others to do all of the above

http://www.copyright.gov/title17/index.html, Title 17, “Copyright.”
Some limitations under Copyright Law

• Copyright covers the *particular* expression of an idea, not the idea itself!

• Rights are not unlimited – sections 107-122 of the *Copyright Law of the United States of America*, Chapter 1, establish limitations:
“Fair Use” Limitations

• Not mentioned in older copyright law; developed through court decisions over the years

• Currently covered in section 107 of the present copyright law (17 USC 107)
  http://www.copyright.gov/title17/92chap1.html#107

• Covers purposes for which reproduction of a copyrighted work may be considered “fair”, and four factors used to determine the fairness of a particular use.

http://www.copyright.gov/title17/92chap1.html#107
Four Factors That Help Determine “Fair Use”

• What is the nature of the copyrighted work?
• How much of the work is used and how substantial a portion of the whole work?
• What is the purpose and character of the use? Commercial? Nonprofit educational use?
• What effect does the use have on the potential market for or value of the copyrighted work?
Purposes For Which Reproduction of a Copyrighted Work Might Be Considered “Fair Use”

- Criticism
- Comment
- Parody

- News reporting
- Teaching
- Scholarship
- Research
How Is Copyright Secured Under Current U.S. Copyright Law?

• Automatic granted under the Berne Convention of 1989 from the time the work is created in fixed form, whether published or unpublished;

• Registration not required, but confers definite advantages when dealing with enforcement issues and compensation for infringement;

• Unpublished foreign works are also eligible for copyright protection in the U.S., but there are eligibility restrictions for published foreign works.
Benefits to Copyright Registration

• Registration establishes a public record for the claim of copyright;

• For works of U.S. origin, registration is required before an infringement suit may be filed in Federal court (!);

• Registration enables the copyright owner to record the registration with the U.S. Customs Service for protection against the importation of infringing copies!
Form of Copyright Notice

- Notice of Copyright is *no longer required* under the Berne Convention, but may still be used, and is recommended.

- Notice has three elements:
  - The symbol © or the word “Copyright” or the abbreviation “Copr.” (Use a “P” rather than a “C” in the circle for sound recordings)
  - Year of first publication
  - Name of owner of copyright
When does a copyrighted work enter the Public Domain?

• Works copyrighted before 1923 are now in the public domain.

• Works copyrighted on or after 1/1/1923 may still be under copyright protection, but determining copyright is not a simple question; see http://copyright.cornell.edu/resources/publicdomain.cfm

• The U.S. Copyright Office will do a search to determine current copyright status on a particular work upon request, for an hourly fee.
Trade Secrets
Trade Secrets

• Information not generally known to others that is capable of yielding a business advantage over competitors who do not know it.

• May be:
  – Formulas
  – Patterns
  – Processes
  – Devices
  – Compounds
  – Data, mailing lists, etc.
  – Other compilation of information that is used in business.
Examples of Trade Secrets

• The formula for Coca-Cola is the world’s most famous trade secret, but check out what the Wikipedia says here.

• Colonel Sanders’ secret recipe for fried chicken, served at KFC. Sanders also received U.S. patent 3,245,800 for a method of pressure-cooking fried chicken.

• The formula for WD-40.
Benefits of Trade Secrets

- No Fees
- No need to disclose details to the public
- Can be established without naming inventors
- No term limits
- Rights obtained immediately
Drawbacks of Trade Secrets

• Must be able to keep it a secret!
• May be independently discovered by legitimate or illegitimate means, thus, no longer a secret.
• May be more difficult to enforce rights and prosecute lawsuits involving a trade secret, as the existence of the trade secret must be proven before a lawsuit may proceed.
Searching U.S. and Foreign Patents
Let’s begin with specific references to a new technology in an Internet new article – here we have the inventors’ names, and their research affiliations.
White House Task Force on High Tech Patent Issues

In early June, the White House announced major steps to improve incentives for future innovation in high tech patents, a key driver of economic growth and good paying American jobs. The White House issued five executive actions and seven legislative recommendations designed to protect innovators from frivolous litigation and ensure the highest-quality patents in our system.
Search for Patents

New to Patent Searching? See this important information about searching for patents:

- How do I know if my invention is patentable?
- How to Conduct a Preliminary U.S. Patent Search: A Step by Step Strategy - Web Based Tutorial (36 minutes)
- The Seven-Step Strategy - Outlines a suggested procedure for patent searching

Patents may be searched using the following resources:

- USPTO Patent Full-Text and Image Database (PatFT)
- USPTO Patent Application Full-Text and Image Database (AppFT)
- Global Patent Search Network (GPSN)
- Patent Application Information Retrieval (PAIR)
- Public Search Facility
- Patent and Trademark Resource Centers (PTRCs)
- Patent Official Gazette
- Common Citation Document (CCD)
- Search International Patent Offices
- Search Published Sequences
- Patent Assignment Database (Assignments on the Web)

USPTO Patent Full-Text and Image Database (PatFT)

Inventors are encouraged to search the USPTO’s patent database to see if a patent has already been filed or granted that is similar to your patent. Patents may be searched in the USPTO Patent Full-Text and Image Database (PatFT). The USPTO houses full text for patents issued from 1976 to the present and PDF images for all patents from 1790 to the present.

Searching Full Text Patents (Since 1976)

Customize a search on all or a selected group of elements (fields) of a patent.

- Quick Search
- Advanced Search
- Patent Number Search

Searching PDF Image Patents (Since 1790)

Searches are limited to patent numbers and/or classification codes for pre-1976 patents.

- View Patent Full-Page Images
Let's start our search here!
US Patent & Trademark Office
Patent Application Full Text and Image Database

Data current through August 22, 2013.

Query [Help]

Term 1: Huang, Yonggang$ in Field 1: Inventor Name

Term 2: 
in Field 2: All Fields

Select years [Help] 2001-present

Search  Reset
No. 5 is the 2008 patent application from the news article, and no. 1 might be a continuation – reflecting four more years of developments – to the same invention.
CONTROLLED BUCKLING STRUCTURES IN SEMICONDUCTOR INTERCONNECTS AND NANOMEMBRANES FOR STRETCHABLE ELECTRONICS

Abstract

In an aspect, the present invention provides stretchable, and optionally printable, components such as semiconductors and electronic circuits capable of providing good performance when stretched, compressed, flexed or otherwise deformed, and related methods of making or tuning such stretchable components. Stretchable semiconductors and electronic circuits preferred for some applications are flexible, in addition to being stretchable, and thus are capable of significant elongation, flexing, bending or other deformation along one or more axes. Further, stretchable semiconductors and electronic circuits of the present invention are adapted to a wide range of device configurations to provide fully flexible electronic and optoelectronic devices.

Inventors: Rogers; John A.; (Champaign, IL); Meitl; Matthew; (Raleigh, NC); Sun; Y Barg; (Naperville, IL); Ko; Heung Cho; (Urbana, IL); Carlson; Andrew; (Urbana, IL); Choi; Won Mook; (Champaign, IL); Stoykovich; Mark; (Dover, NH); Jiang; Hanqing; (Urbana, IL); Huang; Yonggang; (Glencoe, IL)

Correspondence
Name and Address: GREENLEE WINNER AND SULLIVAN P.C
4875 PEARL EAST CIRCLE, SUITE 200
BOULDER
CO
80301
(52) U.S. Cl... 257/415, 438/53, 174/254, etc.

INID codes

Gathers all pages of the document into a single PDF file.
To examine the classifications, start by clicking the ‘Home’ button..
PatFT: Patents
Full-Text from 1976
Quick Search
Advanced Search
Number Search
View Full-Page Images
PatFT Help Files
PatFT Status, History
PatFT Database Contents
Report Problems

AppFT: Applications
Published since March 2001
Quick Search
Advanced Search
Number Search
View Full-Page Images
AppFT Help Files
AppFT Status, History
Report Problems

<< BOTH SYSTEMS >>

The databases are operating normally.

Notices & Policies
How to View Images
Assignment Database
Public PAIR
Searching by Class
Sequence Listings
Attorneys and Agents

Privacy Policy
CPC is the new Cooperative Patent Classification System, which the USPTO will adopt over the next 3-5 years.
Class 174, subclass 254, which we got from the ‘US Cl.’ field on the face of the patent.
CONDUITS, CABLES OR CONDUCTORS

- With closure for face plate opening
  - Bus bars or bus ducts (Residual)
  - Single duct conduits
- Preformed panel circuit arrangement (e.g., printed circuit)
  - With encapsulated wire
  - With cooling means
  - Micropanel
- Convertible shape (e.g., flexible) or circuit (e.g., breadboard)
  - With particular substrate or support structure
  - With particular material
    - Conducting (e.g., ink)
    - Insulating
- Adhesive/bonding
  - With electrical device
    - With particular conductive connection (e.g., crossover)
  - Feedthrough
    - With solder
      - Voidless (e.g., solid)
        - Preform in hole
        - Hollow (e.g., plated cylindrical hole)
  - Termination post
  - With single conductive plane (e.g., tape, cable)
    - Extensible
    - Combined
    - Branched
  - Multi-duct conduit and/or plural branch
    - Wire harness
      - Bus bars
      - Casing, moldings
      - Ribbon type
      - Bus bars
‘Contracting’ all the main lines, except for the one showing subclass 254..

Mainline

One-dot indentation

Two-dot indentation
Click on the line to check the hierarchy of the subclass, and then the ‘Descriptions’ for each level of the hierarchy.
CLASS 174, ELECTRICITY: CONDUCTORS AND INSULATORS

68.1 CONDUITS, CABLES OR CONDUCTORS:
250 Preformed panel circuit arrangement (e.g., printed circuit):
254 Convertible shape (e.g., flexible) or circuit (e.g., breadboard):

WITH FLUIDS OR VACUUM
32 ANTI-INDUCTIVE STRUCTURES
37 UNDERGROUND
40R OVERHEAD
46 HANDLES
47 COMBINED FLUID CONDUIT AND ELECTRICAL CONDUCTOR
480 WALL MOUNTED
50 BOXES AND HOUSINGS
650 FEEDTHROUGH OR BUSHING
66 COVERS OR FACE PLATES
68.1 CONDUITS, CABLES OR CONDUCTORS
68.2 Bus bars or bus ducts (Residual)
68.3 Single duct conduits
250 Preformed panel circuit arrangement (e.g., printed circuit)
251 With encapsulated wire
252 With cooling means
253 Micropanel
254 Convertible shape (e.g., flexible) or circuit (e.g., breadboard)
Convertible shape (e.g., flexible) or circuit (e.g., breadboard):
This subclass is indented under subclass 250. Subject matter wherein the structure is either easily bent without breaking or has means of easily change its conductor circuit configuration.

(1) Note. Terms that are somewhat synonymous with "breadboard" are "prototype" and "universal board".

SEE OR SEARCH CLASS:

361, Electricity: Electrical Systems and Devices, subclass 398 for flexible printed circuits which include plural, diverse electronic devices.

With particular substrate or support structure:
This subclass is indented under subclass 250. Subject matter including a material means distinguished by significant construction or configuration which provides a supporting surface for other materials, especially materials used as printed-circuits patterns.

With particular material:
This subclass is indented under subclass 250. Subject matter wherein at least a part of the circuit board structure is composed of one or more specific substances.

Conducting (e.g., ink):
This subclass is indented under subclass 256. Subject matter including a material adapted to the transmission of electricity.

(1) Note. The conducting material may be for example superconducting, semiconducting or resistive.

Insulating:
This subclass is indented under subclass 256. Subject matter including a material on or through which essentially no electrical current flow.

Adhesive/bonding:
This subclass is indented under subclass 256. Subject matter including a material which causes parts of the structure to stick, bind or fasten together.

SEE OR SEARCH THIS CLASS, SUBCLASS:

263, for soldered feed through connections where the composition of the solder is nominal.

SEE OR SEARCH CLASS:
All Granted Patents since 1790 that have a classification in 174/254 (the oldest was granted in 1926!).

Feb 2010 – 992 patents;
Feb 2011 – 1059 patents;
Feb 2012 – 1140 patents;
Aug 2013 – 1306 patents!

Note the increasing rate of change!
If we go back and click on the blue ‘A’ in the Classification Schedule, we get a list of all applications published since 2001 that have a classification in 174/254.
All published applications from 2001 to the present that have a classification in 174/254. Some of these published applications will also show up as Granted Patents, but the text will most likely be different from the application.

Feb 2008 – 151
Feb 2010 – 301 (two year interval)
Feb 2011 – 413
Feb 2012 – 532
Aug 2013 – 663!

Once again, note the positive rate of change!
We may search any one of 30 specific fields on the ‘Quick Search’ or ‘Boolean’ search screens in either the PatFT or AppFT databases. Note that the ‘Field’ name must be changed to ‘Current US Classification’ to use a Classification number as the search term.
Here’s an example of searching for an exact keyword phrase in the Applications database. Note the dollar sign ($) used as a ‘wild card,’ and the quotation marks to search for that exact phrase as a whole, not the words individually.
Too many applications to look through! How can we reduce the number of applications we must examine? Remember, we only need a few examples of similar inventions, which will then lead us to the appropriate classifications!
We may restrict the number of ‘hits’ for our keyword phrase by limiting the phrase to only the ‘Title’ OR the ‘Abstract’ fields on the front page of each application!
<table>
<thead>
<tr>
<th>PUB. APP. NO.</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>20130210277</td>
<td>HIGH SPEED COMMUNICATION JACK</td>
</tr>
<tr>
<td>20130208509</td>
<td>Backlight Module and Thermal Design Thereof</td>
</tr>
<tr>
<td>20130202985</td>
<td>FLEXIBLE CIRCUIT BOARD AND METHOD FOR MANUFACTURING THE SAME, AND FUEL CELL USING THE FLEXIBLE CIRCUIT BOARD</td>
</tr>
<tr>
<td>20130195438</td>
<td>LENS BARREL HAVING SHUTTER FLEXIBLE CIRCUIT BOARD AND IMAGE PICKUP APPARATUS HAVING THE SAME</td>
</tr>
<tr>
<td>20130176693</td>
<td>CIRCUIT BOARD FOR DISPLAY AND DISPLAY MODULE WITH DISPLAY AND CIRCUIT BOARD</td>
</tr>
<tr>
<td>20130175984</td>
<td>MOBILE TERMINAL POWER RECEIVING MODULE UTILIZING WIRELESS POWER TRANSMISSION AND MOBILE TERMINAL RECHARGABLE BATTERY INCLUDING MOBILE TERMINAL POWER RECEIVING MODULE</td>
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<td>20130163240</td>
<td>LED STREET LAMP</td>
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<td>20130160183</td>
<td>TEXTILE ARRANGEMENT AND METHOD FOR MANUFACTURING</td>
</tr>
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<td>20130141912</td>
<td>CIRCUIT BOARD FOR DISPLAY DEVICE AND DISPLAY DEVICE HAVING THE SAME</td>
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<tr>
<td>20130135854</td>
<td>ILLUMINATION DEVICE</td>
</tr>
<tr>
<td>20130128524</td>
<td>Back Frame and Backlight System Thereof</td>
</tr>
</tbody>
</table>
How can we find out about the research strengths of a particular business or research institution? Such as, in the case of our current example, Northwestern University?!
Here, we change the ‘Field’ name to ‘Assignee Name,’ that is, the entity that owns the rights to the patent.
New patent applications reflect many of Northwestern University’s strongest research areas. When we search with the name of a particular company, the results may provide ‘competitive intelligence’ about that company’s research interests.

<table>
<thead>
<tr>
<th>PUB. APP. NO.</th>
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</thead>
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<tr>
<td>20130211500</td>
<td>Liquid Cast Biodegradable Arterial Stent</td>
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<td>20130210050</td>
<td>PROTEASE FOR PROTEOMICS</td>
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<td>20130209999</td>
<td>SQSTM1 MUTATIONS IN AMYOTROPHIC LATERAL SCLEROSIS</td>
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<tr>
<td>20130199605</td>
<td>COMPOSITE OF GRAPHENE OXIDE AND NANOSTRUCTURES, METHODS OF MAKING AND APPLICATIONS OF SAME</td>
</tr>
<tr>
<td>20130196469</td>
<td>Low-Temperature Fabrication of Metal Oxide Thin Films and Nanomaterial-Derived Metal Composite Thin Films</td>
</tr>
<tr>
<td>20130195828</td>
<td>Pharmaceutical Compositions and Methods for Digesting Atherosclerotic Plaques</td>
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<tr>
<td>20130195759</td>
<td>NANOSTRUCTURES SUITABLE FOR SEQUESTERING CHOLESTEROL AND OTHER MOLECULES</td>
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<td>20130184144</td>
<td>METHODS OF MAKING NON-COVALENTLY BONDED CARBON-TITANIA NANOCOMPOSITE THIN FILMS AND APPLICATIONS OF THE SAME</td>
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<tr>
<td>20130183671</td>
<td>ALLELIC DISORDERS CAUSED BY MUTATIONS IN TRPV4</td>
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<td>20130174884</td>
<td>ANISOTROPIC AMBIPOLAR TRANSVERSE THERMOELECTRICS AND METHODS FOR MANUFACTURING THE SAME</td>
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<tr>
<td>20130172404</td>
<td>Delivery of Oligonucleotide Functionalized Nanoparticles</td>
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<tr>
<td>20130150560</td>
<td>AMYLOID BETA DERIVED DIFFUSIBLE LIGANDS (ADDLs), ADDL-SURROGATES, ADDL-BINDING</td>
</tr>
</tbody>
</table>
Our search results may be more easily visualized and used in spreadsheet format. We can easily do this using the tools available at the website www.freepatentsonline.com with a free subscription.
http://www.freepatentonline.com/search.html

Enter your search here

Expert Search  Quick Search

Click here for syntax instructions, field abbreviations and character map

Search  Reset

Date Range  All years  Last 20 years
Word Stemming  On  Off
Sort Order  Chronological  Relevancy

*Entering date parameters in the box will override the 'date range' buttons.

Coverage Details: Coverage details for the patent database can be found here.

Note that most fields support Phrase (ABST/"cardboard box"), Proximity (ABST/"cardboard box"~5), Wildcard (ABST/card*), and Leading Wildcard (ABST/"ectomy") queries. Some fields support range queries and math operations. Only basic examples are provided below. See the syntax guide for advanced syntax details.

<table>
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My Portfolios

Portfolio Management: Click a portfolio name to view or edit the contents, or use the management functions to edit and manipulate portfolios. To add records to your portfolios, just do a search and then add results individually, or as a group.

Your account can contain up to 20 portfolios and 10000 documents total across multiple portfolios.

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<td>A flexible circuit structure with stretchability comprises a flexible circuit structure having a plurality of protruding substrate portions (12) that are extended and a plurality of conductive traces (13) that are embedded.</td>
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<td>The present invention relates to a method for manufacturing a flexi-rigid printed circuit board including a substrate, a flexible printed circuit board comprising a substrate, signal lines, and an adhesive-free flexible laminate formed from a polyimide film in which an array of vias are formed.</td>
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<td>Method for producing a flexi-rigid printed circuit board and flexi-rigid printed circuit board</td>
<td>The invention relates to a method for producing a flexi-rigid printed circuit board including a substrate, a flexible printed circuit board comprising a substrate, signal lines, and an adhesive-free flexible laminate formed from a polyimide film in which an array of vias are formed.</td>
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<td>8502808</td>
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<td>Flexible printed circuit board with waterproof structure</td>
<td>A flexible printed circuit board includes a substrate, a flexible printed circuit board comprising a substrate, signal lines, and an adhesive-free flexible laminate formed from a polyimide film in which an array of vias are formed.</td>
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<td>Wiring substrate with a torsion restrictor for a terminal</td>
<td>A wiring substrate comprises a conductor pattern embedded in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8492657</td>
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<td>Printed wiring board, method for forming the printed wiring board</td>
<td>A printed wiring board comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8497190</td>
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<td>Flexible printed circuit board</td>
<td>A flexible printed circuit board includes a substrate, a flexible printed circuit board comprising a substrate, signal lines, and an adhesive-free flexible laminate formed from a polyimide film in which an array of vias are formed.</td>
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<td>Flexible laminate and flexible electronic circuit board formed by using a flexible circuit board</td>
<td>A flexible laminate and flexible electronic circuit board formed by using a flexible circuit board includes a substrate, a flexible printed circuit board comprising a substrate, signal lines, and an adhesive-free flexible laminate formed from a polyimide film in which an array of vias are formed.</td>
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<td>8498555</td>
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<td>Flexible wiring substrate</td>
<td>A flexible wiring substrate comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>Low profile compliant leads</td>
<td>A low profile compliant leads comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>Printed circuit board</td>
<td>A printed circuit board comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>Printed circuit board, method for manufacturing the same</td>
<td>A printed circuit board, method for manufacturing the same comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>Multilayered printed wiring board</td>
<td>A multilayered printed wiring board comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>Suspension board assembly sheet with circuit board and method for manufacturing the same</td>
<td>A suspension board assembly sheet with circuit board and method for manufacturing the same comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8471151</td>
<td>2013-06-25</td>
<td>Layout method for bridging electrode capable of shielding bright spot</td>
<td>An flex-rigid printed circuit board includes a substrate, a flexible printed circuit board comprising a substrate, signal lines, and an adhesive-free flexible laminate formed from a polyimide film in which an array of vias are formed.</td>
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<td>8466369</td>
<td>2013-06-18</td>
<td>Circuit structure of circuit board</td>
<td>A circuit structure of a circuit board includes a dielectric layer, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8466371</td>
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<td>Circuit structure of circuit board with compliant cantilever</td>
<td>An interconnecting structure for interconnecting two electronic modules comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8461459</td>
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<td>Flex-rigid wiring board and method for manufacturing the same</td>
<td>A flex-rigid wiring board includes a substrate, a flexible printed circuit board comprising a substrate, signal lines, and an adhesive-free flexible laminate formed from a polyimide film in which an array of vias are formed.</td>
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<td>8463321</td>
<td>2013-06-04</td>
<td>Method for manufacturing multilayer flexible printed circuit board</td>
<td>A method for manufacturing a multilayer PCB comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8456581</td>
<td>2013-06-04</td>
<td>Flex circuit with single sided routing and double sided attach</td>
<td>A flex circuit having conductive traces formed on only one side comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8450614</td>
<td>2013-05-28</td>
<td>Signal transmission line and circuit board</td>
<td>A signal line and a circuit board that can be easily bent in a U shape comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8441803</td>
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<td>Retaining facility for printed circuit boards on curved surfaces</td>
<td>A retaining facility for clearance-free fixing of a printed circuit board comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8431828</td>
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<td>Composite substrate</td>
<td>A composite substrate comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8426739</td>
<td>2013-04-23</td>
<td>Printed circuit board, method for manufacturing the same, and pads</td>
<td>A printed circuit board, method for manufacturing the same, and pads comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8420216</td>
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<td>Thermosetting resin composition</td>
<td>The thermosetting resin composition according to the present invention comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8420944</td>
<td>2013-04-16</td>
<td>Connection structure of flexible printed circuits and optical pickup device</td>
<td>A connection structure of Flexible printed circuits and optical pickup device comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8420946</td>
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<td>Printed circuit board</td>
<td>An exemplary printed circuit board includes a substrate, a different type of substrate, and a different type of conductive traces formed in a plurality of vias.</td>
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<td>8422239</td>
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<td>Display device</td>
<td>A display device includes a display panel, a case that has a microfabricated membrane, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8410372</td>
<td>2013-04-02</td>
<td>Wiring board, stacked battery device, and vehicle having stacked battery</td>
<td>A wiring board to be inserted collector foils of each unit comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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<td>8410709</td>
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<td>Parallel light-emitting circuit of parallel LED light-emitting device</td>
<td>A circuit board of a parallel light-emitting circuit of parallel LED light-emitting device comprises a plurality of conductive traces formed in a plurality of vias, a plurality of conductive traces formed in a plurality of vias, and a plurality of conductive traces formed in a plurality of vias.</td>
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Column G, the names of the owners of each patent, is an instant marketing tool for anyone with new, patented technology in this field. Or, as an employment tool for identifying which companies might be interested in hiring new researchers with experience in these fields!
Innovation – how technology changes over time

We can trace the development of a given technology over time by looking at the ‘prior art’ and ‘cited by’ links on the front page of U.S. patents.
Let’s select an older patent from the ‘Patent Number’ search screen so we can look at one that has had time to influence later (that is, *more recent*) inventions.
Flexible circuit board and production method therefor

Abstract

A desired circuit wiring pattern is formed by forming by plating means a conductive layer having excellent resistance at least to an etching solution on a metal layer which is removed in the post-process by etching means using a resist layer. A surface protective layer having a hole for exposing part of the circuit wiring pattern is formed on both sides of the circuit wiring pattern at a predetermined position as an external connection terminal portion. The circuit wiring pattern can be formed in multiple layers by coating the conductive layer with a circuit wiring layer of another conductive material and a bump is formed to fill the hole as required.

Inventors: Inaba; Masaichi (Ushiku, JP)
Assignee: Nippon Mektron, Ltd. (Tokyo, JP)
Appl. No.: 08/724,080
Filed: September 30, 1996
Flexible circuit board and production method therefor

Abstract

A desired circuit wiring pattern is formed by forming by plating means a conductive layer having excellent resistance at least to an etching solution on a metal layer which is removed in the post-process by etching means using a resist layer. A surface protective layer having a hole for exposing part of the circuit wiring pattern is formed on both sides of the circuit wiring pattern at a predetermined position as an external connection terminal portion. The circuit wiring pattern can be formed in multiple layers by coating the conductive layer with a circuit wiring layer of another conductive material and a bump is formed to fill the hole as required.

Inaba, Masaichi (Ushiku, JP)
Assignee: Nippon Mektron, Ltd. (Tokyo, JP)
Appl. No.: 08/724,080
Filed: September 30, 1996

Later patents that refer back to this 1998 patent as part of their ‘prior art.’

Prior Art – or earlier inventions that show earlier steps in the development of this technology.
These thirteen more recent patents all refer back to US5759417 as part of the ‘Prior Art,’ or earlier line of development, for their invention.
• European Patent Office
  – http://worldwide.espacenet.com
• Coverage:
  – EPO and PCT published applications from the most recent 24 months.
  – In January 2012, espacenet® held data on 70 million patents from 90 countries. Most include an English-language abstract. Coverage from 1836 (US) forward (varies by country).
  – JPO published abstracts in English from October 1976 forward.
  – Updated weekly.
Published U.S. application number for our original ‘stretchable electronics’ patent application.

‘Search’ button further down at bottom of screen.
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<td>Applicant: UNIV VIRGINIA [US]</td>
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<td>Priority date: 2007-06-13</td>
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<td>Inventor: ROGERS JOHN A [US]</td>
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<td>Applicant: MEITL MATTHEW [US] (+7)</td>
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INPADOC patent family

Abstract of US2008157235 (A1)

In an aspect, the present invention provides stretchable, and optionally printable, components such as semiconductors and electronic circuits capable of providing good performance when stretched, compressed, flexed or otherwise deformed.
### Family list: US2008157235 (A1) — 2008-07-03

#### 1. Methods and devices for fabricating and assembling printable semiconductor elements

- **Inventor:** ETIENNE MENARD [US]  
  JAE LEE KEON [US]  
  (+3)

- **Applicant:** UNIV ILLINOIS [US]

- **CPC:** B81C2201/0185  
  B82Y10/00  
  H01L21/02628  
  (+15)

- **Publication info:** CN101120433 (A)  
  2008-02-06

- **Priority date:** 2004-06

#### 2. Printable semiconductor structures and related methods of making and assembling

- **Inventor:** NUZZO RALPH G  
  ROGERS JOHN A  
  (+8)

- **Applicant:** UNIV ILLINOIS

- **CPC:** B81C201/00  
  B81C1/00  
  H01L21/00  
  (H01L21/20  
  (+11)

- **Publication info:** CN101632156 (A)  
  2010-01-20

- **Priority date:** 2008-08-04

#### 3. Controlled buckling structures in semiconductor interconnects and nanomembranes for stretchable electronics

- **Inventor:** ROGERS JOHN A  
  MATTHEW MEITL  
  (+15)

- **Applicant:** UNIV ILLINOIS [US]

- **CPC:** B81B3/0078  
  B82Y10/00  
  H01L21/6835  
  (+25)

- **Publication info:** CN101681695 (A)  
  2010-03-24

- **Priority date:** 2006-09

#### 4. Methods and devices for fabricating and assembling printable semiconductor elements

- **Inventor:** NUZZO RALPH G  
  ROGERS JOHN A

- **Applicant:** UNIV ILLINOIS

- **CPC:** B81C2201/0185  
  B81C1/00  
  H01L21/336

- **Publication info:** CN102097458 (A)  
  2011-06-15

- **Priority date:** 2004-06-06
### 6. METHODS AND DEVICES FOR FABRICATING AND ASSEMBLING PRINTABLE SEMICONDUCTOR ELEMENTS

- **Inventor:** NUZZO RALPH G [US]  
  ROGERS JOHN A [US]  
  (+6)
- **Applicant:** UNIV ILLINOIS [US]
- **EC:** B82Y10/00  
  H01L21/02K4E3L5  
  (+4)
- **IPC:** B81C1/00  
  H01L21/20  
  H01L21/02  
  H01L21/20  
  (+11)
- **Publication info:** EP1759422 (A2)  
  2007-03-07  
  EP1759422 (A4)  
  2011-04-06  
- **Priority date:** 2004-06-04

### 7. PRINTABLE SEMICONDUCTOR STRUCTURES AND RELATED METHODS OF MAKING AND ASSEMBLING

- **Inventor:** NUZZO RALPH G [US]  
  ROGERS JOHN A [US]  
  (+8)
- **Applicant:** UNIV ILLINOIS [US]
- **EC:** B82Y10/00  
  H01L21/336D  
  (+5)
- **IPC:** H01L21/302  
  H01L21/2842  
  H01L23/62  
  (+2)
- **Publication info:** EP1915774 (A2)  
  2008-04-30
- **Priority date:** 2005-06-02

### 8. CONTROLLED BUCKLING STRUCTURES IN SEMICONDUCTOR INTERCONNECTS AND NANOMEMBRANES FOR STRETCHABLE ELECTRONICS

- **Inventor:** ROGERS JOHN A [US]  
  MEITL MATTHEW [US]  
  (+15)
- **Applicant:** UNIV ILLINOIS [US]
- **EC:** B81B3/0052Z  
  B82Y10/00  
  (+11)
- **IPC:** H01B7/06  
  H01R35/00
- **Publication info:** EP2064710 (A2)  
  2009-06-03  
  EP2064710 (A4)  
  2011-05-04
- **Priority date:** 2006-09-06

### 9. PATTERN TRANSFER PRINTING BY DYNAMIC CONTROL OF ADHESION ON ELASTOMER STAMP

- **Inventor:** NUZZO RALPH G  
  ROGERS JOHN A (+6)
- **Applicant:** UNIV ILLINOIS [US]
- **EC:**  
  H01L21/02  
  H01L27/12
- **IPC:** H01L21/02  
  H01L27/12
- **Publication info:** JP2007027693 (A)  
  2007-02-01
- **Priority date:** 2005-06-02

### 10. SHRINKABLE SINGLE CRYSTAL SILICON FOR HIGH PERFORMANCE ELECTRONICS ON RUBBER SUBSTRATE

- **Inventor:** ROGERS JOHN A  
  KANG DAHL-YOUNG (+1)
- **Applicant:** UNIV ILLINOIS [US]
- **EC:** H01L29/16G  
  H01L29/786A
- **IPC:** H01L21/02  
  H01L21/336  
  H01L27/12  
  (+1)
- **Publication info:** JP2007281406 (A)  
  2007-10-25
- **Priority date:** 2006-04-07

### 11. METHODS AND DEVICES FOR FABRICATING AND ASSEMBLING PRINTABLE SEMICONDUCTOR ELEMENTS

- **Inventor:**  
- **Applicant:**  
- **EC:**  
- **IPC:**  
- **Publication info:**  
- **Priority date:**
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Link to patent family at Esp@cenet

CONTROLED BUCKLING STRUCTURES IN SEMICONDUCTOR INTERCONNECTS AND NANOMEMBRANES FOR STRETCHABLE ELECTRONICS


Applicant(s):

Classification: - international: H01L21/00; H01L29/84; H05K1/00
- European: H01L21/8258; H05K1/02J6

Abstract of US2008157235 (A1)

In an aspect, the present invention provides stretchable, and optionally printable, components such as semiconductors and electronic circuits capable of providing good performance when stretched, compressed, flexed or otherwise deformed,
INPADOC legal status: US2008157235 (A1) — 2008-07-03

CONTROLLED BUCKLING STRUCTURES IN SEMICONDUCTOR INTERCONNECTS AND NANOMEMBRANES FOR STRETCHABLE ELECTRONICS

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Legal status of US2008157235 (A1) 2008-07-03:

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Citing documents

INPADOC legal status

INPADOC patent family

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Bibliographic data: US2008157235 (A1) — 2008-07-03

CONTROLL ED BUCKLING STRUCTURES IN SEMICONDUCTOR INTERCONNECTS AND NANOMEMBRANES FOR STRETCHABLE ELECTRONICS

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Inventor(s):

Applicant(s):

Classification:
- international: H01L21/00; H01L29/84; H05K1/00
- European: H01L21/8258; H05K1/02J6

Application number: US20070851182 20070906

Priority number(s):

Abstract of US2008157235 (A1)

Translate this text

In an aspect, the present invention provides stretchable, and optionally printable, components such as semiconductors and electronic circuits capable of providing good performance when stretched, compressed, flexed or otherwise deformed, with semiconductor materials such as silicon and thin film transistors (TFTs) coated with a layer of gold (Au) or aluminum (Al). The invention comprises a structured substrate having one or more layers that can stretch up to 22.8% stretchability with 700 nm Al/200 nm Au.
### List of Citing Documents: US2008157235 (A1) — 2008-07-03

- **9 documents citing US2008157235 (A1)**

#### Table of Citing Documents

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<tr>
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CONTROLLED BUCKLING STRUCTURES IN SEMICONDUCTOR INTERCONNECTS AND NANOMEMBRANES FOR STRETCHABLE ELECTRONICS

Page bookmark: US2008157235 (A1) - CONTROLLED BUCKLING STRUCTURES IN SEMICONDUCTOR INTERCONNECTS AND NANOMEMBRANES FOR STRETCHABLE ELECTRONICS

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In an aspect, the present invention provides stretchable, and optionally printable, components such as semiconductors and electronic circuits capable of providing good performance when stretched, compressed, flexed or otherwise deformed,
CONTROLLED BUCKLING STRUCTURES IN SEMICONDUCTOR INTERCONNECTS AND NANOMEMBRANES FOR STRETCHABLE ELECTRONICS

United States

Patent Application Publication

Rogers et al.

(19) United States

(12) Patent Application Publication

Rogers et al.

(10) Pub. No.: US 2008/0157235 A1

(43) Pub. Date: Jul. 3, 2008

filed on Sep. 6, 2006, provisional application No. 60/577,077, filed on Jun. 4, 2004, provisional application No. 60/601,061, filed on Aug. 11, 2004, provisional application No. 60/650,305, filed on Feb. 4, 2005, provisional application No. 60/663,391, filed on Mar. 18, 2005, provisional application No. 60/677,617, filed on May 4, 2005, provisional application No. 60/777,077, filed on Jun. 4, 2004, provisional application No. 60/601,061, filed on Aug. 11, 2004, provisional application No. 60/650,305, filed on Feb. 4, 2005, provisional application No. 60/663,391, filed on Mar. 18, 2005, provisional application No. 60/677,617, filed on May 4, 2005, provisional application No. 60/790,104, filed on Apr. 7, 2006.

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- Lemelson-MIT’s Handbook for Inventors

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  - http://law.unh.edu/thomasfield/ipbasics/index.php

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