Patenting Systems,
Patentable Subject Matter,
and Prior Art

Dannie Jost

International School of Solid State Physics
Materials for Renewable Energy
July 18-28, 2012
Ettore Majorana Foundation and Centre for Scientific Culture
Survey

Now
1. How many of you have applied for a patent?
2. How many of you have ever been granted a patent? Where?
3. How many of you have ever earned revenue from a patent?

Future
1. How many of you want to apply for a patent?
2. How many of you want to earn revenue from patents?
Outline

• I – The Role of Patents in Technology Transfer and Research
• II – Patents and Intellectual Property: from Venice to Paris on the way to Uruguay
• III – Patents: Bibliographic Data, Description, and Claims
• IV – Prior Art, Science, Internet and Open Access
What is a patent?

• State granted monopoly rights for 20 years on an invention in return for disclosing the invention completely.
  – A right to exclude third parties from exploiting the invention commercially.
  – Publication that contains detailed technical information.

Patents provide the patent owner with the legal means to prevent others from making, using, or selling the new invention for a limited period of time, subject to a number of exceptions.
I – The Role of Patents in Technology Transfer and Research
Patents and clean energy: bridging the gap between evidence and policy: Final report (2010)

“The role of intellectual property rights (IPRs) in the transfer of climate change technologies has emerged as a particularly contentious issue in the past two years. Against this background, the United Nations Environment Programme (UNEP), the European Patent Office (EPO) and the International Centre for Trade and Sustainable Development (ICTSD) joined forces to undertake an empirical study on the role of patents in the transfer of clean energy technologies (CETs).”

Editors and contributors: Konstantinos Karachalios, Nikolaus Thumm (EPO); Ahmed Abdel Latif, Pedro Roffe (ICTSD); Benjamin Simmons (UNEP); Tahir Amin (Initiative for Medicines, Access and Knowledge (I-MAK)) (download)
“Unsurprisingly, and in line with the most general trends, most of the evidence to date on whether IPRs, in particular patents, will impact technology transfer to developing countries remains inconclusive.”

02 Economic and market barriers to technology transfer*

- Lack of financial resources
- High investment costs
- Incompatible prices, subsidies, tariffs
- Lack of incentives
- Consumers’ low income
- Lack of markets
- High upfront costs
- Lack of access to credit
- Lack of competition
- Weak currency
- High costs compared with traditional technology
- High borrowing costs
- High transaction costs
- Interests of large energy producers dominate
- IPR issues

* By UNFCCC Non-Annex I parties

Number of barriers
Why are patents important?

• Competitive element for advanced technologies
  – If you are an industrial start-up in an advanced technology, asserting yourself in the market will require a patent portfolio.

• Provide information on the state of the art
  – If you are a researcher, you need to know what the industry is doing and patenting.
INTELLECTUAL PROPERTY RIGHTS (IPR)

• Objects
  – Patents ([TRIPS 1994]; [EPC 1973, PCT 1970])
  – Trademarks
  – Copyright
  – Designs
  – Integrated Circuits ([Washington Treaty, 1989])
  – Geographical Indications
  – Trade Secrets
  – Traditional Knowledge
II – Patents and Intellectual Property: from Venice to Paris on the way to Uruguay
… the Republic of Florence issued a patent in 1421 to the eminent architect and inventor, Filippo Brunelleschi, for his ship, which was designed to transport Carraran marble for his famous Duomo of Florence.

However the ship sunk, and with it the (first) Florentine patent system.
Venice, 1474

“The Venetian Republic, on March 19, 1474, enacted the first known general patent statute, with overwhelming support in the Venetian legislature[39]. This statute, which sought to encourage technological advancement by issuing private grants and importation licenses, established a foundation for the world’s first patent system, leading one historian to proclaim that ‘the international patent experience of nearly 500 years has merely brought amendments or improvements upon the solid core established in Renaissance Venice’ “

Venice, 1474

We have among us men of great genius, apt to invent and discover ingenious devices; and in view of the grandeur and virtue of our City, more such men come to us every day from divers parts.
Statute of Monopolies, 1624

... any Declaration before-mentioned shall not extend to any Letters Patents and Grants of Privilege for the Term of fourteen Years or under, hereafter to be made, of the sole Working or Making of any manner of new Manufactures within this Realm, to the true and first Inventor and Inventors of such Manufactures, which others at the Time of Making such Letters Patents and Grants shall not use, so as also they be not contrary to the Law, nor mischievous to the State, by raising Prices of Commodities at home, or Hurt of Trade, or generally inconvenient ...
US Constitution, 1787

Sec. 8

The Congress shall have Power …

To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries;

⇒ First Congress, Patent Act, 1790
1883

- **Paris Convention for the Protection of Industrial Property**
- 174 Parties (Member States)
- Article 4: [A to I. Patents, Utility Models, Industrial Designs, Marks, Inventors’ Certificates: Right of Priority G. Division of the Application]
Fast Forward…

- 1947 GATT (1993) General Agreement on Tariffs and Trade
- 1994 GATT
- 1995 WTO World Trade Organization
  - Uruguay Round 1986-1994
  - Trade Related Aspects of Intellectual Property Rights
TRIPS Article 27*

**Patentable Subject Matter**

1. Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application. *(5) Subject to paragraph 4 of Article 65, paragraph 8 of Article 70 and paragraph 3 of this Article, patents shall be available and patent rights enjoyable without discrimination as to the place of invention, the field of technology and whether products are imported or locally produced.*

* As of 10 May 2012, the WTO counted 155 Member States
Possible Exclusions 1

2. Members *may* exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.
Optional Exclusions II

3. Members may also exclude from patentability:
   (a) diagnostic, therapeutic and surgical methods for the treatment of humans or animals;
   (b) plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and microbiological processes. However, Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by any combination thereof. The provisions of this subparagraph shall be reviewed four years after the date of entry into force of the WTO Agreement.
What can be patented?

• patents **shall** be available for any **inventions**, whether products or processes, in all fields of technology
  – Invention
  – Products or Processes
  – Technology
AND

• New
  – Noveltiy

• Inventive Step
  – State of the Art; non-obvious

• Industrial Application
  – Useful
EPC Article 52(1)

(1) European patents shall be granted for any inventions which are susceptible of industrial application, which are new and which involve an inventive step.
What is an invention?

**EPC Article 52(2)** recites what is not regarded as an invention:

(a) discoveries, scientific theories and mathematical methods;

(b) aesthetic creations;

(c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers;

(d) presentation of information.
Sec. 25.- (1) A patent may, subject to the provisions of this section, be granted for any new invention which involves an inventive step and which is capable of being used or applied in trade or industry or agriculture.

(2) Anything which consists of-
(a) a discovery;
(b) a scientific theory;
(c) a mathematical method;
ZA Patents Act No. 57 of 1978

... 

(d) a literary, dramatic, musical or artistic work or any other aesthetic creation;
(e) a scheme, rule or method for performing a mental act, playing a game or doing business;
(f) a program for a computer; or
(g) the presentation of information, shall not be an invention for the purposes of this Act.
35 USC § 101

Inventions Patentable

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.
35 USC §102

Conditions for patentability; novelty and loss of right to patent.

A person shall be entitled to a patent unless —

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or
(d) the invention was first patented or caused to be patented, or was the subject of an inventor’s certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor’s certificate filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by applicant for patent, or
(f) he did not himself invent the subject matter sought to be patented, or
(g) before the applicant’s invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

Bui (2011)  
93 J. Pat. & Trademark Off. Soc'y 441

• Moving the U.S. from a “first-to-invent” system to “first-to-file” system with a limited one-year grace period only for an inventor's own prior publication and inventor-derived public disclosure; [Patent Reform Act of 2011, H.R. 1249, 112th Cong. §3 (2011) ]

• Eliminating “interference proceedings” and replacing therewith “derivation proceedings” to ensure first to file is actually an original inventor and not derived from another; [ld. §3]

• Eliminating best mode failure as a litigation defense; [ld. §15]

• Prohibiting the issuance of patents claiming “any strategy for reducing, avoiding or deferring tax liability” [ld. §14 ] and “human organisms;” [ld. §33]
• Eliminating the incentive to sue for false patent marking [Id. §16] and to join multiple defendants in a single lawsuit; [Id. §19]
• Codifying existing regulations for 3rd party submission of prior art in published applications and expanding time period for 3rd party submission of prior art; [Id. §8]
• Expanding prior user rights as a defense to infringement to all technologies (not just business method claims); [Id. §5]
• Creating new USPTO proceedings for Post-Grant Review [Id. §6, Chapter 31] and Inter Partes Review [Id. §6, Chapter 32] (where any person can challenge the validity of a patent within the USPTO with limited discovery) and Supplemental Examination [Id. §12] (where a patent owner can correct problems with a patent and strengthen the value of the patent in anticipation of litigation); and
• Creating a new Patent Trial & Appeal Board [Id. §7] to replace “Board of Patent Appeals and Interferences” to handle, among others, new Post-Grant Review and Inter Partes Review.
Invention v Discovery

• Patents specify applications of the laws of nature, and shall not claim the laws of nature as such.
• Invention provides solutions to technical problems, and it may or may not involve a sophisticated application of the laws of nature.
• Discovery involves the acquisition of (new) information and knowledge.
Can you get a patent for a chemical element?
may be produced in this manner as shown by the following reaction: Pu^{239}(\alpha,\gamma)Cm^{249} and Pu^{240}(\alpha,3\gamma)Cm^{249}. The energies of the accelerated particles required to accomplish this reaction will vary with the conditions under which the reaction is carried out. These factors are well known, however, and the optimum energy for the reaction desired may be easily calculated. In general, for the alpha bombardment of Pu^{239}, alpha energies of between 30 and 40 mev. have been found desirable. The plutonium targets for cyclotron bombardment may be prepared by the evaporation of a suitable plutonium solution, for example plutonium nitrate, on grooved platinum plates followed by mild ignition to form plutonium oxide. Following bombardment the curium may then be separated from the plutonium by the chemical methods which will be subsequently set forth in this application. Other heavy metal isotopes than Pu^{239} may also be used as the target material, for example other isotopes of plutonium and isotopes of neptunium and americium may be used. Similarly, the charged particle used in the accelerator is not limited to the alpha particle, but ions of protium, deuterium, tritium, and He^2 may also be used. The preparation of curium by the charged-particle bombardment method may be further illustrated by the following example.

**EXAMPLE I**

The Pu^{239} target was prepared as described above with 100 mg. of plutonium (as the oxide) deposited upon the platinum target plate. The plutonium target was then exposed to a bombardment of helium ions of energy 40 mev. in a 60-inch cyclotron for 63.1 microamperes hours. Following the bombardment the plutonium oxide was dissolved by treatment with sulfuric acid, and the sulfuric acid solution then evaporated to dryness. This was followed by dissolution of plutonium sulfates in dilute nitric acid and the remaining undissolved oxide was dissolved by heating with nitric acid together with a small amount of added hydrochloric acid. The plutonium in solution was then oxidized to the hexavalent state. Lanthanum fluoride was then precipitated from the solution, carrying with it the insoluble curium trifluoride and leaving in solution the soluble hexavalent plutonium fluoride. The alpha activity of the precipitate was found to be about 2 x 10^6 alpha particle disintegrations/min. This alpha activity was analyzed with the alpha pulse multi-channel analyzer and it was found that 95% of this activity was 96^{249} activity with a range of 4.75 ± 0.1 cm. (energy 6.4 mev.) and decays with a half-life of 3.0 ± 0.1 months.
How do I apply for a patent?

Step 1. Visit your Technology Transfer office or local Patent Office. Get information on (i) your rights (ii) obligations and (iii) procedures.

Step 2. For the procedural aspects and patent prosecution process, let the pros handle it.

Step 3. Read the small print of your contracts (employment, collaboration, consortium, etc) as to owns the intellectual property that you generate.
III – Patents: bibliographic data, description, and claims.
# Patent Specification

## Structure

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## Description

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## Claims

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(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
9 September 2005 (09.09.2005)

(10) International Publication Number
WO 2005/083811 A3

(51) International Patent Classification: H01L 51/20,
31/0384

(21) International Application Number:
PCT/US2004/031611

(22) International Filing Date:
23 September 2004 (23.09.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/505,200 23 September 2003 (23.09.2003) US


(72) Inventors; and
(75) Inventors/Applicants (for US only): GINLEY, David,

(74) Agent: VERNON, Deborah, M.; Proskauer Rose LLP, One International Place, Boston, MA 02110 (US).


(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,

(54) Title: ORGANIC SOLAR CELLS INCLUDING GROUP IV NANOCRYSTALS AND METHOD OF MANUFACTURE

[Continued on next page]
Porous block nano-fiber composite (110), a filtration system (10) and methods of using the same are disclosed. An exemplary porous block nano-fiber composite (110) includes a porous block (100) having one or more pores (200). The porous block nano-fiber composite (110) also includes a plurality of inorganic nano-fibers (211) formed within at least one of the pores (200).
Patent Kind Codes

- WO WIPO (World Intellectual Property Organization)
- A1 PCT International Application (With search report)
- A2 PCT International Application (Without search report)
- A3 PCT International Application Search Report A9
  Republished PCT International Application or PCT
  International Application Search Report
Patent Prosecution

Examination:

- **Application**
- **Examination**
- **Court**
  - Interpretation
  - grated CH

Scope of the claims:

- **Claims**
  - Novelty, Inventive Step
  - State of the Art
  - Search Report
  - Inventive Activity

Time
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H01L31/20 H01L31/0384

According to International Patent Classification (IPC) or to both national classification and IPC.

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, INSPEC, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>1,2, 5-10,13, 16,18, 19, 21-28, 31,33-40</td>
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Further documents are listed in the continuation of box C.

Patent families are listed in annex.

1 Special categories of cited documents:
A: "A document defining the general state of the art which is not considered to be of particular relevance.
E: earlier document but published on or after the International filing date.
L: document which may be relevant to priority claim(s) or which is cited to establish the publication date of another document or other special reason (as specified).
C: document referring to an oral disclosure, use, exhibition or other measure.
P: document published prior to the international filing date but later than the priority date claimed.

Date of the actual completion of the international search: 13 October 2005

Date of mailing of the international search report: 26/10/2005
IV – Prior Art, Science, Internet and Open Access.
When?
World Intellectual Property Organization (WIPO)

- **WIPO GOLD**
  - INTERNATIONAL PATENT CLASSIFICATION
  - PATENTSCOPE (search)
    - External databases
European Patent Office (EPO)

ESPACENET

- More than 70 million patent documents worldwide (since 1836)
- Getting started brochure (2.1 MB)
  - Smart search
  - Quick search
  - Advanced search
  - Number search
  - Classification search
## Smart search field identifiers

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PatFT: Patents
Full-Text from 1976

Quick Search
Advanced Search
Number Search

View Full-Page Images
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PatFT Status, History
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<< BOTH SYSTEMS >>

The databases are operating normally.

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How to View Images

Assignment Database
Public PAIR
Searching by Class
Sequence Listings
Attorneys and Agents

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Quick Reference Cards

- CASLINK for one-step structure searching in CAS REGISTRYSM, MARPAT, and CAplusSM (PDF) (~148K)

User Guides

- MARPAT User Guide (PDF) (6/11)

Updated 7/7/2011 11:42:00 AM
Search the European classification

Search the US classification
Bibliographic data: US201167821 (A1) — 2011-07-14

COMBUSTION SYSTEMS, POWER PLANTS, AND FLUE GAS TREATMENT SYSTEMS INCORPORATING SWEEP-BASED MEMBRANE SEPARATION UNITS TO REMOVE CARBON DIOXIDE FROM COMBUSTION GASES

Page bookmark: US2011167821 (A1) - COMBUSTION SYSTEMS, POWER PLANTS, AND FLUE GAS TREATMENT SYSTEMS INCORPORATING SWEEP-BASED MEMBRANE SEPARATION UNITS TO REMOVE CARBON DIOXIDE FROM COMBUSTION GASES

Inventor(s): BAKER RICHARD W [US]; WIJMANS JOHANNES G [US]; MERKEL TIMOTHY C [US]; LIN HAIQING [US]; DENEILS RABIN [US]; THOMPSON SCOTT [US]

Applicant(s): MEMBRANE TECHNOLOGY AND RES INC [US]

Classification: - international: B01D53/22; B01D53/62; F01K27/00; F25J3/08
- European: B01D53/22; Y02C10/10; Y02E50/34D

Application number: US201113071331 20110324

Priority number(s): US201113071331 20110324; WO2009US02874 20090508; US20100734941 20100602; US20080127415P 20080512

Also published as: US8016923 (B2) US20092770326 (A1) US8114192 (B2) WO2009139835 (A1) US2010236404 (A1) → more

US201167821 (A1)
US2011167821 A1

- No cited documents
- No citing documents

• INPADOC legal status
  – EP Register (blank)

• INPADOC patent family
  – 10 documents
    • US8114192 (B2) — 2012-02-14
      – 18 cited documents
      – 0 citing documents
GAS SEPARATION PROCESSES USING MEMBRANE WITH PERMEATE SWEEP TO RECOVER REACTION FEEDSTOCKS

Inventors: Richard W. Baker, Palo Alto, CA (US); Johannes G. Wijmans, Menlo Park, CA (US); Timothy C. Merkel, Menlo Park, CA (US)

Assignee: Membrane Technology & Research, Inc, Menlo Park, CA (US)

Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 340 days.

Filed: May 11, 2009

Prior Publication Data
US 2009/0277326 A1 Nov. 12, 2009

Related U.S. Application Data
Provisional application No. 61/127,415, filed on May 12, 2008.

Int. Cl. B01D 53/22 (2006.01)

U.S. Cl. .............. 95/45; 95/47; 95/50; 95/54; 95/55; 96/4; 96/9; 423/226; 423/414; 423/579; 423/359; 422/187; 422/234; 585/818; 585/819; 585/903

Field of Classification Search ............. 95/45, 47, 95/50, 55, 54; 96/4, 7, 9; 423/226, 414, 423/359, 359; 422/187, 234; 585/818, 819, 585/903

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US 4,981,498, 01/1991, Bikson et al. (withdrawn)

* cited by examiner

Primary Examiner — Jason M Greene
Attorney, Agent, or Firm — J. Furrant; K. Bean

ABSTRACT

A gas separation process for treating off-gas streams from reaction processes, and reaction processes including such gas separation. The invention involves flowing the off-gas across the feed side of a membrane, flowing a sweep gas stream, usually air, across the permeate side, and passing the permeate/sweep gas mixture to the reaction. The process recovers unreacted feedstock that would otherwise be lost in the waste gases in an energy efficient manner.
To remember

TRIPS Article 7 Objectives
The protection and enforcement of intellectual property rights should contribute to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare, and to a balance of rights and obligations.
TRIPS Article 8

Principles

1. Members may, in formulating or amending their laws and regulations, adopt measures necessary to protect public health and nutrition, and to promote the public interest in sectors of vital importance to their socio-economic and technological development, provided that such measures are consistent with the provisions of this Agreement.

2. Appropriate measures, provided that they are consistent with the provisions of this Agreement, may be needed to prevent the abuse of intellectual property rights by right holders or the resort to practices which unreasonably restrain trade or adversely affect the international transfer of technology.
Thank you

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