



Patentanwälte
European Patent Attorneys
European Trademark and Design Attorneys

Patenting Nanotechnology Inventions in Europe

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EU Lisbon Agenda 2000

- Research activities at national and Union level must be better integrated and coordinated to make them as efficient and as innovative as possible.
- At the same time, innovation and ideas must be adequately rewarded within the new knowledge-based economy, particularly through patent protection.

EC Action Plan on Nanotechnologies 2005

- i. Foster R&D in the EU
- ii. Build an infrastructure of „poles of Excellence“
- iii. Invest in human resources
- iv. Favour the transformation of knowledge into valuable applications
- v. Integrate the social dimension



EC Action Plan on Nanotechnologies 2005

- In order to reflect the leadership of Europe in nanotech publications into patents, reference is made to the importance of a „strong, harmonized and affordable IPR framework“
- Regarding patents, the Action Plan supports the establishment of a nanotech patent monitoring system as well as the harmonisation of practices in the processing of nanotech patent applications between patent offices such as the EPO, the USPTO and the JPO.



EPO Nanotechnology working group

- Creation of a special classification tag Y01N for nanotechnology with six sub-classes (e.g. molecular computing, nanotubes, scanning probe technology) in addition to IPC classification
- Classification is based on technical experts, not keywords
- Availability of non-patent literature on nanotechnology
- Training of examiners



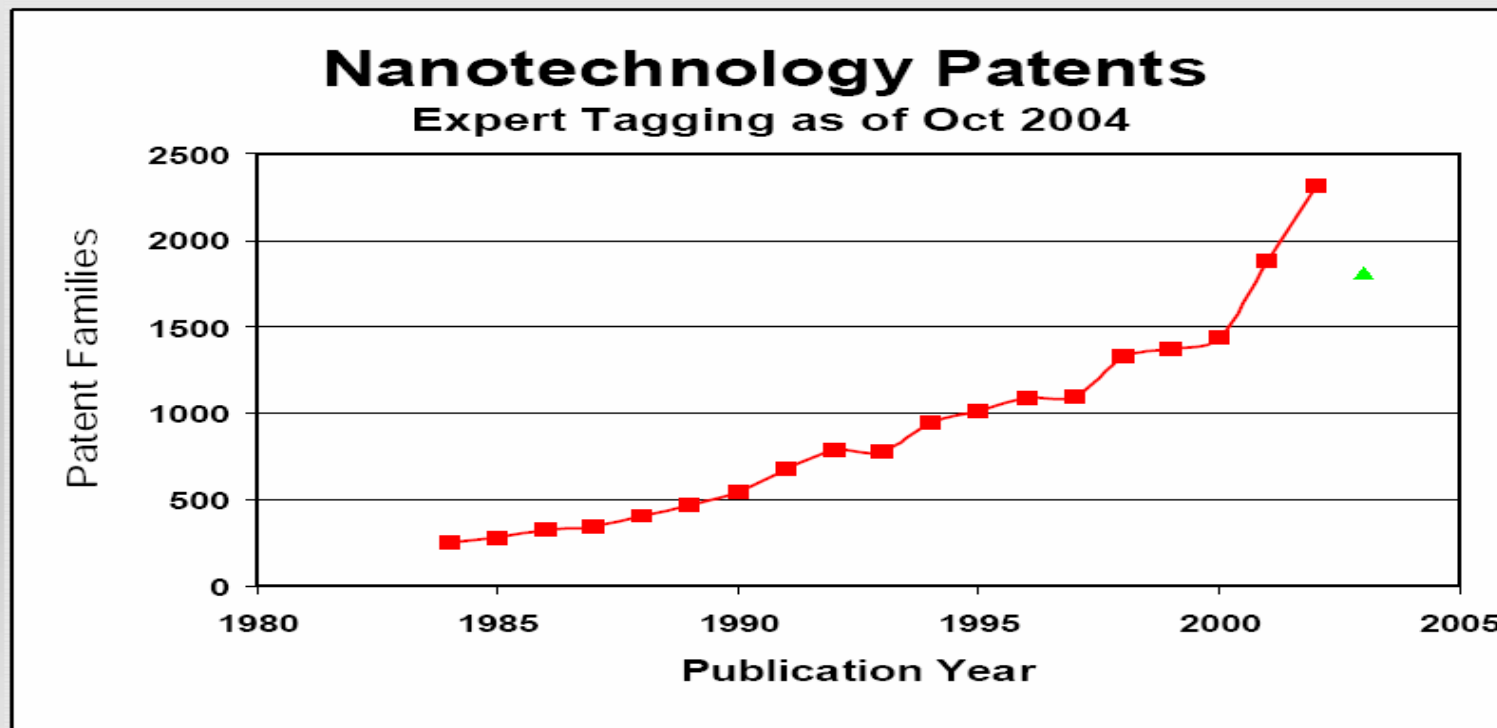
EPO Nanotechnology working group

EPO definition of nanotechnology:

- entities with a controlled geometrical size of at least one functional component below 100 nm in one or more dimensions susceptible to make physical, chemical or biological effects available which are intrinsic to that size, or
- equipment and methods for controlled analysis, manipulation, processing, fabrication and measurement with a precision below 100 nm

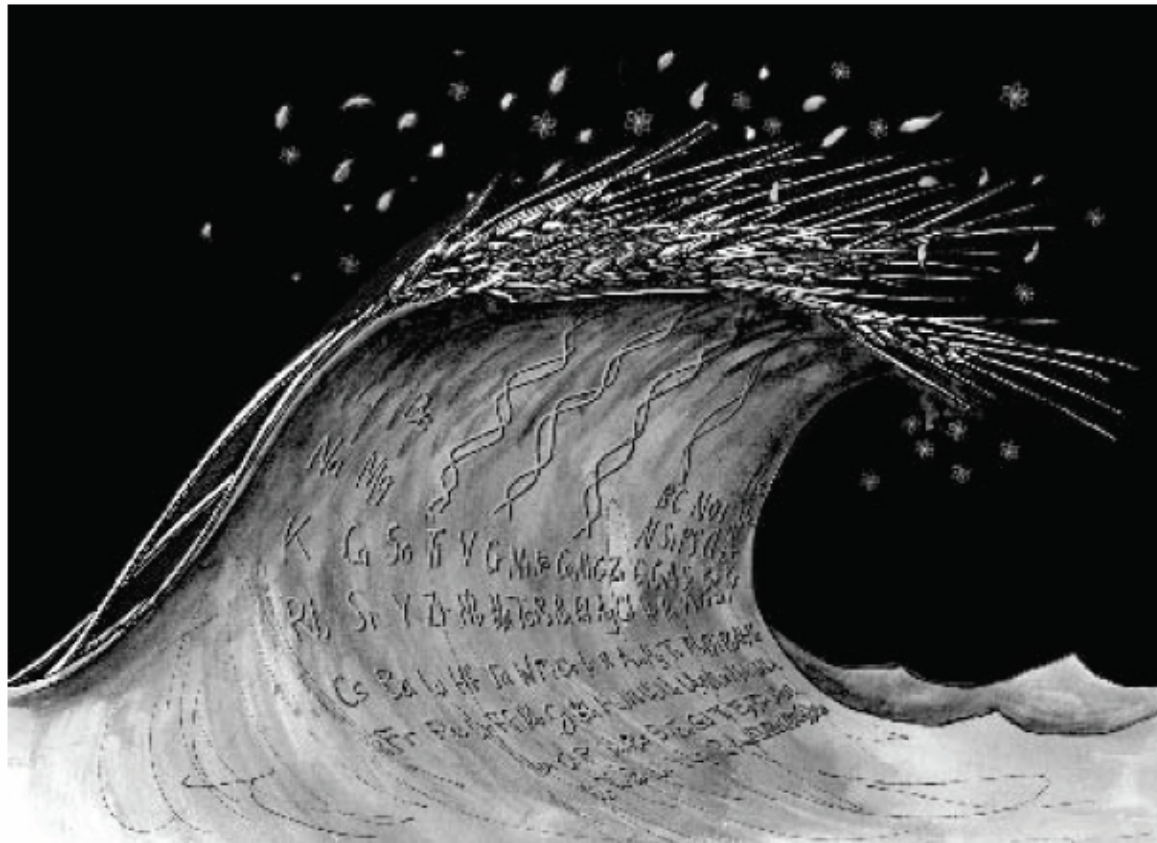


EPO patent statistics



31 % Nanoelectronics/Information Processing
 27 % Nanobiotech/Pharmacy
 15 % Materials

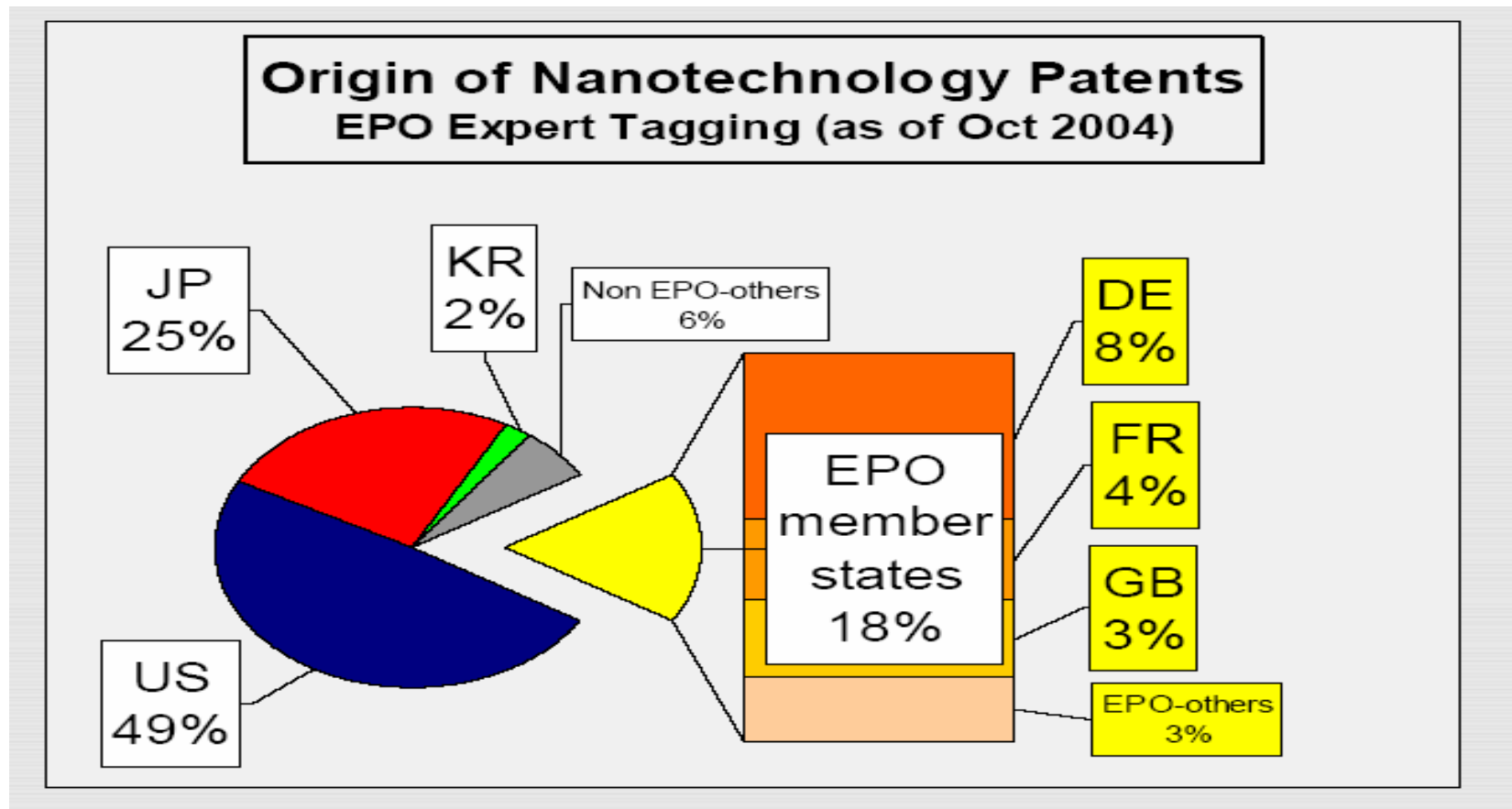
Other Views



Etc-group

The number of nanotech patents is surging, breaking across all industry sectors and sweeping up all of nature, both living and non-living.

EPO patent statistics



Nano-specific Aspekts of Patent Law

- Skilled person with respect to disclosure as well as inventiveness may be a multi-disciplinary team
- Problems of biotech patents (e.g. sufficiency of disclosure) are combined with problems of electronics patents (e.g. functional claims)

Consequences for the Practitioner:

- No completely new legal problems
- Multi-disciplinary teams



Filing Strategy

Early protection of basic inventions: Protection of business applications:

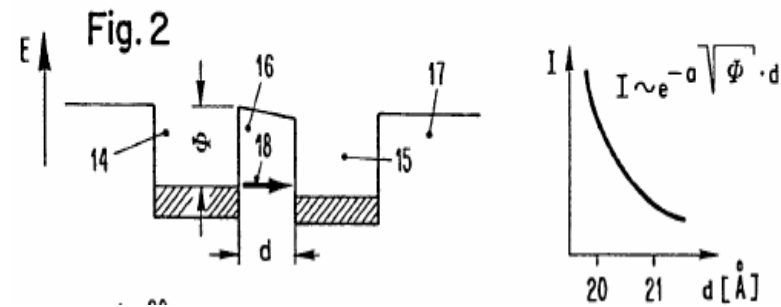
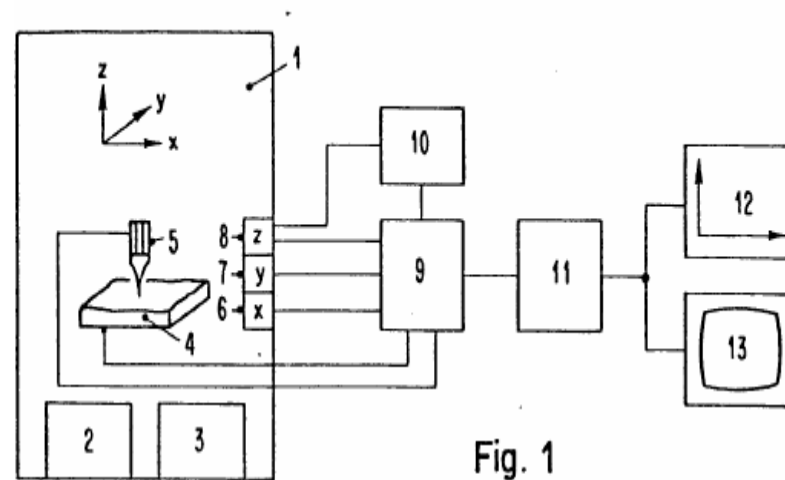
- Possible broad pioneer patent
 - Risk of too early expiry
 - Risk of different technological development
- Claims more specific to actual commercial product
 - Smaller scope of protection
 - Risk of being too late (dependent patent)



Examples of Nanotechnology Patents

Claims

1. Apparatus for highest resolution surface analysis using the vacuum tunnel effect, with an ultra-high vacuum chamber, which can be cooled down to a temperature close to absolute zero, in which chamber there is provided a conducting sample as base electrode which cooperates with a fine conducting tip serving as scanning electrode, the latter being positioned above the sample at a distance at which tunneling currents can flow, characterized in that there are provided three piezo electrical drive means (6, 7, 8) acting in three different dimensions to adjust the tip (5) and the sample (4) relative to each other in such a way that the tip is operating as a scanning electrode which is directed across the sample surface, that there are further provided measuring equipment (9) for the tunneling current and for the tunneling voltage to derive therefrom the tunnel resistance, an electronic automatic control means (10) for fine adjustment of the piezo electric drive means for the vertical dimension (z), whereby one of the electrical parameters is being kept constant by varying the vertical adjustment of the scanning tip, and that there are provided additional analyzing means (11), to provide information about the sample surface structure derived from the three-dimensional tip coordinates or from their electrical equivalents, respectively, and to record these graphically with a plotter (12) or on a viewing screen (13), the apparatus operating such, that the varying drive current of the piezo electric vertical dimension (z) drive means provides an image of the varying surface properties during scanning of a raster line in one lateral dimension (x), while the other lateral dimension (y) is being kept constant.





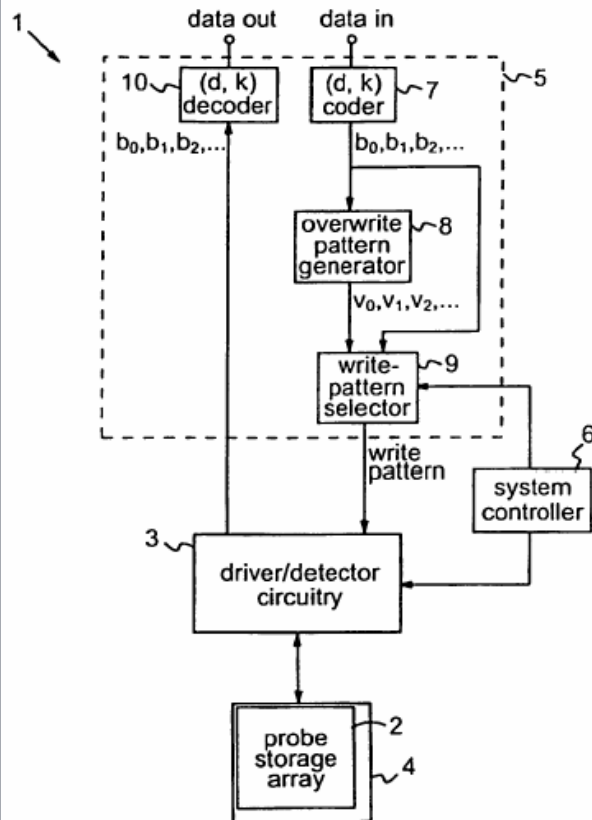
Examples of Nanotechnology Patents

<p>⑬  Europäisches Patentamt European Patent Office Office européen des brevets</p>	<p>⑪ Veröffentlichungsnummer: 0 027 517 B1</p>
<p>⑫ EUROPÄISCHE PATENTSCHRIFT</p>	
<p>④⑤ Veröffentlichungstag der Patentschrift: 15.02.84</p>	<p>⑥① Int. Cl.⁸: H 01 J 37/285, G 01 B 7/34, H 01 L 41/08</p>
<p>②① Anmeldenummer: 80104966.9</p>	
<p>②② Anmeldetag: 21.08.80</p>	
<p>⑤④ Gerät zur rasterartigen Oberflächenuntersuchung unter Ausnutzung des Vakuum-Tunneleffekts bei kryogenischen Temperaturen.</p>	
<p>③⑩ Priorität: 20.09.79 CH 8486/79</p>	<p>⑦③ Patentinhaber: International Business Machines Corporation, Old Orchard Road, Armonk, N.Y. 10504 (US)</p>
<p>④③ Veröffentlichungstag der Anmeldung: 29.04.81 Patentblatt 81/17</p>	<p>⑦② Erfinder: Binnig, Gerd, Reidholzstrasse 41, CH-8805 Richterswil/ZH (CH)</p>
<p>④⑤ Bekanntmachung des Hinweises auf die Patenterteilung: 15.02.84 Patentblatt 84/7</p>	<p>Erfinder: Rohrer, Heinrich, Bachtelstrasse 27, 8805 Richterswil/ZH (CH)</p>
<p>⑧④ Benannte Vertragsstaaten: DE FR GB</p>	<p>⑦④ Vertreter: Schröder, Otto H., Dr.-Ing., c/o International Business Machines Corporation Zurich Patent Operations Säumerstrasse 4, CH-8803 Rüschlikon/ZH (CH)</p>



Examples of Nanotechnology Patents

EP 1 372 151 B1



Claims

1. A method for overwriting data in a probe-based data storage device (1) wherein data is represented by the presence and absence of pits formed in a storage surface (4) by a probe of the device, the method comprising:

coding input data such that successive bits of a first value in the coded input data are separated by at least one bit of the other value;

generating overwrite data bits v_0, v_1, v_2, \dots , from the coded input data bits b_0, b_1, b_2, \dots , such that, if a pit represents a bit of said first value in the data storage device (1) then $v_i = \bar{b}_{i-1}$ for $i \geq 1$ and v_0 has said first value, and if a pit represents a bit of said other value in the data storage device (1) then $v_i = b_{i-1}$ for $i \geq 1$ and v_0 has said other value; and

overwriting data on the storage surface (4) with the overwrite data bits.



Examples of Nanotechnology Patents

United States Patent [19]
Iijima

[11] **Patent Number:** **5,747,161**
 [45] **Date of Patent:** **May 5, 1998**

[54] **GRAPHITE FILAMENTS HAVING TUBULAR STRUCTURE AND METHOD OF FORMING THE SAME**

- [75] Inventor: **Sumio Iijima**, Tokyo, Japan
- [73] Assignee: **NEC Corporation**, Tokyo, Japan
- [21] Appl. No.: **735,140**
- [22] Filed: **Oct. 22, 1996**

Related U.S. Application Data

[63] Continuation of Ser. No. 331,158, Oct. 28, 1994, abandoned, which is a continuation of Ser. No. 941,696, Sep. 8, 1992, abandoned.

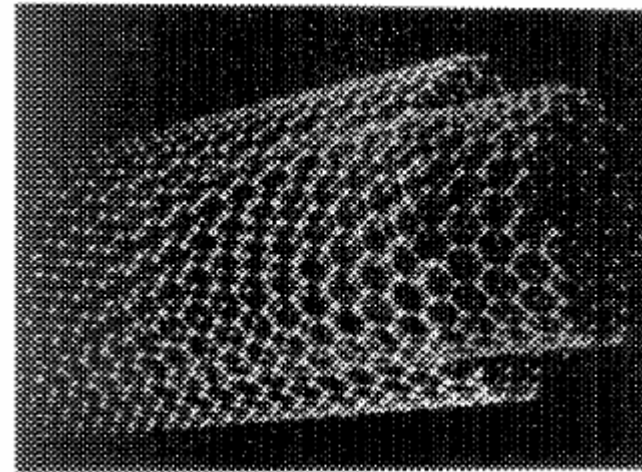
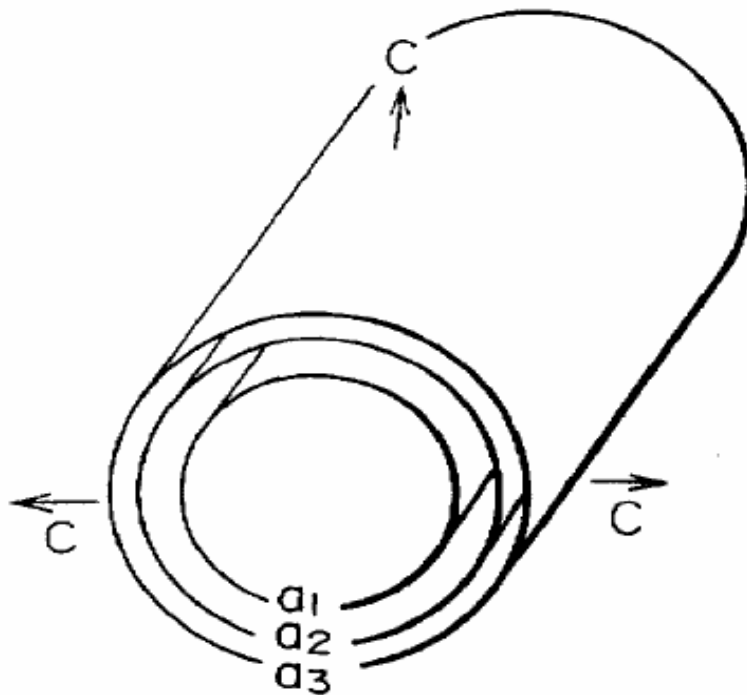
[30] **Foreign Application Priority Data**

Oct. 31, 1991 [JP] Japan 3-313663

OTHER PUBLICATIONS

- N. Hamada, et al., New One-Dimensional Conductors: Graphitic Microtubules, vol. 68 No. 10, pp. 1579-1581, 9 Mar. 1992, *Physical Review Letters*.
- S. Iijima et al., Pentagons, heptagons and negative curvature in graphite microtubule growth, *Nature*, vol. 356, pp. 776-778 (1992).
- T.W. Ebbesen and P.M. Ajayan, Large-scale synthesis of carbon nanotubes, *Nature*, vol. 358, pp. 220-222, 16 Jul. 1992.
- "International Symposium on the Physics and Chemistry of Finite Systems: From Clusters To Crystals", A NATO Advanced Workshop, Oct. 8-12, 1991, Richmond, Virginia. 141st Committee for Micro-beam Analysis, Materials for 69th Research Society, Sep. 9-10, 1991, Matsuzaka Heights, Japan Society for the Promotion of Science.
- Bacon, R., *Journal of Applied Physics*, vol. 31, No. 2, Feb. 1960, pp. 283-290.

Examples of Nanotechnology Patents



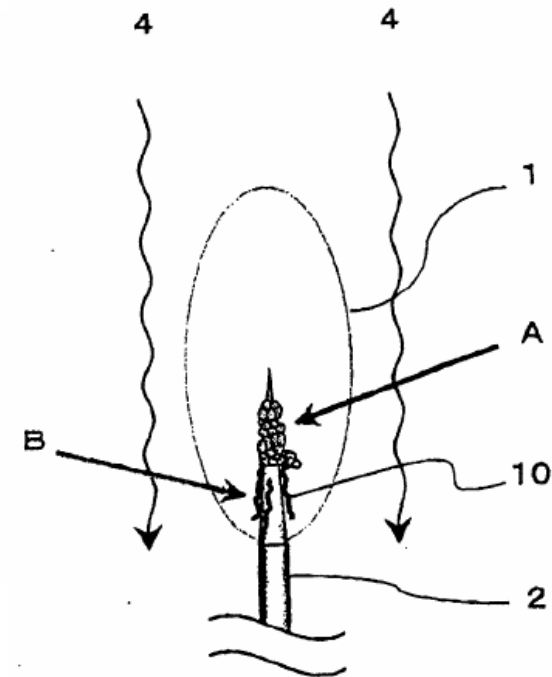
1. A graphite filament having a tubular structure and an outer diameter of 30 nm or less, said tubular structure comprising a helical structure of carbon hexagons.

Examples of Nanotechnology Patents

EP 1 464 619 A1

Claims

1. A method of manufacturing a densest multi-wall carbon nanotube, the method comprising depositing the densest multi-wall carbon nanotubes primarily on the surface of a graphite rod by introducing the graphite rod into plasma flame generated in an inert gas atmosphere added with hydrogen to vaporize carbon.





Conclusions:

- Nanotechnology is not as revolutionary as it may look at first glance
- Many things today get the „sexy“ nano-label, which in the past simply were called chemistry

Thank you for your attendance !