CONSULTANCY | AGENCY | LAW FIRM

PATENT PROTECTION OF NANOTECHNOLOGY RELATED INVENTIONS

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PhD in Physical Chemistry
Imaginenano2018, March 13-15 Bilbao (Spain)

GLOBAL NETWORK, LOCAL FEEL

PONS Intellectual Property is a global IP firm founded in 1945 and headquartered in Madrid.

We protect your innovation in any country worldwide through our 12 offices accross Europe, Asia and America.

We protect the results of innovation processes to create added value from intangible assets.

The patent department is composed of 35 technicians, including European Patent Attorneys and PhDs.

OVERVIEW

BRIEF INTRODUCTION

PATENT REQUIREMENTS FOR NANOTECHNOLOGY RELATED INVENTIONS

FINAL REMARKS

WHAT IS A PATENT?

A patent protects an invention.
An invention is a technical solution to a technical problem

A patent is:

- An Intellectual Property right conferred by a State to the inventor for a limited period (20 years) that can be transferred or be subjected to licenses
- Which relies on an invention which fulfils the requirements of patentability
- That enables the owner to forbid the use of the invention by third parties without his consent
- In exchange of having the content of the patent public

The spirit of the patent system is to promote the progress of science and technology by **ensuring disclosure**

THE VALUE OF A GRANTED PATENT

- Patents allow market exclusivity to recover the large investment
- Patents are one of the major assets of companies
- The profits allow the reinvestment in discovering and developing new inventions
- The possibility to licensiate technologies and continue doing R&D
- A good option when an invention is easy to be imitated
- A good option when it is difficult to keep an invention as a secret
- Patent protection is useful to forbid the use of the invention by third parties without consent and to have the right to ask for damages
- In the last years, patents are also used as indicator of a high level of research, in CV´s and scientific projects

SCIENTIFIC PUBLICATION

Long and very descriptive **title**

Abstract
Summary of the performed study, main results and conclusions

Many **authors** (depending on the area)

State of art :
Review of the technology
Many references, only few citations to patents
Starting hypotheses

Results and discussion
- Detailed description of the results.
- Detailed description of the starting hypotheses/mechanisms and their weaknesses.
- Theoretical evidences.
- Discussions

Conclusions
- Brief summary of the best results and the confirmation of the starting hypotheses.
- Approach to new hypothesis and suggestions to new studies.

PATENT DOCUMENT

Clear and concise **title**, not containing fancy names

Abstract
Main aspects of the claims and the area of interest

Inventor(s) and applicant(s)

Description
- State of art::

Approach to technical problem and its industrial application
Few references, only of the last years, both patents and scientific publications
- Technical problem to be solved and its solution (invention).
- Advantages of the invention and industrial applicability.
- Embodiments. Examples.

Claims: Scope of the protection
- Product
- Process/Method
- Use
- Device

Drawings

BASIC REQUIREMENTS FOR EUROPEAN PATENT APPLICATIONS

All European patent applications have to meet the following requirements of the European Patent Convention (EPC) to be granted:

- the invention must be new (the principle of "novelty")
- it must involve an inventive step, and
- it must be susceptible to industrial application.
- It must be adequately disclosed and
- the claims of the application must be clear, concise and supported by the description..

Nanomaterials and nanotechnology related patent applications are not treated differently from patent applications belonging to other fields: patent requirements must be fulfilled in order for the application to be granted.

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UNITY OF INVENTION

An invention or a group of inventions so linked as to form a single general inventive concept. → There may be unity of invention between claims in different categories.

Categories of claims

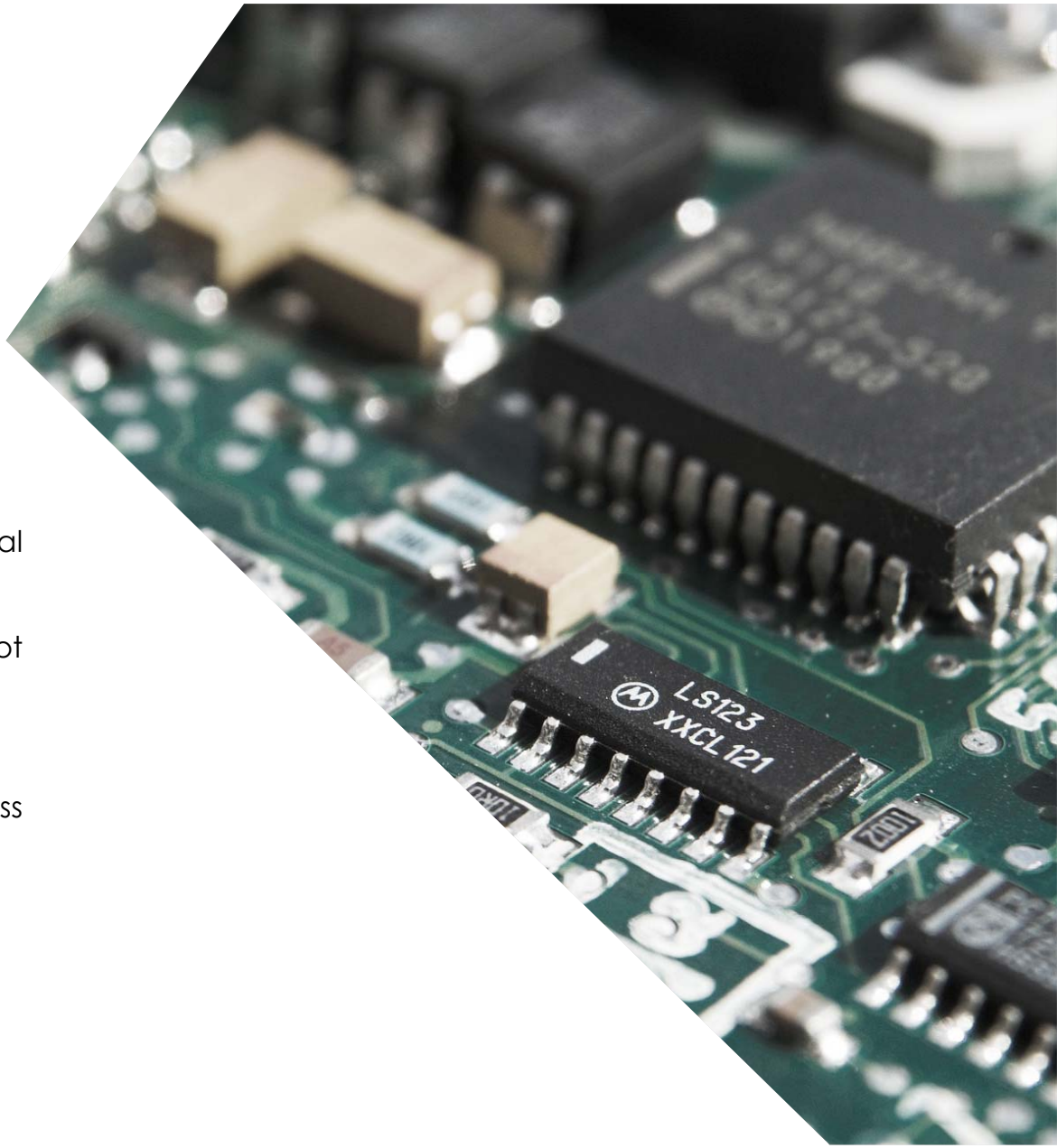
Claims directed to a physical entity

- Product: characterised by its structural or its functional features
- Device: characterised in its static state, even if they are not invariant

Claims directed to a physical activity

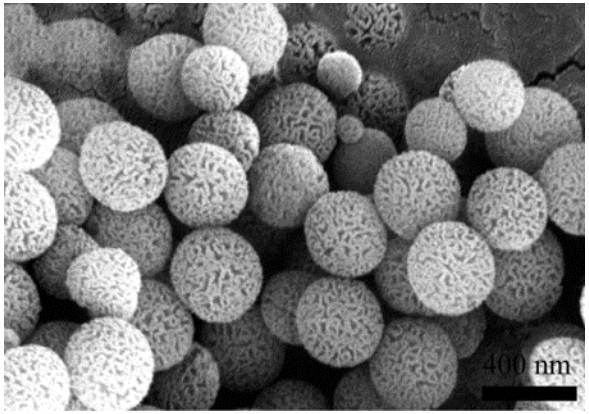
- Process / Method: essential features to carry out the process as a chronological sequence of process steps
- Use / Method consisting in the use

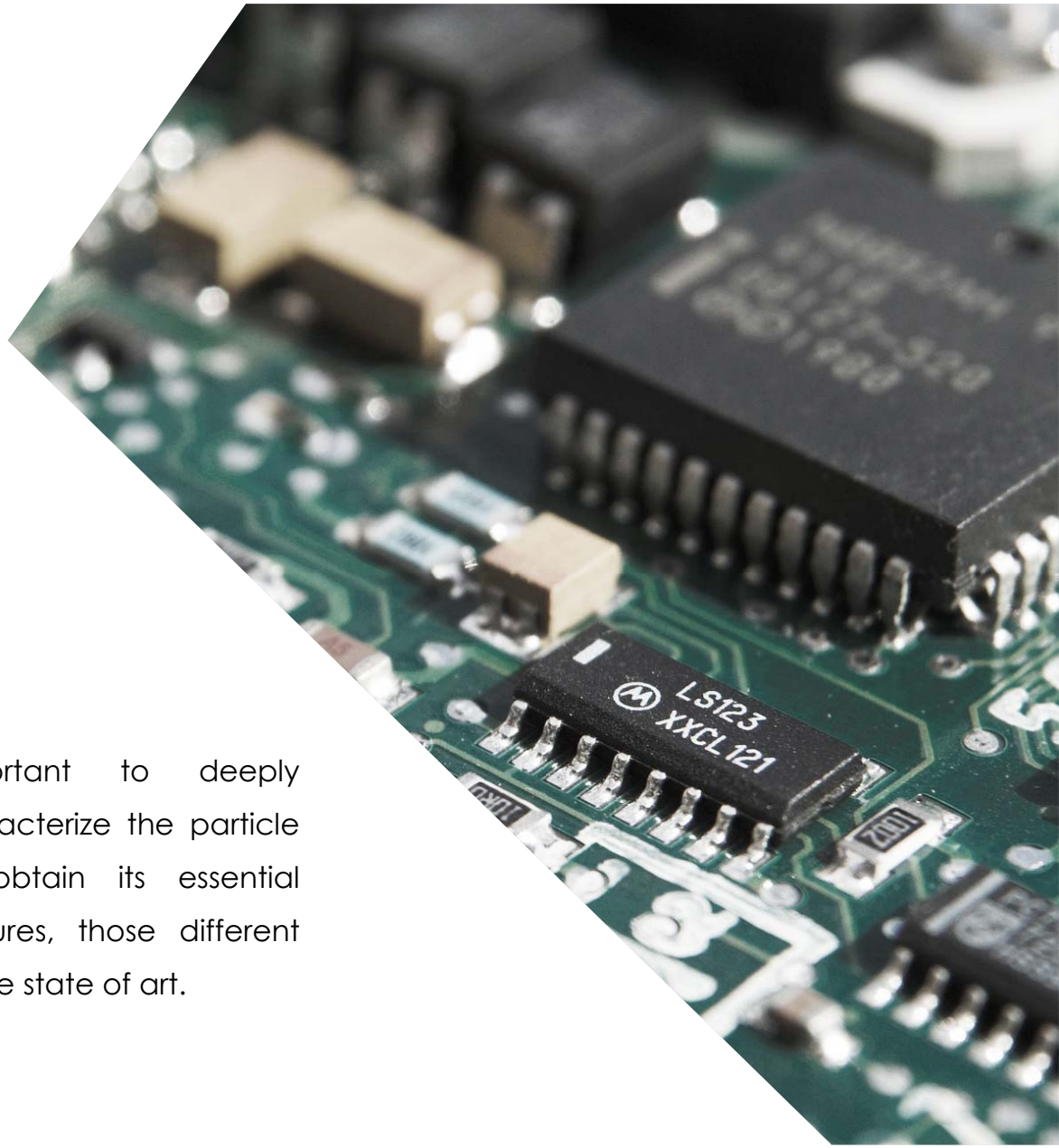
A patent application may contain claims of different categories



UNITY OF INVENTION

Particle
+
Process for obtaining said particle
+
Material comprising said particle
+
Process for obtaining said material
+
Use of said material
+
…

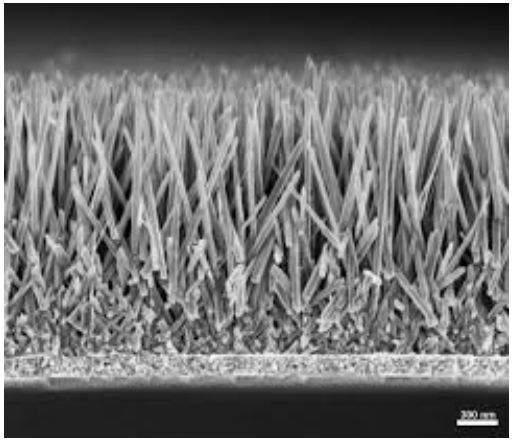


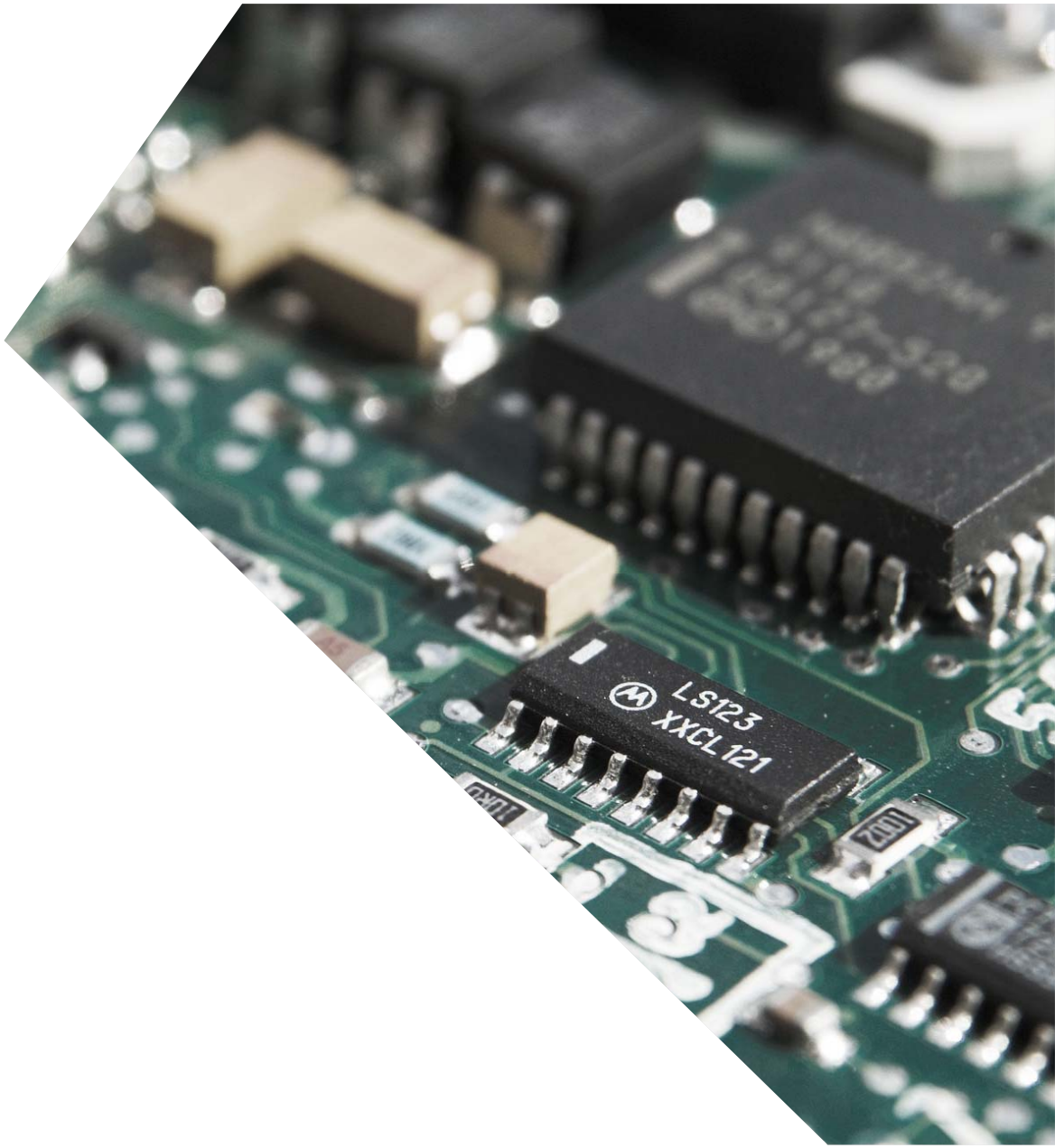


Important to deeply characterize the particle to obtain its essential features, those different to the state of art.

UNITY OF INVENTION

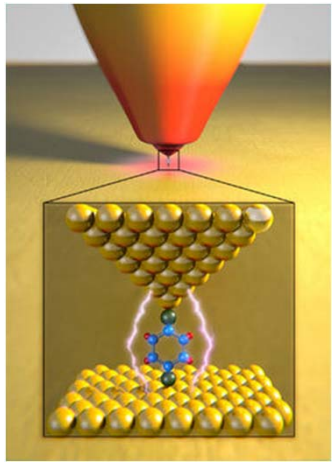
Material
+
Process for obtaining said material
+
Use of said material as component
+
Use of said material as a part of a device
+
…

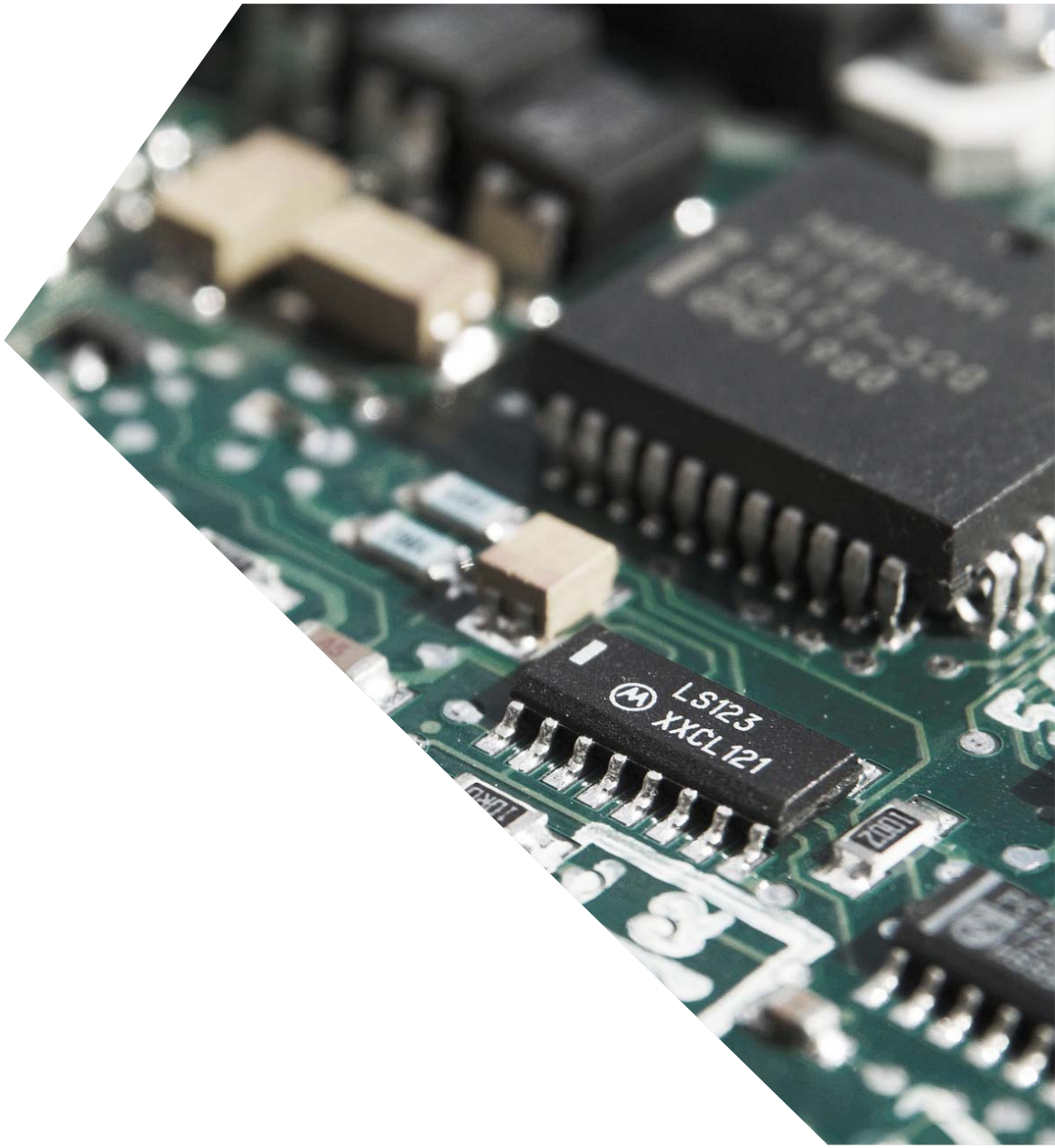




UNITY OF INVENTION

…
+
Component/part of a device comprising a material
+
Device comprising said component
+
Process for the manufacture of said device





UNITY OF INVENTION

EP1746610 (B1)

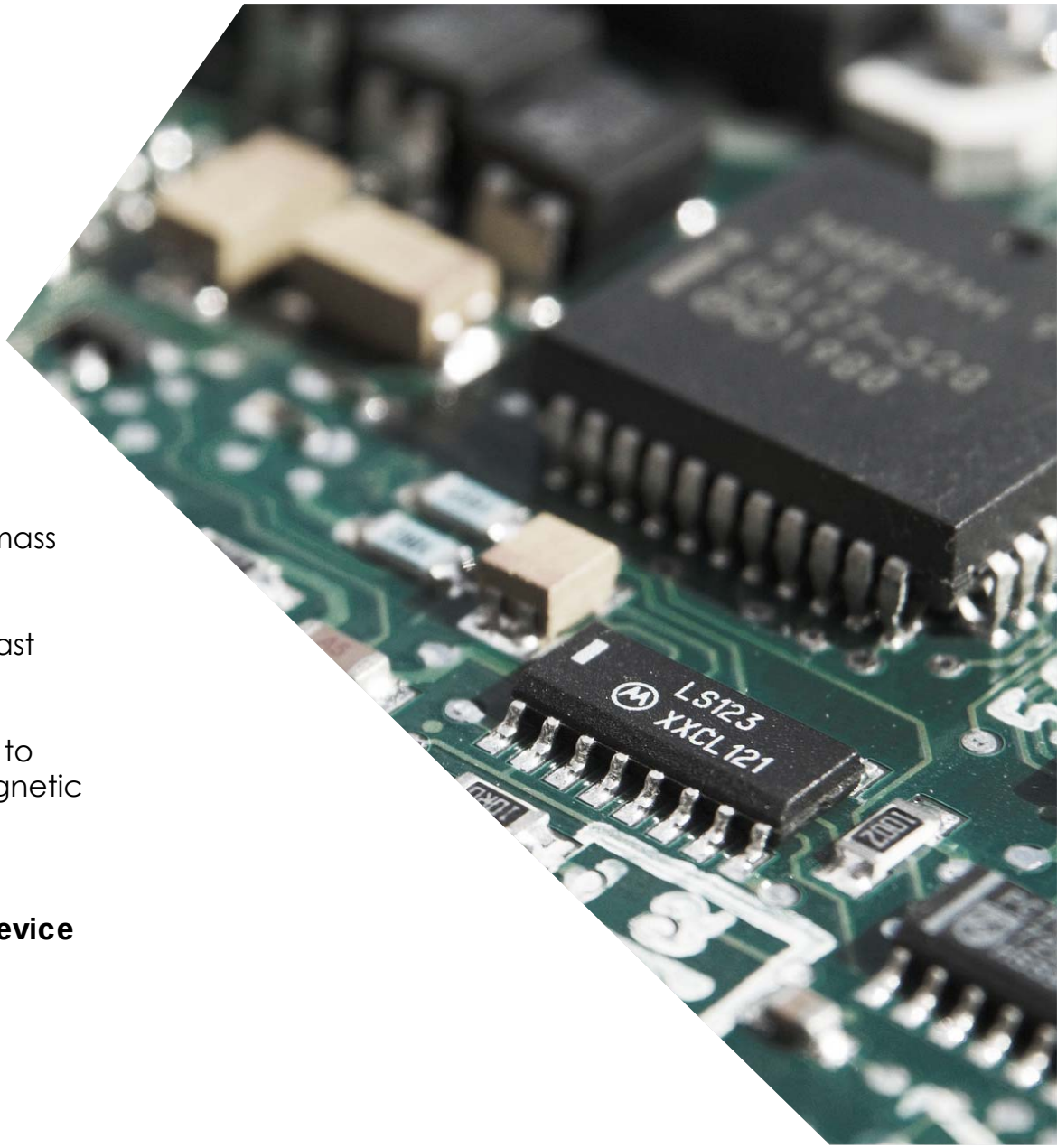
Classification:	- international:	*A61K41/00; A61K49/18; B22F1/00; B22F1/02; B22F9/24; G01N33/543; G11B5/712; G11B5/714; H01F1/00*
	- cooperative:	A61K41/0052; A61K49/1878; B22F1/0018; B22F9/24; B82Y25/00; B82Y30/00; B82Y5/00; G01N33/54373; G11B5/712; G11B5/714; H01F1/0045; Y10S977/773; Y10S977/84; Y10S977/838; Y10S977/925; Y10S977/953; Y10S977/96

Nanomagnetism
Nanotechnology
Nanobiotechnology or nanomedicine

1. **Magnetic nanoparticles** of noble metals non-magnetic in the mass state of size less than 5 nm comprising:
a) a core formed from a noble metal and
b) an anisotropic crust formed from compounds containing at least one metal-sulphur covalent bond.

10. **Process for preparation of magnetic nanoparticles** according to claims 1-9, comprising the reaction of a precursor of the non-magnetic noble metal with a thiol derivative of general formula HS-R in stoichiometric excess and in the presence of a reducing agent.

14. Use of magnetic nanoparticles according to claims 1-9 in a **device** for the controlled release of drugs.



UNITY OF INVENTION

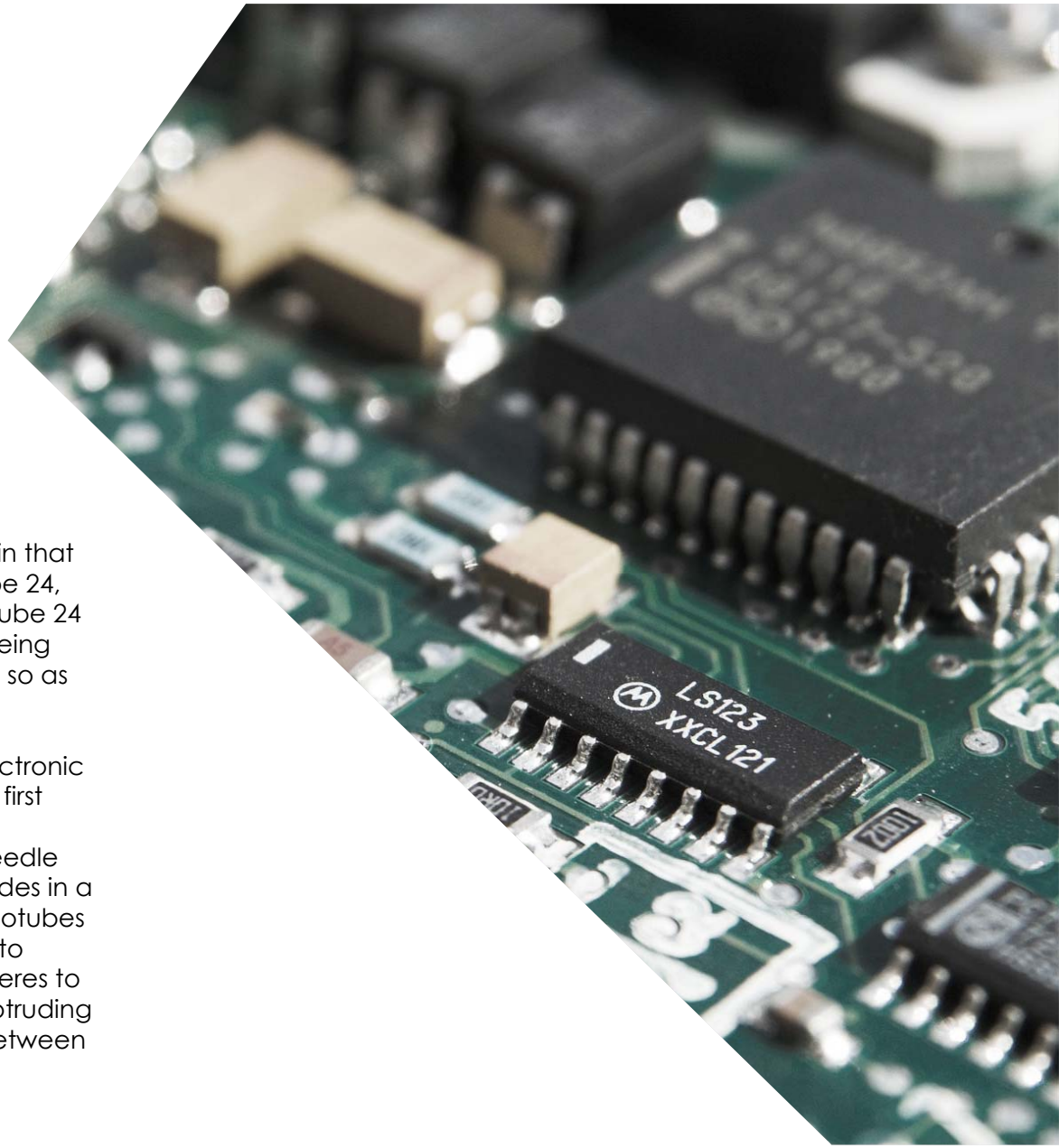
EP1054249 (B1)

Classification:	- international:	***B23Q17/09; C01B31/02; G01B21/30; G01B5/28; G01B7/34; G01N1/04; G01N13/00; G01N19/02; G01N21/75; G01Q10/00; G01Q60/16; G01Q60/38; G01Q60/54; G01Q70/12; G01Q70/16; G11B5/127; G21G5/00; G21K7/00;*** (IPC1-7): G01B21/30; G01N13/12; G12B21/04
	- cooperative:	G01Q60/16; G01Q60/38; G01Q60/54; G01Q70/12; B82Y15/00; B82Y35/00; Y10S977/869; Y10S977/873; Y10S977/876

Nanotechnology
Methods or apparatus for
measurements or analysis of nanostructures

1. **A surface signal operating probe for an electronic device** characterized in that said probe **comprises a nanotube** 24, a holder 2a which holds said nanotube 24, and a fastening means which fastens a base end portion 24b of said nanotube 24 to a surface of said holder with a tip end portion 24a of said nanotube 24 being caused to protrude; and said tip end portion 24a is used as a probe needle so as to scan surface signals.

13. **A method for manufacturing a surface signal operating probe** for an electronic device, said method being characterized in that said method comprises: a first process in which a voltage is applied across electrodes 22 and 23 in an electrophoretic solution 20 in which nanotubes 24 to be used as a probe needle are dispersed, so that said nanotubes are caused to adhere to said electrodes in a protruding fashion; a second process in which said electrodes to which nanotubes 24 are caused to adhere in a protruding fashion and a holder 2a is caused to approach very close to each other, so that each of said nanotubes 24 adheres to a surface of said holder with a tip end portion 24a of said nanotube in a protruding fashion; and a third process in which an electric current is caused to flow between said nanotube 24 and said holder 2a so that a base end portion 24a of said nanotube 24 is fusion-welded to said holder 2a.



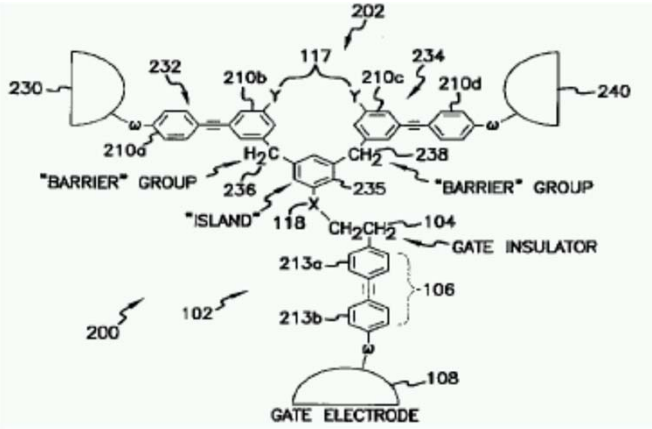
CLARITY

The strength of a claim depends on how it is written.

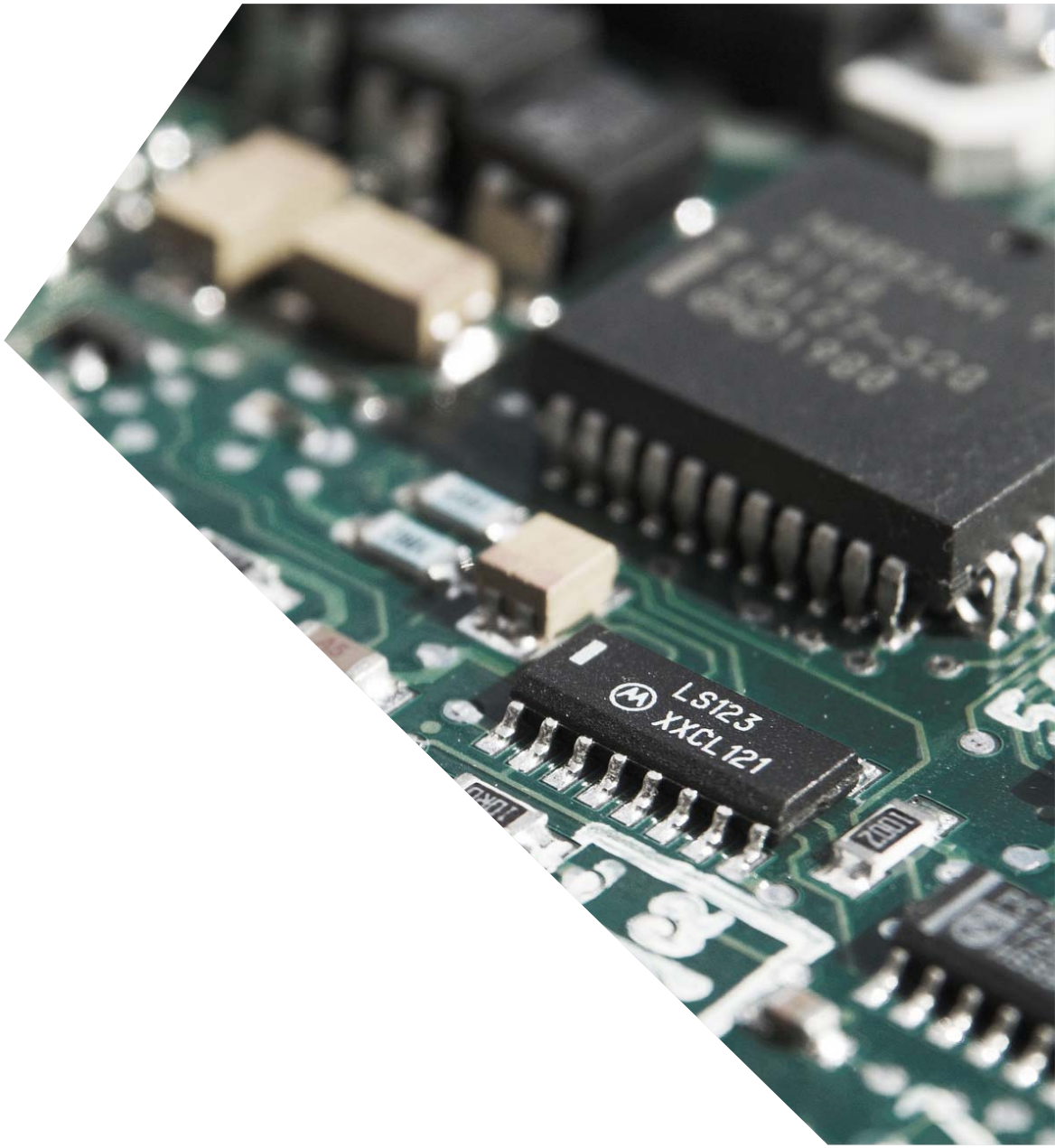
The meaning of a claim should be clear by its wording alone; it must be free of contradiction.

It is important to let clear what the category of the invention is; the wording of a claim must not leave any doubt as to its category.

Device or substance?



Single molecule transistor



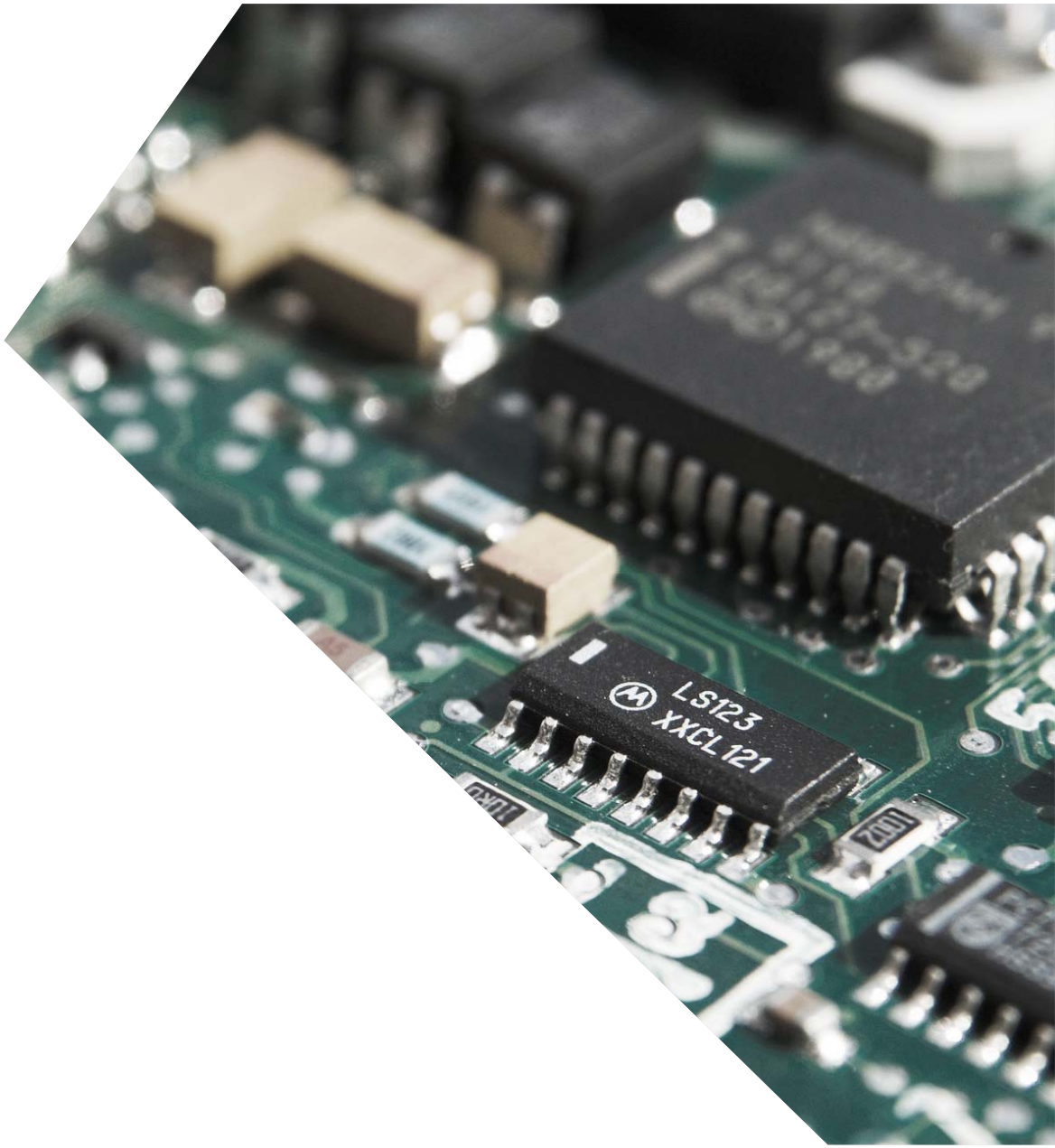
CLARITY

A claim may be divided into

- a preamble representing the closest prior art and
- a characterizing portion representing the inventive features

Closest prior art is a single document of the state of art related to the same purpose and having the most relevant features in common with the invention.

State of art is everything available to the public by means of a written or oral description, by use or by offer before the date of filing of the patent application.



CLARITY

(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

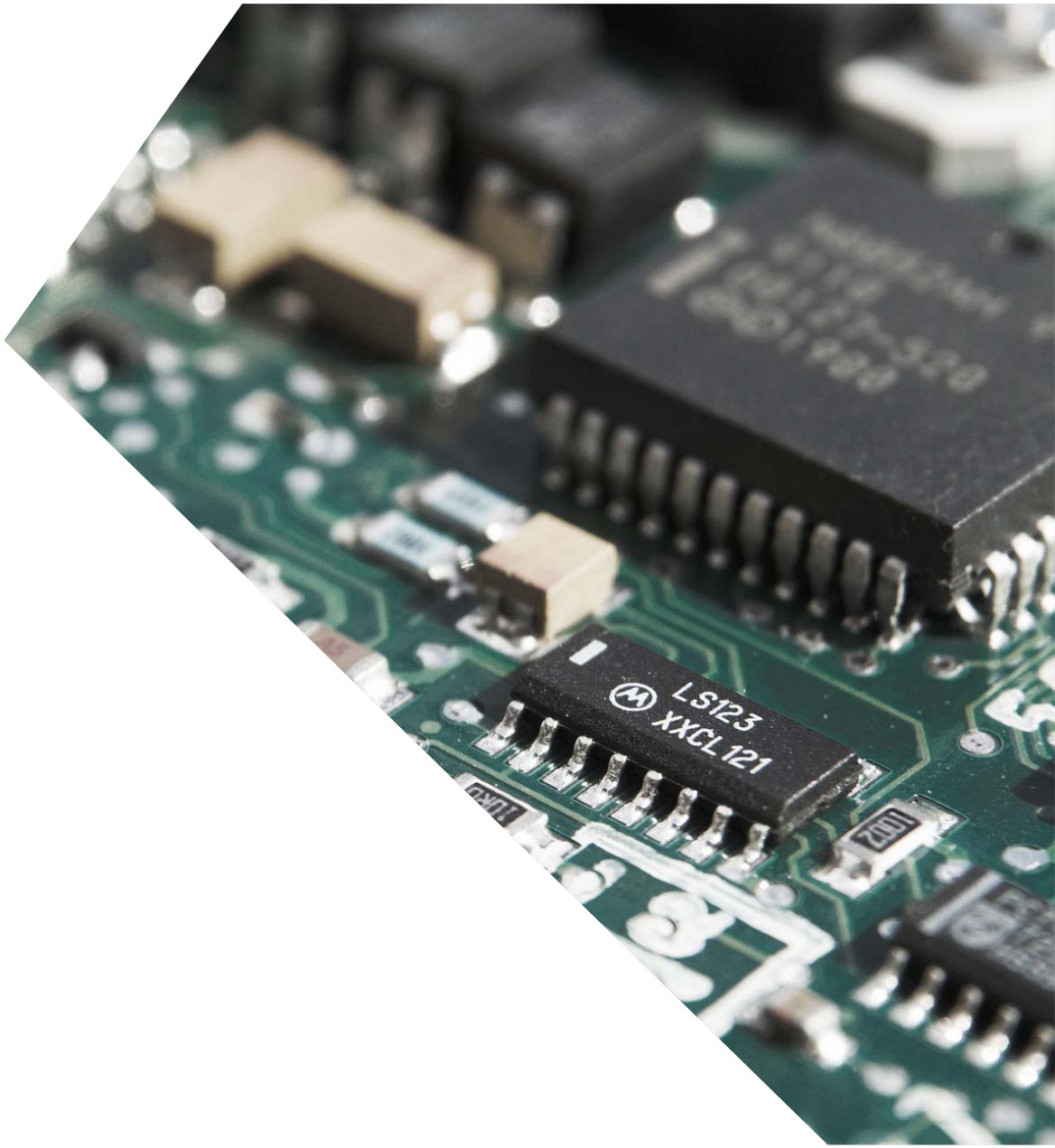
(11) EP 2 116 872 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
21.05.2014 Bulletin 2014/21

(51) Int Cl.:
G02B 1/02 (2006.01)
B82Y 20/00 (2011.01)
G02B 5/08 (2006.01)
G02B 5/28 (2006.01)
G02B 1/00 (2006.01)

1. A mesoporous nanoparticulate multilayer structure having properties of a Bragg reflector or unidimensional photonic crystal, that consists of periodically alternating optically uniform nanoparticle layers of different refractive indices, wherein said nanoparticles is of any material that can be obtained in the form of nanoparticles of a size comprised between 1 nm and 100 nm and which allows the desired refractive index contrast between the layers to be obtained, each layer having a thickness between 1 nm and 200 nm and pores between 1 to 100 nm, **characterised in that** said pores form an externally accessible and interconnected porosity in the mesoporous nanoparticulate multilayer structure that allows the diffusion of liquids therethrough.

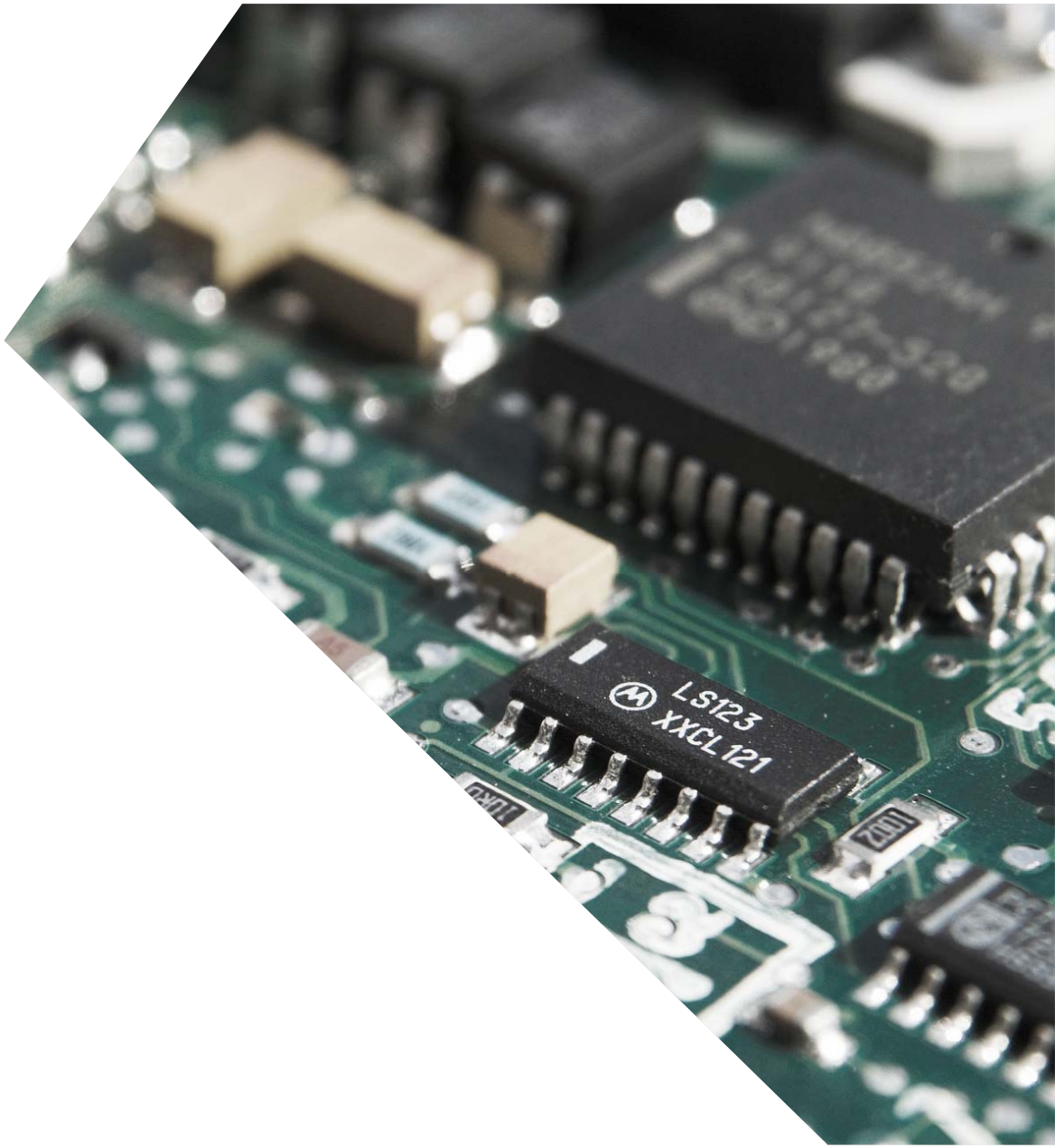


NANOTECHNOLOGY RELATED INVENTIONS

The European Patent Office uses the following definition to identify patents in the area of Nanotechnology:

The term **Nanotechnology** covers entities with a controlled geometrical size of at least one functional component below 100 nanometres (nm) in one or more dimensions susceptible of making physical, chemical or biological effects available which are intrinsic to that size.

Since the beginning of 2011, patent searchers have been able to use the "**B82Y" sub-class** to find documents relating to nanotechology in the world's patent databases.

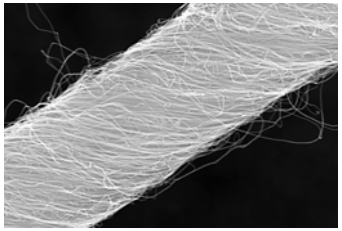


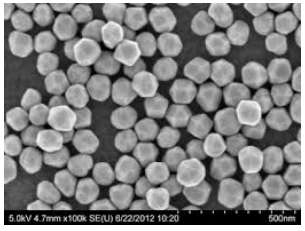
CLARITY

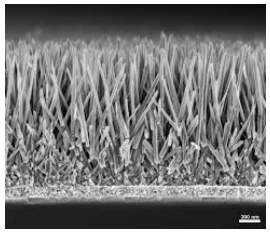
The term “nano” should be defined in the description part of the patent document.

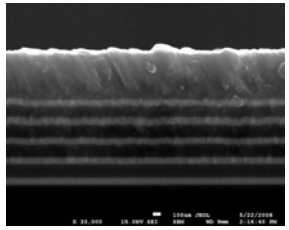
Other common terms in the field of nanotechnology should be clearly defined in the description part:

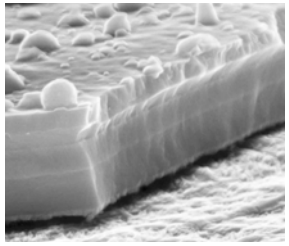
- Type of nanostructure (particle, layers, rods, platellets, etc)
- Mesoporosity
- Thickness

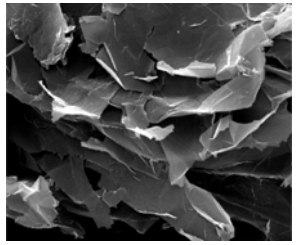


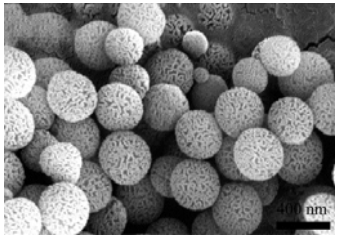


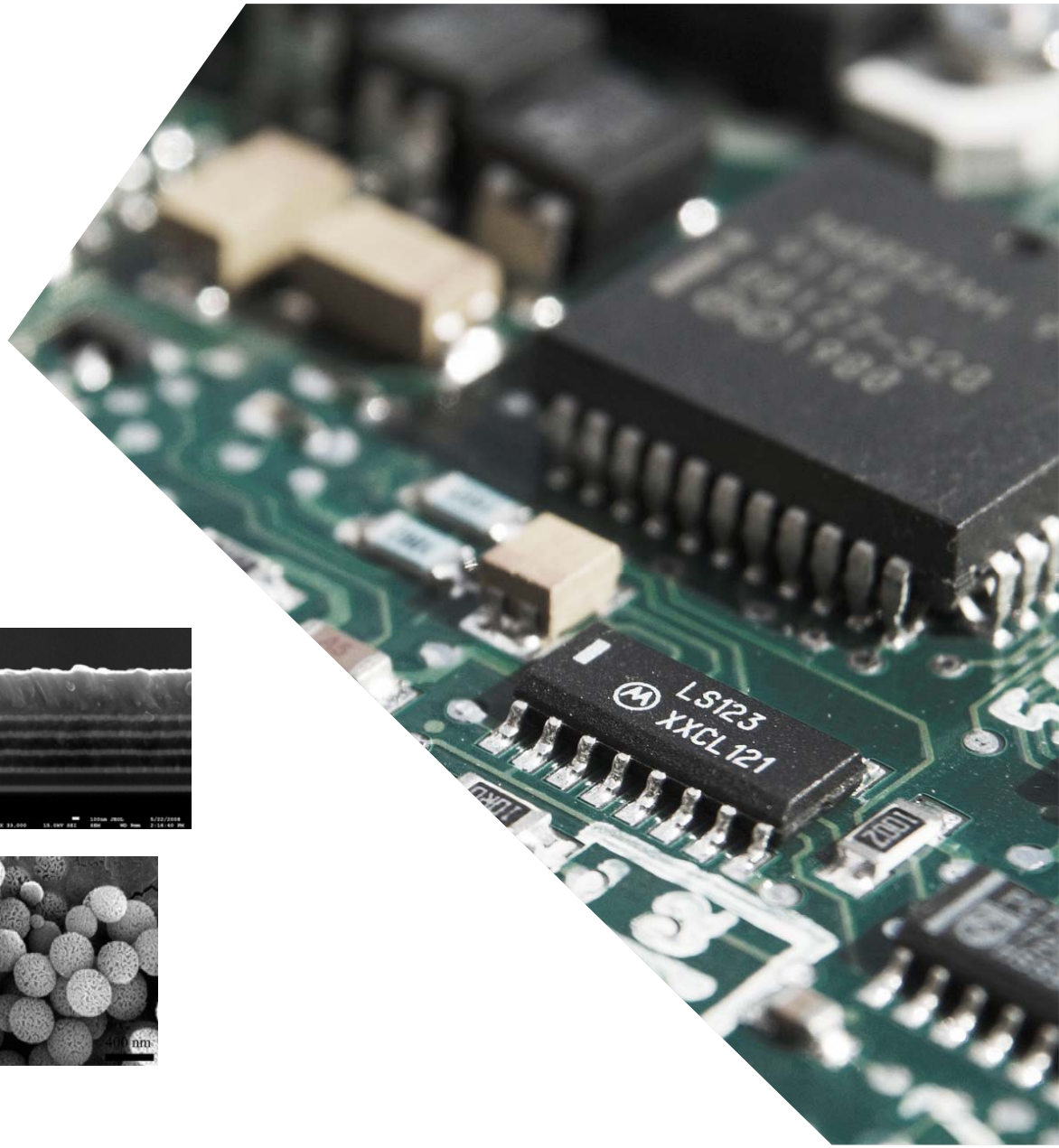










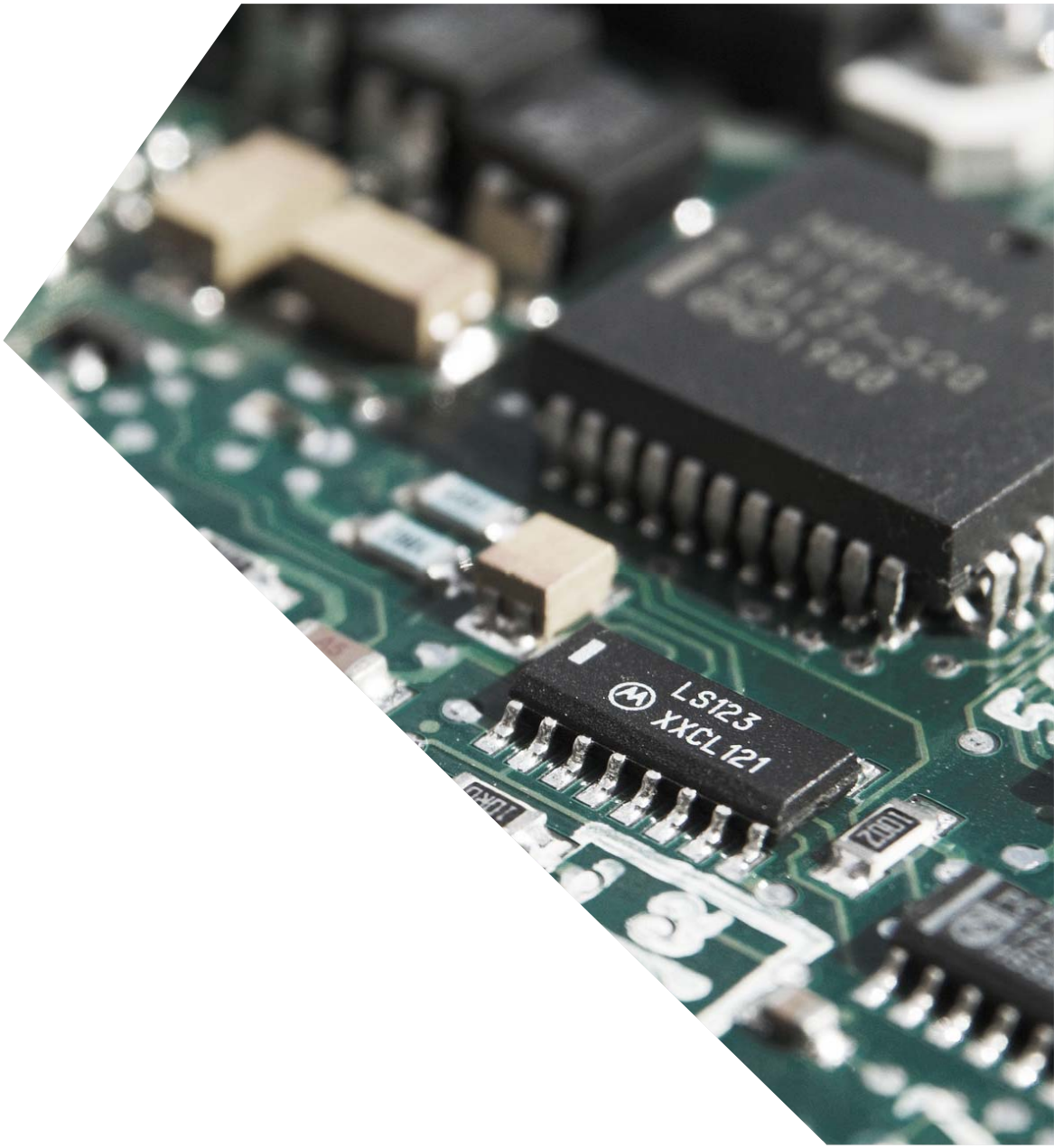


NOVELTY

An invention is new if it does not form part of the state of art: if a single document does not disclosure all the features of the invention in combination.

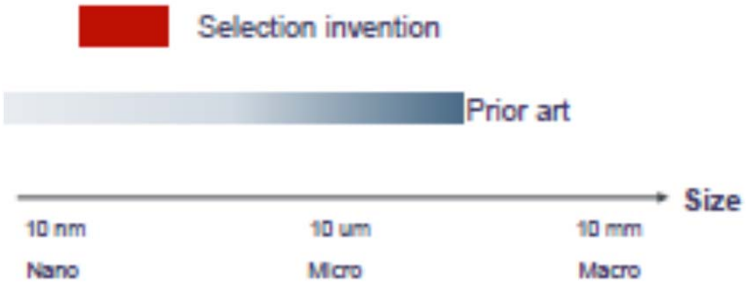
State of art is everything made available to the public by means of a written or of an oral description by use or by offer, before the date of filing of the patent application.

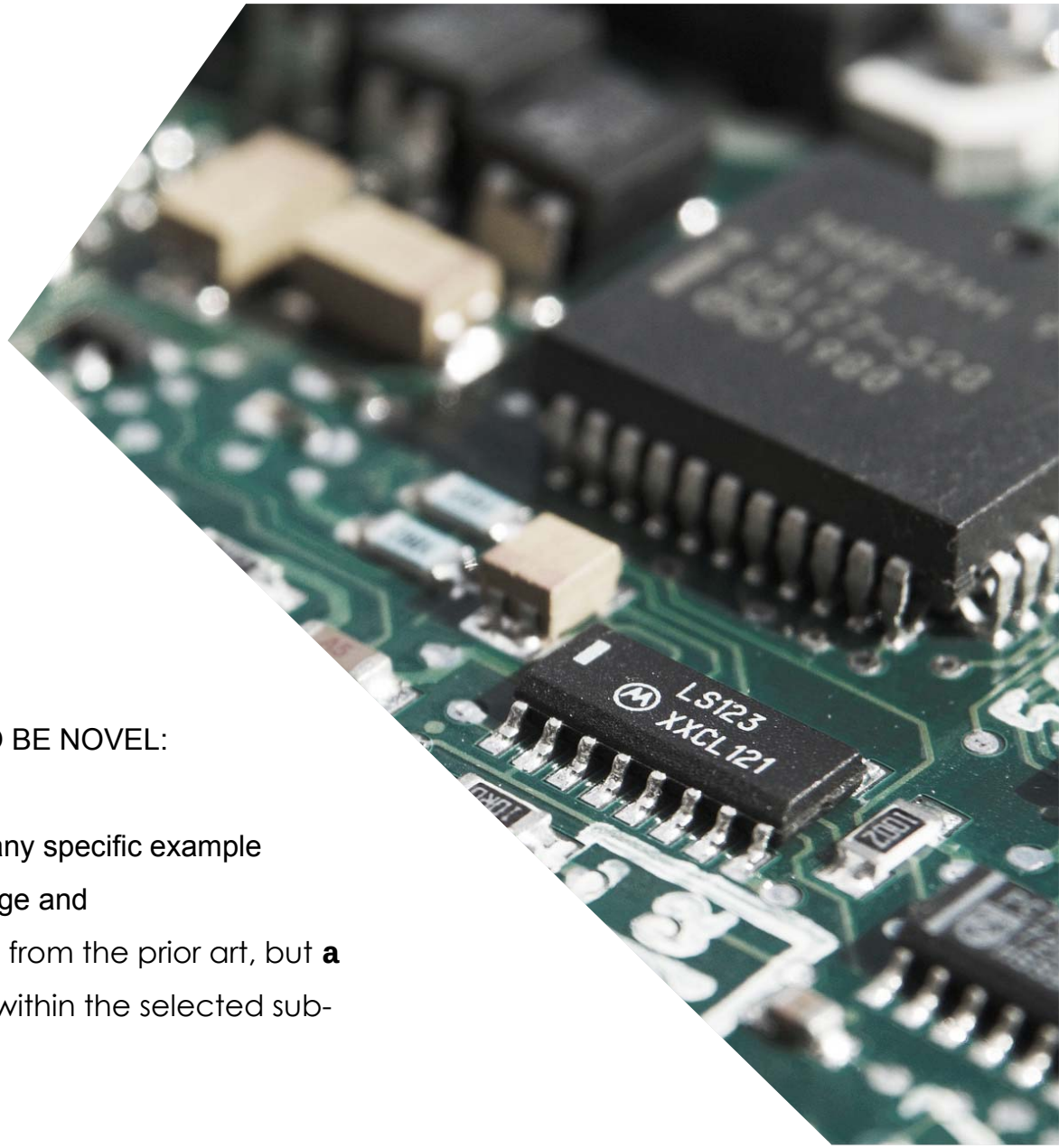
State of art is everything made avalilable to the public anywhere in the world and in any language before the date of filing of the patent application.



NOVELTY

A **selection invention** is an invention for which the distinguising feature is the selection of a range of values from a previous broader range.





The following criteria must be satisfied in order for A SUB-RANGE TO BE NOVEL:

(a) The sub-range must be **narrow** compared to the prior art

(b) The selected sub-range must be **sufficiently far removed** from any specific example disclosed in the prior art and from the end points of the known range and

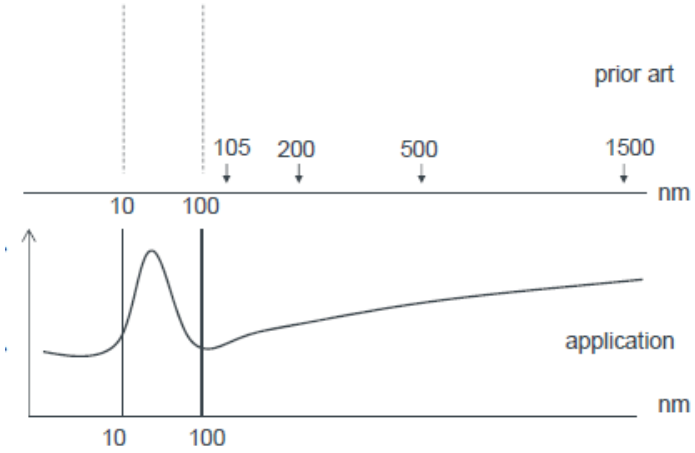
(c) The selected sub-range must not provide an arbitrary specimen from the prior art, but **a purposive selection** → the technical effect that occurs only within the selected sub-range must be shown.

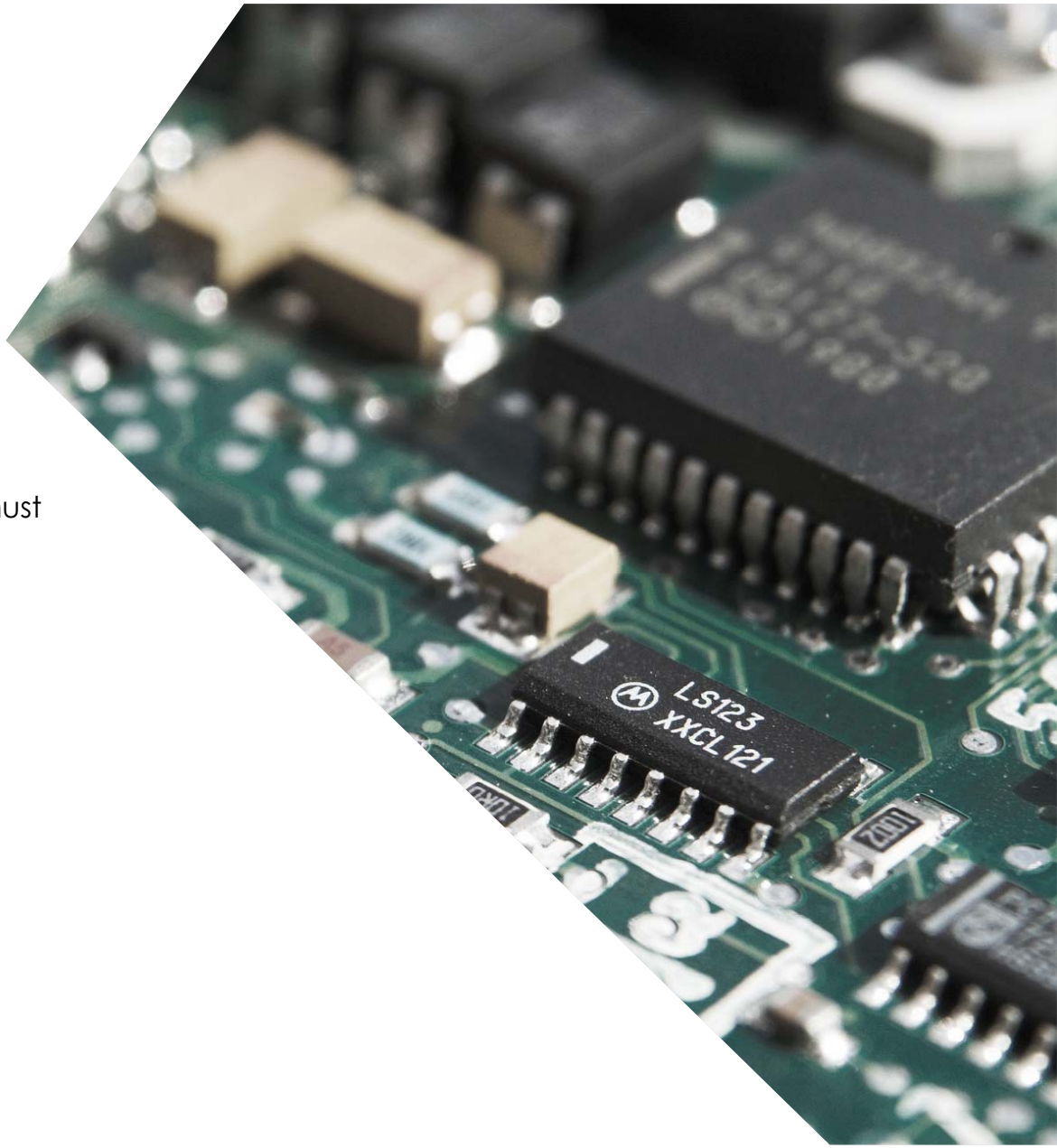
INVENTIVE STEP

(c) The selected sub-range must not provide an arbitrary specimen from the prior art, but **a purposive selection** → the technical effect that occurs only within the selected sub-range must be shown.

Example: Nanomaterial

The technical effect that occurs within the nanometer range must be shown in comparison to the prior art.



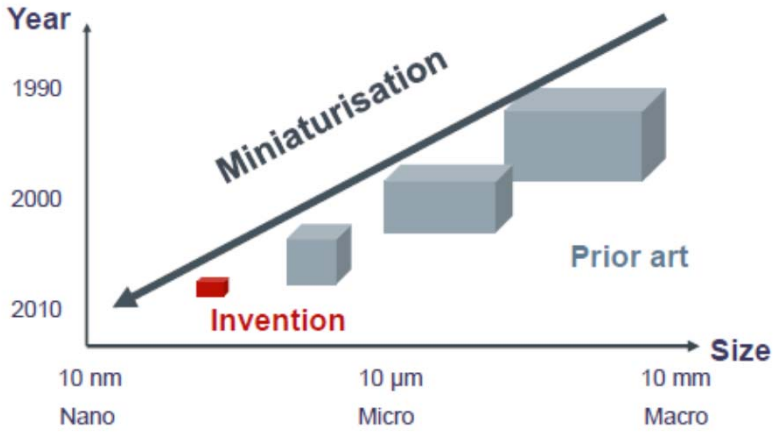


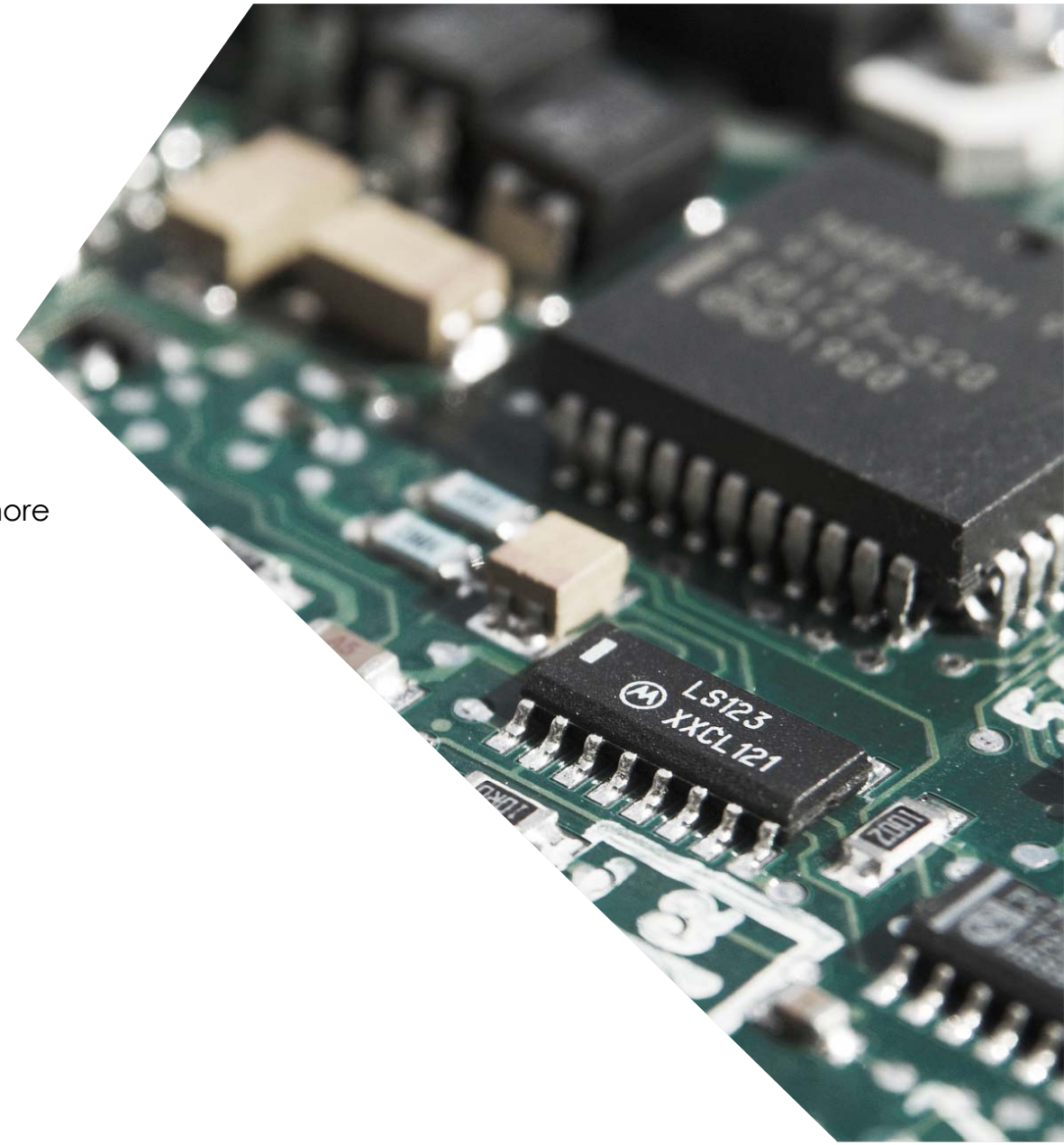
INVENTIVE STEP

(c) The selected sub-range must not provide an arbitrary specimen from the prior art, but **a purposive selection** → the technical effect that occurs only within the selected sub-range must be shown.

Example: Miniaturisation of devices

A development within a normal trend towards more minituarisation of a device has no inventive step.





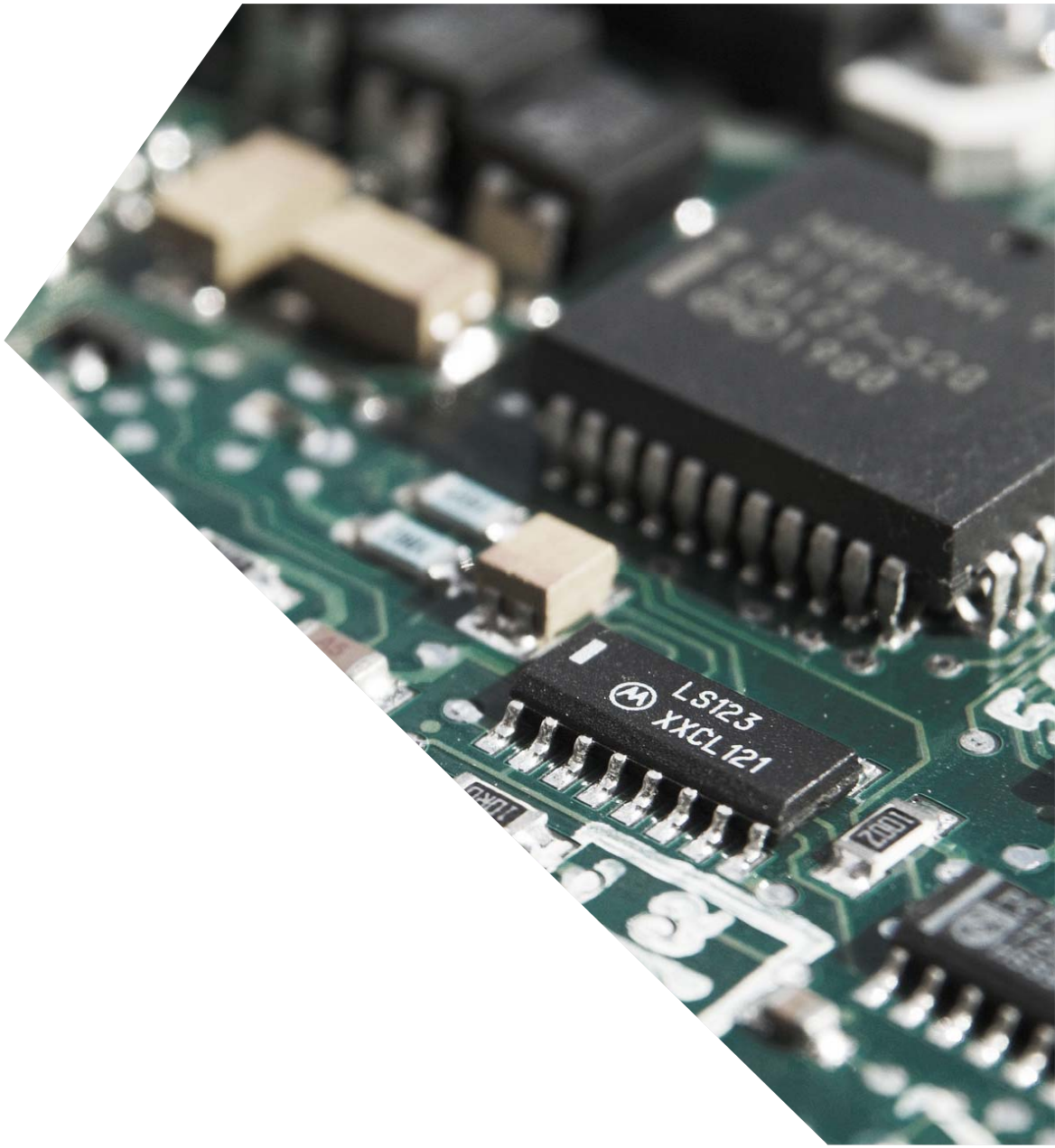
SUFFICIENCY OF DISCLOSURE

Nanotechnology is often the product of highly sophisticated preparation methods and tools for manipulating materials in the nanometre or even molecular range

→ beyond the knowledge of the person of average skill in the field, and even beyond that of experts.

Example:

It is not sufficient to say "nanoelectrodes with a diameter of 5 nm were deposited onto a substrate“. the precise conditions for carrying out the deposition have to be described



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FINAL REMARKS

Before disclosing any result, please

- consider if the results are:
  - susceptible to be patented
  - are commertially interesting

- consider to request an especialist for a patentability report (search of "state of art" and analysis of the requirements of patentability)

- take care with the technical aspects of the patent application, particularly with claims, since they delimit the scope of protection of the invention

THANK YOU VERY MUCH FOR YOUR ATTENTION

Thanks to Phantomsnet for the invitation to this conference

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