

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 08/123/EST	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/IT2008/000532	International filing date (<i>day/month/year</i>) 04.08.2008	Priority date (<i>day/month/year</i>) 09.04.2008	
International Patent Classification (IPC) or national classification and IPC INV. C01B3/00			
Applicant Pascucci Maddalena			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>8</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> <i>sent to the applicant and to the International Bureau</i>) a total of <u>2</u> sheets, as follows:</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3bis of Annex C of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p style="margin-left: 20px;"><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. II Priority</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p style="margin-left: 20px;"><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. VI Certain documents cited</p> <p style="margin-left: 20px;"><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p style="margin-left: 20px;"><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 2009-11-09	Date of completion of this report 15.06.2010		
Name and mailing address of the international preliminary examining authority: European Patent Office P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Fax: +31 70 340 - 3016	Authorized officer Cristescu, Ioana Telephone No. +31 70 340-2467		



Box No. I Basis of the report

1. With regard to the **language**, this report is based on
- the international application in the language in which it was filed
 - a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - international search (under Rules 12.3(a) and 23.1(b))
 - publication of the international application (under Rule 12.4(a))
 - international preliminary examination (under Rules 55.2(a) and/or 55.3(a))
2. With regard to the **elements*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

Description, Pages

1-15 as originally filed

Claims, Numbers

1-15 as originally filed

Drawings, Sheets

1/4-4/4 as originally filed

a sequence listing - see Supplemental Box Relating to Sequence Listing.

3. The amendments have resulted in the cancellation of:
- the description, pages
 - the claims, Nos.
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
 - any table(s) related to sequence listing (*specify*):
4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- the description, pages
 - the claims, Nos. 1-10
 - the drawings, sheets/figs
 - the sequence listing (*specify*):
5. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 70.2 (e)).
6. Supplementary international search report(s) from Authority(ies) have been received and taken into account in drawing up this report (Rule 45bis.8(b) and (c)).

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/IT2008/000532

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>2, 6, 9-12, 15</u>
	No: Claims	<u>1, 3-5, 7, 8, 13, 14</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-15</u>
Industrial applicability (IA)	Yes: Claims	<u>1-15</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reference is made to the following documents:

D1: EP-A-1 551 032 (OSAKA IND PROMOTION ORG [JP] ARATA YOSHIKI [JP]) 6 July 2005 (2005-07-06)

D2: E. CAMPARI, S. FOCARDI, V. GABBANI, V. MONTALBANO, F. PIANTELLI, S. VERONESI: "Overview of H_Ni systems: old experiments and new setup" 5TH ASTI WORKSHOP ON ANOMALIES IN HYDROGEN-DEUTERIUM LOADED METALS, ASTI, ITALY, 2004, XP002517911

D3: S. FOCARDI, V. GABBANI, V. MONTALBANO, F. PIANTELLI, S. VERONESI: "Evidence of Electromagnetic radiation from Ni-H Systems" 11TH INTERNATIONAL CONFERENCE ON CONDENSED MATTER NUCLEAR SCIENCE 2004, MARSEILLE, FRANCE, 2004, XP002517912

D4: CERRON-ZEBALLOS E ET AL: "INVESTIGATION OF ANOMALOUS HEAT PRODUCTION IN NI-H SYSTEMS" SOCIETA ITALIANA DI FISICA, NUOVO CIMENTO A, EDITRICE COMPOSITORI, BOLOGNA, IT, vol. 109A, no. 12, 1 December 1996 (1996-12-01), pages 1645-1654, XP008103248 ISSN: 0369-3546

Amendments

1. The amendments filed with the letter dated 09.11.2009 introduces subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2) (b) PCT. The amendments concerned are the following:

Amended claim 1 is directed to a method for carrying out an **hexothermal** reaction of nickel and hydrogen, characterized in that said method comprises the steps of providing a metal tube, introducing into said metal tube a nanometric particle nickel powder and injecting into said metal tube a hydrogen gas having a temperature **much greater than 150°C** and a pressure **much greater than 2 bars**.

Amended claim 1 is therefore pointing on performing the reaction between nickel and hydrogen in the domain of very high pressures and very high temperatures. Basis for performing the interaction between hydrogen and nickel at temperatures much greater than 150°C and a pressure much greater than 2 bars could not be found in the description as filed. Description as filed, page 5 lines 1-6 and claims 3 and 4 indicate temperatures between 150° to 500° C and pressures from 2 to 20 bars.

a. Therefore the description as filed discloses that the reaction is to be performed also at pressure and temperatures only slightly higher than 150° C and 2 bars (for example at 151°C and 2.01 bar).

b. The domain of very high temperature and pressures (for example 1000°C, 100 bars) is not disclosed.

It is therefore considered that amended claim 1 filed with the letter dated 09.11.2009 introduces subject-matter which extends beyond the content of the application as filed, contrary to Article 34(2)(b) PCT.

In addition, description as filed refers to exothermal reactions; the term 'hexothermal' is vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the definition of the subject-matter of said claim unclear, Article 6 PCT.

Therefore the International Preliminary Examination has been carried out based on claims 1-15 as filed.

Disclosure

2. The application does not meet the requirements of Article 5 PCT as the description does not disclose in a manner sufficiently clear the invention.

In the description it is claimed that the reaction of hydrogen with nickel is generating energy. However, there is no explicit evidence of energy production in the description or Figures, as would be temperature measurements, radiation emission measurements, or any alternative measurements showing production of energy.

According to PCT Guidelines 5.45 and 5.47, the disclosure of the claimed invention is considered sufficiently clear and complete if it provides information which is sufficient to allow the invention to be carried out by a person skilled in the art without undue experimentation. As factors to be considered in determining whether undue experimentation is needed to carry out the claimed invention, which should be considered for the present invention are: the general knowledge of the invention and the level of predictability in the art.

At present cold fusion, which is the basic explanation given in the description for generating energy is not accepted as mainstream science and technology. Relevant for the present invention is D4, which is reporting an independent experiment between Nickel (as a rod) and hydrogen, where no heat generation could be put into evidence, which would result as a fusion process between Nickel atom and a proton.

As the invention seems, at least at first, to offend against the generally accepted laws of physics and established theories, the disclosure should be detailed enough to prove to a skilled person conversant with mainstream science and technology that the invention is indeed feasible. This implies, inter alia, the provision of all the data which

the skilled person would need to carry out the claimed invention, since such a person, not being able to derive such data from any generally accepted theory, could not be expected to implement the teaching of the invention by trial and error.

In the present case, the invention does not provide experimental evidence (nor any firm theoretical basis) which would enable the skilled person to assess the viability of the invention. The description is essentially based on general statements and speculations which are not apt to provide a clear and exhaustive technical teaching.

Novelty

3. Furthermore, the above-mentioned lack of clarity notwithstanding, the subject-matter of **claims 1, 3-5, 7, 8, 13 and 14** is not new in the sense of Article 33(2) PCT, and therefore the criteria of Article 33(1) PCT are not met.

3.1. Document D1 discloses a method of generating heat using a hydrogen condensate, wherein the hydrogen condensate comprises metal nano - ultrafine particles containing a plurality of metal atoms and a plurality of hydrogen isotope atoms solid - dissolved among the plurality of metal atoms. At least two of the plurality of hydrogen isotope atoms are condensed so that an interatomic nuclear distance between the two hydrogen isotope atoms is smaller than or equal to an internuclear spacing of a molecule consisting of the two hydrogen isotope atoms, the heat generation method comprising applying energy to the hydrogen condensate; and generating heat by causing the at least two hydrogen isotope atoms to react with each other due to the energy (claim 1). As metal atoms, nickel and copper are disclosed (claim 2). The pressure of the process is disclosed to be between 10 and 100 atmospheres (§46). By applying an ultrasonic wave (§64), the temperature of the system is raised to very high values, the outer wall temperature being 250°C (Figure 4, §73). D1 discloses that besides microwave heating, the energy might be generated based on high pressure, discharge, etc (§14). It follows that the subject-matter of claims 1, 3-5, 7, 8, 13 and 14 is not new in the sense of Article 33(2) PCT.

Inventive step

4. The present application does not meet the criteria of Article 33(1) PCT, because the subject - matter of **claims 2, 6, 9-12 and 15** does not involve an inventive step in the sense of Article 33(3) PCT.

4.1. The document D1 is regarded as being the closest prior art to the subject - matter of claim 2. The subject - matter of claim 2 therefore differs from this known D1 in that a catalyst is present. The technical effect is that the presence of the

catalyst enhances the reaction between nickel and hydrogen. The problem to be solved may therefore be regarded as enhancing the reaction between nickel and hydrogen.

The solution proposed in **claim 2** of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) as catalysts in general have the purpose of enhancing chemical reactions and a person skilled in the art would always consider using catalysts in enhancing chemical reactions.

The same reasoning applies, mutatis mutandis, to the subject - matter of the corresponding **claim 6**, which therefore is also considered not inventive.

4.2. Dependent **claims 9-12** and **15** do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step.

The presence of a lead and boron with the function of neutron shielding is known in the art, a neutron shield being disclosed in Figure 2, D3 (relevant for claims 9 and 10 of the application). Water is widely used as cooling agent in various exothermal chemical or nuclear reactions (relevant for claim 11 of the application). Use of a nickel isotope powder instead of nickel powder is merely one of several straightforward possibilities from which the skilled person would select, without the exercise of inventive skill (claim 12 of the application). Existence of various trace elements in little spots or corroded regions of the Ni-H system is disclosed in D2, Figure 9 (relevant for claim 15 of the application).

Re Item VIII

5.1. Claims 1, 5 and 15 do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claims attempt to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

5.2. The term 'isothermal reaction' used in claim 1 is vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers, thereby rendering the definition of the subject-matter of said claims 1-4 unclear, Article 6 PCT. It is unclear how an isothermal reaction is generating energy.

5.3. Attention is drawn to the applicant that according to PCT Guidelines 5.22, 'an apparatus for carrying out an exothermal reaction' is interpreted as any apparatus suitable for carrying out the process, with the corresponding technical features as

disclosed by the claims. Claims 7 and 8 which disclose a variable pressure and temperature relate to a mode of carrying out the process and are not intrinsic technical features of the apparatus.

5.4. The description page 12, lines 17-20, cites that in 'Figure 2 the locations of the two samples are indicated by arrows'. However, Figure 2 does not show these arrows. Therefore, the position of the samples analysed in Figure 3 and 4 is not disclosed.

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CLAIMS

1. A method for carrying out an hexothermal reaction of nickel and hydrogen, **characterized in that**
- 3 said method comprises the steps of providing a metal tube, introducing into said metal tube a nanometric particle nickel powder and injecting into said metal tube a hydrogen gas having a temperature much greater than 150°C and a pressure much greater than 2 bars.
- 10 2. A method according to claim 1, **characterized in that** said hydrogen temperature varies in a range from 150 to 500°C.
3. A method according to claim 1, **characterized in that** said nickel powder is a nickel isotope powder.
- 15 4. A method according to claim 1, **characterized in that** said hydrogen is injected into said tube under a pulsating pressure.
5. A method according to claims 1 and 2, **characterized in that** said hydrogen temperature is a variable temperature which varies in said range from 150 to 500°C.
- 20 6. A method according to claim 1, **characterized in that** said metal tube is a copper metal tube.
7. A modular apparatus for providing a
- 25 hexothermal reaction by carrying out the method according to claim 1, **characterized in that** said apparatus comprises a metal tube (2) including a nanometric particle nickel powder (3) and a high temperature and pressure hydrogen gas.
- 30 8. A method according to claim 1, **characterized in that** in said method catalyze materials are used.
9. An apparatus method according to claim 7, **characterized in that** said nickel powder filled metal

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tube (2) is a copper tube, said copper tube further including at least a heating electrical resistance, said tube being encompassed by a jacket (7) including either water and boron or only boron, said jacket (7) being encompassed by a further lead jacket (8) in turn optionally encompassed by a steel layer (9), said jackets (7, 8) being adapted to prevent radiations emitted from said copper tube (2) from exiting said copper tube (2), thereby also transforming said radiations into thermal energy.

10. An apparatus according to claim 1, characterized in that said apparatus comprises, encompassing said nickel powder, hydrogen and electric resistance (101) containing copper tube (100) a first steel-boron armored construction (102) encompassed by a second lead armored construction (103) for protecting said copper tube (100), a hydrogen bottle connection assembly (106) and a hydrogen bottle (107), said apparatus further comprising, outside of said lead armored construction (103), a cooling water steel outer pipe assembly (105).