

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 H₂/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.