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**D E C I S I O N**  
**of 7 March 2001**

**Case Number:** T 0541/96 - 3.4.1

**Application Number:** 90916086.3

**Publication Number:** 0516622

**IPC:** G21B 1/00

**Language of the proceedings:** EN

**Title of invention:**  
Element and energy production device

**Applicant:**  
ZACHARIAH, Chacko P.

**Opponent:**

-

**Headword:**

-

**Relevant legal provisions:**  
EPC Art. 57, 83

**Keyword:**  
"Industrial application (no)"  
"Sufficiency of disclosure (no)"

**Decisions cited:**

-

**Catchword:**

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Boards of Appeal

Chambres de recours

**Case Number:** T 0541/96 - 3.4.1

**D E C I S I O N**  
**of the Technical Board of Appeal 3.4.1**  
**of 7 March 2001**

**Appellant:** ZACHARIAH, Chacko P.  
6365 Bay Club Drive  
Fort Lauderdale, FL 33308 (US)

**Representative:** Jackson, David Spence  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 3 January 1996  
refusing European patent application  
No. 90 916 086.3 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** G. Davies  
**Members:** M. G. L. Rognoni  
H. K. Wolfrum

## Summary of Facts and Submissions

- I. The appellant (applicant) lodged an appeal, received on 1 March 1996, against the decision of the Examining Division, despatched on 3 January 1996, refusing the application No. 90 916 086.3 (publication No. 0 516 622). The fee for the appeal was paid on 28 February 1996 and the statement setting out the grounds of appeal was received on 8 May 1996.
- II. In the decision under appeal, the Examining Division held that the application did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC).
- III. The appellant requested that decision under appeal be set aside and the application be "allowed to proceed to grant" on the basis of the following documents:

**Claims:** 1 to 10 as filed with a letter dated 17 August 1995;

**Description:** pages 2, 5 and 6 as originally filed, pages 1, 3, 4 and 13 as filed with a letter dated 10 November 1994, pages 7 to 12 as filed with the letter dated 17 August 1995.

**Drawings:** sheet 1/1 as originally filed.

Furthermore, with the statement of the grounds of appeal, the appellant requested an opportunity to attend oral proceedings if "refusal of this appeal, or

of the application", was considered.

IV. In a communication dated 16 November 2000, accompanying a summons to oral proceedings, the Board expressed the preliminary opinion that the present application did not appear to fulfil the requirements of Articles 57 and 83 EPC.

V. With a letter dated 20 February 2001, the representative of the appellant informed the Board of the appellant's decision not to attend, or to be represented at, the oral proceedings.

VI. Oral proceedings were held on 7 March 2001 in the absence of the appellant.

VII. The wording of claim 1 reads as follows:

"1. A system for making unstable elements more stable comprising:

(a) a cathode, the negative electrode, substantially formed of an element selected from the group consisting of heavy elements having an odd nucleon nuclei formed of odd number of neutrons and even number of protons but excluding those with stable nucleon configurations of proton and neutron numbers 8, 10, 14, 20, 28, 40, 50, 82, and 126 as well as all even nucleon and all other odd nucleon nuclei which are unstable; heavy meaning mass numbers greater than 24;

(b) an anode, the positive electrode, substantially formed of an element selected from the group consisting essentially of elements Ag, Au, Pt, Cu,

and compounds of said elements;

- (c) an additive selected from the group consisting of heavy water of deuterium;  $H_2O$ ,  $D_2O$ , and radioactive water  $T_2O$ ; radioactive water;  $D_2$ ,  $D$ ,  $T_2$ ,  $H$ , and other light nuclei; proton beams, neutron beams, and mixtures of proton and neutron beams; provided to said electrodes; and seeding, those of said additives which are not adequately electrically conducting, with electric charge carrying materials; and
- (d) means for a direct current between the said cathode and anode;

whereby light nuclei and nucleons from the said additive are induced to enter the interstitial spacing of the said cathode and fuse, by low temperature fusion, with the said heavy cathode nuclei forming heavier isotopes of the said cathode and higher elements of higher atomic number."

The wording of claim 7 reads as follows:

"7. A method for making unstable elements more stable comprising the steps of:

- (a) forming a cathode, the negative electrode, substantially from an element selected from the group consisting of heavy elements having odd nucleon nuclei formed of odd number of neutrons and even number of protons but excluding those with stable nucleon configurations of proton or neutron numbers 8, 10, 14, 20, 28, 40, 50, 82, and 126 as well as all even nucleon and all other odd

nucleon nuclei which are unstable; heavy meaning mass numbers greater than 24;

- (b) forming an anode, the positive electrode, substantially from an element selected from the group consisting essentially of elements Ag, Au, Pt, Cu, and compounds of said elements;
- (c) exposing said electrodes to an additive selected from the group consisting of heavy water of deuterium;  $H_2O$ ,  $D_2O$ , and radioactive water  $T_2O$ ; radioactive water;  $D_2$ ,  $D$ ,  $T_2$ ,  $H$ , and other light nuclei; proton beams, neutron beams, and mixtures of proton and neutron beams; and seeding, those of said additives which are not adequately electrically conducting, with electric charge carrying materials; and
- (d) applying a direct current between the said cathode and anode;

whereby light nuclei and nucleons from the said additive are induced to enter the interstitial spacing of the said cathode and fuse, by low temperature fusion, with the said heavy cathode nuclei forming heavier isotopes of the said cathode and higher elements of higher atomic number."

Claims 2 to 6 and claims 8 to 10 are dependent on claims 1 and 7, respectively.

VIII. The appellant's submissions may be summarised as follows:

It was well known that, in radioactive decay, an

unstable heavy nucleus (parent) decayed by emitting various light nuclei and their components (nucleons and electrons) and various combinations of them, accompanied by some energy in certain instances, and formed a less heavy nucleus ("daughter"). This process continued until the "daughter nucleus" became a stable nucleus less heavy than the "parent nucleus". The thrust of the present invention was to reverse radioactivity and make unstable nuclei stable and tap energy whenever produced, by adding the usual particles, such as those resulting from radioactivity, to an unstable nucleus in the presence of an electric charge. The particles emitted in regular radioactive decay included neutrons, protons, helium and its constituents, hydrogen isotopes and their constituents. In the present invention, these particles constituted the additives which were captured by the unstable cathode nuclei and, thus, allowed such nuclei to be transformed into heavier and stable nuclei of an atom or isotope. Hence, according to the present invention, the cathode was transformed whereas in fusion reactions the cathode essentially acted as a catalyst. The description as originally filed gave numerous examples of the reaction processes according to the present invention. Furthermore, any additives to be used with any of the unstable nuclei could be easily determined by looking at the initial (starting) unstable nucleus and the more stable reactant end-product nucleus. The arrangement of the electrodes and the additives were shown in detail in some figures. The optimum temperature corresponded to the most efficient process that took place and depended both on the cathode material and on the additive. As confirmed by the affidavit submitted with the grounds of appeal, the application as originally filed showed all the features

of the invention in sufficient detail for a person skilled in the art to easily carry out the claimed process without any undue experimentation. Furthermore, since there was utility in stabilizing nuclear wastes, there should be no doubt as to the industrial applicability of the present invention.

### **Reasons for the Decision**

1. The appeal is admissible.
  
2. The question to be considered in the present appeal is whether the application as originally filed discloses the invention in sufficient detail to enable the skilled person to perform carry it out successfully.
  - 3.1 The gist of the present invention consists essentially in inducing fusion between light nuclei and heavy unstable nuclei at low temperature by means of an electric field.
  
  - 3.2 According to the description (page 2, lines 8 to 11), low temperature fusion takes place "in the lattice structure of the heavier atoms (such as Al, Mg, Pd, etc.) and other face-centered cubic space lattices as well as other compactly packed lattices like compact hexagonal space lattices". Dissociated deuterium (D) and tritium (T) atoms and their ions are forced to enter a lattice of palladium (Pd) atoms under the influence of an electric field, and to fill the spaces in the lattice. As the amplitude of oscillation of the heavy Pd atoms increases, the atoms and their ions are "squeezed" within the lattice. When "optimum conditions and temperatures are achieved", Pd and D nuclei fuse



- together.
4. The appellant has stressed that the present invention is essentially different from cold fusion, because the cathode (e.g. Pd) takes part in the actual fusion process, whereas in cold fusion the cathode simply acts as a catalyst. Furthermore, in the appellant's view, the present invention and the reaction processes referred to in the description are based on confirmed and sound scientific principles. In this respect, the appellant has cited Marie Curie's discovery of natural transmutation and the experiments of Lord Rutherford on artificial transmutation.
  
  5. The Board agrees with the appellant that the nuclear change of one element into another (transmutation) is an acquired scientific fact. In the cited experiments, however, transmutation occurs when high-speed alpha-particles hit the target ions, whereas the present invention relies on "particles at very very slow speeds" located inside a lattice of heavy nuclei, as explained in item 4 of the grounds of appeal. This fundamental difference between the present invention and transmutation occurring in the Rutherford experiments does not allow the skilled person to derive from the latter any teaching which could be of help in carrying out the former, or even in assessing its viability.
  
  - 6.1 According to Article 52(1) EPC a European patent can be granted for an invention which is, *inter alia*, susceptible of industrial application. This concept is related to the obligation on an applicant to give a sufficient description of the invention, as required by Article 83 EPC. An invention or an application for a

patent for an alleged invention which would not comply with the generally accepted laws of physics would be incompatible with the requirements of Articles 57 and 83 because it cannot be used and therefore lacks industrial application. Also the description would be insufficient to the extent that the applicant would not be able to describe how it could be made to work.

6.2 It goes without saying that the EPC does not prevent the patentability of "revolutionary" inventions. However, Article 83 EPC makes the amount of information required for a sufficient disclosure of an invention somewhat dependent on the actual "nature" of the invention. If the latter lies in a well-known technical field and is based on generally accepted theories, the description need not comprise many specific technical details which would anyway be implicit to a skilled person. However, if 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 (i.e. susceptible of industrial application). 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, cannot be expected to implement the teaching of the invention just by trial and error.

7.1 In the present case, the description is essentially based on general statements and speculations which are not apt to provide a clear and exhaustive technical teaching, and which do not appear to be supported by

any experimental evidence:

- (page 2, third paragraph) "When the amplitude of oscillation of the heavy Pd atoms gets higher it squeezes the D, T, etc. atoms and their ions in the interstitial spaces and at the right conditions fusion of Pd and D takes place".
- (page 5, third paragraph) "when the optimum conditions and temperatures are achieved, the amplitude of oscillation of the Pd in the lattice gets virtually equal to half the interstitial space (interatomic distance) in the lattice and if a H isotope gets in the plane of the shortest distance between the two large Pd atoms, the H isotope will fuse with the Pd atom";
- (page 11, second paragraph) "When sufficient D.C. (direct current) Voltage is applied to the anode and the cathode, electrolysis begins and the dissociated D and T atoms, molecules, and ions enter the cathode's interstitial spaces and at the right conditions fusion occurs".

Though the description repeatedly refers to the "right conditions", these are nowhere clearly defined.

7.2 As the appellant has provided neither experimental evidence nor any firm theoretical basis which would enable the skilled person to assess the viability of **nuclear fusion in a lattice at low temperature**, it is irrelevant to consider whether the fusion reactions referred to in the description may be theoretically possible, or whether they might indeed occur under certain conditions.

8. In summary, the appellant has outlined a hypothetical experimental set-up which should, in the appellant's view, allow nuclear fusion "under certain conditions" at low temperature, but has neither defined the critical parameters of such a process in clear technical terms nor provided any evidence that it would be possible to achieve the claimed result under realistic laboratory conditions.
  
9. For the above reasons, the Board finds that the present application does not fulfil the requirements of Articles 57 and 83 EPC, and that the Examining Division was right in refusing the application.

## **Order**

### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

R. Schumacher

G. Davies