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Datasheet for the decision of 29 January 2025

Case Number: T 1261/22 - 3.4.01

Application Number: 15749782.7

Publication Number: 3183735

IPC: G21G1/10, G21F9/00

Language of the proceedings: EN

Title of invention:
EXOTHERMIC TRANSMUTATION METHOD

Applicant:
Ad Maiora LLC
Gapmed Limited

Headword:
Exothermic transmutation method / Ad Maiora

Relevant legal provisions:
EPC Art. 83, 113(1)
EPC R. 103(1)(a)

Keyword:
Sufficiency of disclosure - (no)
Right to be heard - substantial procedural violation (no)
Reimbursement of appeal fee - (no)

Decisions cited:
T 0541/96, T 1329/07, T 1785/06

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Boards of Appeal

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Case Number: T 1261/22 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 29 January 2025

Appellant: (Applicant 1)	Ad Maiora LLC 27741 Crown Valley Parkway Suite 200 Mission Viejo, California 92691 (US)
Appellant: (Applicant 2)	Gapmed Limited Chrysorogiatissis&Kolokotroni Limassol 3040 (CY)
Representative:	Santi, Filippo Barzanò & Zanardo S.p.A. Via Piemonte 26 00187 Roma (IT)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 3 January 2022 refusing European patent application No. 15749782.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	P. Scriven
Members:	T. Zinke
	C. Almberg

Summary of Facts and Submissions

I. The Examining Division refused the application for insufficient disclosure (Article 83 and Rule 42(1)(e) EPC).

II. The applicants appealed that decision.

III. With the statement of grounds, the appellants submitted documents D8 (Curriculum Vitae of Giuseppe de Bellis), D9 (Affidavit by Giuseppe de Bellis), D10 (Test Specification and Procedure document, Test No. DBR-002N5918-TSP-01-R2), and D11 (Presentation entitled: "LENR Test B, Vallecitos December 2015), the latter of which allegedly *confirms the Experiment of the application* (statement of grounds, page 4, third paragraph).

IV. With the statement of grounds, the appellants also requested reimbursement of the appeal fee, because of an alleged violation of their right to be heard (see statement of grounds, page 5, penultimate paragraph).

V. The Board sent a summons to oral proceedings, together with a preliminary opinion, and provided a copy of document D7 (Cerron-Zebellos et al.: "Investigation of anomalous heat production in Ni-H systems", Nuovo Cimento, vol. 109A, No.12, December 1996, pages 1645-1654), already cited in the decision under appeal

(page 4, last paragraph).

VI. In response to the summons, the appellants submitted a document D12 (in Italian, entitled: "Alcuni elementi informativi", together with a machine translation into English, English title: "Some informative elements") authored by the inventor, Giuseppe de Bellis, *to propose some clarifications concerning the use of nichel [sic] catalyst* (see submission dated 18 November 2024).

VII. During oral proceedings, the appellants confirmed that their final requests were that the Examining Division's decision to refuse the application be set aside and a patent granted on the basis of the set of claims for a main request or one of auxiliary requests 1 to 5, all filed with a letter dated 15 October 2021 and subject of the appealed decision.

VIII. Claims 1 and 2 of the main request read

> *1. An exothermic transmutation method for at least partially deactivating radioactive material, the method comprising the steps of:*
> *- Arranging a dusty driver compound comprising at least a transition metal in a chamber (7) of a reactor (1) outside a closed container, the transition metal being composed of an element of the group: Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Zn, Y, Zr, Nb, Mo, Tc, Ru, Rh, Ag, Cd, Hf, Ta, W, Re, Os, Ir,*

Pt, Au, lanthanides and actinides, or a combination thereof;
- Arranging the radioactive material in said chamber (7), the radioactive material being and staying encapsulated in said closed container;
- Providing hydrogen in contact with the dusty driver compound and with the radioactive material at a pressure higher than the ambient pressure;
- Generating an electric field in the chamber (7), the electric field being applied to the dusty driver compound and the radioactive material, the electric field being between 20 and 30000 volts/m;
- Energizing the dusty driver compound by heating, the pressure in said chamber (7) being greater than 5 x 10^5 Pa, said chamber (7) containing at least 99% H_2, hydrogen being provided before heating and staying in the chamber (7) during the subsequent steps, the initial temperature being between 80 and 200°C, then generating a transmutation of said at least one transition metal into another transition metal and proton emission towards the radioactive material, said radioactive material being at least partially deactivated,
- Removing thermal energy from the reactor (1).

2. An exothermic transmutation method for at least partially deactivating radioactive material, the method comprising the steps of:

- Arranging a dusty driver compound comprising at least a transition metal in a chamber (7) of a reactor (1), the transition metal being composed of an element of the group: Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Zn, Y, Zr, Nb, Mo, Tc, Ru, Rh, Ag, Cd, Hf, Ta, W, Re, Os, Ir, Pt, Au, lanthanides and actinides, or a combination thereof;
- Arranging the radioactive material in said chamber (7), the radioactive material being close to or mixed with the dusty driver compound;
- Providing hydrogen in contact with the dusty driver compound and with the radioactive material at a pressure higher than the ambient pressure;
- Generating an electric field in the chamber (7), the electric field being applied to the dusty driver compound and the radioactive material, the electric field being between 20 and 30000 volts/m;
- Energizing the dusty driver compound by ultrasonic waves, the ultrasonic waves having a frequency between 250 an 600 kHz and an energy flux being not less than 1.3 Wm^{-2}, the pressure in said chamber (7) being greater than 5 x 10^5 Pa, said chamber (7) containing at least 99% H_2, hydrogen staying in the chamber (7) during the subsequent steps, then generating a transmutation of said at least one transition metal into another transition metal and proton emission towards the radioactive material, said radioactive material being at least partially deactivated,

- Removing thermal energy from the reactor (1).

IX. The methods in claims 1 and 2 differ by the location of the radioactive material (claim 1: in a closed container and thus separate from the dusty driver compound; claim 2: close to or mixed with the dusty driver compound) and by the way of energizing the dusty driver compound (claim 1: by heating, claim 2: by ultrasonic waves).

X. In auxiliary request 1, claims 1 and 2 differ from those of the main request by introducing a further step, between the step of arranging the radioactive material and the step of providing hydrogen (emphasis by the Board):

...
- Arranging the radioactive material ...

- A step of removing air from the chamber (7);

- Providing hydrogen ...

XI. In auxiliary request 2, claims 1 and 2 differ from those of the main request by defining that the

... radioactive material is a powder having at least 99%, preferably 99.9%, particles of an average size not greater than 10 µm, preferably 5 µm; ...

XII. In auxiliary request 3, claims 1 and 2 differ from those of the main request by further defining:

1. ... the dusty driver compound comprising 50% to 95% Ni and 5% to 50% Fe in weight, Ni atoms being transmuted into Cu; ...

2. ... the dusty driver compound comprising Ni and Fe, preferably 50% to 95% Ni and 5% to 50% Fe in weight, Ni atoms being transmuted into Cu; ...

XIII. In auxiliary request 4, claims 1 and 2 differ from those of auxiliary request 3 by further defining:

... the Ni of the dusty driver compound having at least 99%, preferably 99.9%, particles of an average size not greater than 10 µm, and the Fe of the dusty driver compound has at least 99%, preferably 99.9%, particles of an average size not greater than 10 µm; ...

XIV. Auxiliary request 5 differs from the main request in that claim 1 has been removed, so that claim 2 is the sole independent claim.

Reasons for the Decision

Article 83 EPC

1. The decision under appeal relies on three objections under Article 83 EPC to claim 1 of all requests then on file (which are identical to the requests in appeal) because there was a lack of evidence for three features common to them all, i.e.

   (a) Exothermic Transmutation (decision, reasons, section 10)

   (b) Proton emission (decision, reasons, section 11)

   (c) Deactivation of radioactive material (decision, reasons, sections 12 and 13)

2. In technical fields that are controversial, as is "cold fusion" or "low energy nuclear reaction (LENR)" in the present case, at least one concrete and detailed example should be disclosed, that enables the skilled person to repeat the results. The Board confirms the Examining Division's view on that point (see decision, reasons, section 13, citing T 0541/96).

3. In particular, decision T 0541/96 says, at 6.2:

   > *... 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.*

which is cited with approval in T 1329/07, at 2.2.3.

4. While T 0541/96 deals with the closely-linked requirements for industrial application (Article 57 EPC) and for sufficiency of disclosure (Article 83 EPC), the viewpoint expressed in the cited passage holds for the latter requirement in its own right, as confirmed in T 1329/07 and T 1785/06 (at 3.4.3).

5. As affirmed in T 1785/06 (section 3.4.3), it is not excluded that new scientific discoveries can overthrow established knowledge and theories and can lead to new inventions. But the more a new invention offends against established technical knowledge, the higher are the requirements on the amount of technical information and explanation in a patent application in order to put the skilled person, who only has the common general knowledge at his disposal, in a position to carry out the invention.

6. With the statement of grounds and during oral proceedings, the appellants provided three lines of counter-argument:

(i) The three features in question were only hypotheses as to how the invention worked.

However, it was not necessary correctly to explain how or why an invention worked. Rather, it was sufficient to provide the skilled person with all the information needed to carry it out. In the present case, the skilled person was provided with the specification of the materials, and with the necessary steps (i.e. arranging specific materials in a reactor, providing hydrogen, generating an electric field, energizing the dusty driver compound, removing thermal energy) that should be used to carry out the invention.

(ii) The appellant submitted documents D8 to D11 (with the statement of grounds) and D12 (in response to the summons) to provide further evidence that the three features did actually occur, when the other steps (see above argumentation (a)) were carried out.

(iii) In the statement of grounds (section 4), the appellants cited patents D1a (EP-B-2 368 252, which is a European patent based on the PCT-application D1 (WO-A-2010/058288), D3 (US-A-5 076 971) and D4a (EP-B-2 805 330, which a European patent based on the PCT-application D4 (WO-A-2013/108159), and argued that the technology in them was similar to that in the application and that the fact that those patents were granted was evidence that the invention did not contradict accepted science and technology. D1, D3, and D4 were cited in the International Search Report.

Scientific hypotheses in patent applications

7. With regard to the line of argumentation (i) above, the Board agrees that patent applications, in disclosing the invention such that a skilled person is enabled to carry it out (Article 83 EPC), do not necessarily have to provide a correct scientific explanation of why a claimed method or device works. It is sufficient that following the specified steps allows the skilled person to obtain the results and possible advantages that the application describes.

8. However, in all independent claims on file, the features in question are not only scientific hypotheses; they are steps in the claimed methods. They all define in the energizing step:

> *... then generating a transmutation of said at least one transition metal into another transition metal and proton emission towards the radioactive material, said radioactive material being at least partially deactivated, ...*

9. The claims even set out to define "an exothermic transmutation method". Hence, in order to carry out the invention, the skilled person not only needs to carry out the steps of providing the materials and of handling them in the reactor, but also the three features to which the objections are directed.

Evidence for the features in question

10. With regard to the line of argumentation (ii) above, with the statement of grounds, the appellants submitted D8 to D11.

11. In its preliminary opinion, the Board questioned how documents D8 to D11 related to the application and, in particular, to experiments 1 to 4 discussed in it. Only Raney Nickel as driver material and a mixture of Cobalt-59 (non-radioactive) and Cobalt-60 (radioactive) as radioactive waste were discussed (D9, section 1), second paragraph). Experiments 1 to 4, however, had different starting materials:

Experiment 1:
driver material: a mixture of Nickel and Iron
radioactive waste: Cobalt-60
(A1-publication, page 18, last paragraph under the sub-title *Experiment 1*)

Experiment 2:
driver material: a mixture of Nickel, Iron, and Copper;
radioactive waste: fission waste, hydrate uranyl acetate
(A1-publication, page 20, lines 1-4)

Experiment 3:
driver material and radioactive waste not specified, the mixture investigated includes Nickel, uranyl acetate, and Copper
(A1-publication, page 22, under sub-title: Experiment 3)

Experiment 4:
driver material: Nickel, Iron, Cobalt, Copper
radioactive waste: $UO_2(CH_3COO)_2$ (uranyl acetate)
(A1-publication, page 24, first paragraph)

12. Hence, documents D8 to D11 do not help in establishing that the data provided in the application enables a person skilled in the art to carry out the invention.

13. During oral proceedings, the appellants explained that, for the experiments described in documents D8 to D11, different security restrictions had been imposed by the authorities, in order to ensure that no radioactive accident occurred. It was supposed that, with Raney Nickel, which has a spongy structure, the expected effect would be even faster than with the driver materials disclosed in the application. This would result in less time for the experiment and, hence, less possible exposure to any radioactive emissions.

14. The Board accepts that, for experiments with radioactive material, severe security restrictions apply. But this does not mean that a different starting material can be accepted as evidence for a technical effect that is considered doubtful.

15. In Document D12 the inventor, Professor Giuseppe de Bellis, explains his understanding concerning the similarities between Nickel and Raney Nickel. In particular, he states (machine translation into English, page 2, first three paragraphs):

Both nickel (in the form of fine powders) and Raney nickel (always in powder form) are used as catalysts in hydrogenation and desulfurization processes (food, petroleum

products, pharmaceuticals, ...): the "spongy" (self-compartmentalized) structure of Raney nickel makes it more effective for its greater capacity (ease) than metallic nickel to interact with hydrogen.

Experiments conducted in Italy involved metallic nickel rather than Raney nickel.

As comparable experiments that may have been conducted in recent years have not been made public (all the more so, the compositions of the "mixtures" used remain unknown), it is impossible to derive from literature or technical sources comparative tools between the different compositions. The only possible comparative methodology (by induction) appears to be using as a comparative element the effects of metallic nickel and Raney nickel as catalysts in hydrogenation and electrocatalysis processes.

The document, then, goes on to compare Raney Nickel and Nickel in chemical processes.

16. There is, however (as mentioned in the third paragraph of the cited passage, above), no evidence in D12 that a transmutation of Raney Nickel, if any, was comparable to a transmutation of (any form of) Nickel or any other transition metal defined in the independent claims. Hence, document D12 does not help in providing evidence for feature (a) above.

17. During oral proceedings, the appellants also referred to experiment 1 in the application (page 18, under the

subtitle: Experiment 1), where a transmutation of one transition metal (Co) into another (Ni) was apparently observed. However, in experiment 1 these transition metals are supposed to be the radioactive material before and after the treatment. Even if a transmutation occurred for the radioactive material, this is not evidence for a transmutation of the driver material, which is defined in objected feature (a).

18. With regard to feature (b), during oral proceedings, the appellants only stated that it was still unclear, where the proton emission might occur, i.e. whether it was a result of the transmutation of one transition metal into another, or whether it came from the hydrogen that was involved.

19. Further in regard to feature (b), the position of the Examining Division (decision, reasons, sections 10 and 11) that there was no evidence of spectral or chemical analysis of the driver material before and after the treatment, that no X-ray, gamma-ray, photon or proton detection was made during the experiments, is still valid. The appellants were not able to provide any further details.

20. Hence, at least features (a) and (b) are not sufficiently disclosed (Article 83 EPC).

21. With regard to feature (c), the deactivation of the radioactive material, the appellants' argumentation is accepted that measurements were provided in the application that supported such a deactivation. However, a person skilled in the art would not expect such a deactivation. The skilled person's doubts about these results could possibly be overcome by providing additional measurements (for instance, the chemical or

SEM EDAX measurements, or time-dependent measurements cited by the Examining Division in section 12, page 6, first full paragraph, for instance), but these are not available.

Granted patents as accepted science and technology

22. The line of argumentation (iii) above is not persuasive.

23. The grant of a patent is not necessarily to be considered as evidence for accepted science and technology. Whereas it is accepted practise (and codified in Article 83 EPC, for instance) that a patent should only be granted if it discloses the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, patent offices are generally not equipped with experimental apparatus in order to verify whether inventions work or not. It should also be noted that patents can be revoked for lack of sufficient disclosure (Article 101(2) EPC in combination with Article 100(b) EPC).

24. In addition, the cited patents do not provide evidence that the application is in the field of accepted technology.

24.1 Patent D1a was revoked by Opposition Division and the subsequent appeal was withdrawn (T 134/16), after the Board had announced its opinion that claim 1 of the patent was not sufficiently disclosed.

24.2 Patent D3 deals with alpha-decay that is enhanced by an electric field. The application does not mention alpha-decay.

24.3 Patent D4a deals with ultra low momentum neutrons. These are not mentioned in the application.

Procedural violation - Reimbursement of the appeal fee

25. The appellants asserted that the Examining Division violated their right to be heard (Article 113(1) EPC) in two respects:

(a) The document "Cerron-Zeballos" (D7) was introduced by the Examining Division only in the written decision, without giving the appellants an opportunity to comment on it, in either written or oral proceedings (cf. statement of grounds, section 1), first paragraph).

(b) The decision merely mentioned that the objections under Article 84 EPC, raised during the written procedure, remained. It did not contain the least refutation of the full answers to those objections given in the written submission of 15 October 2021 (cf. statement of grounds, penultimate paragraphs on page 4 and 5).

26. The reference to document D7, for the first time in the grounds of the written decision, amounts to a procedural violation. However, it is not a substantial procedural violation. According to the Boards' jurisprudence (cf. Case Law of the Boards of Appeal, 10th edition, V.A.11.6) a "substantial procedural violation" is an objective deficiency affecting the entire proceedings. Here, the deficiency is only relevant with regard to one out of three objections raised by the Examining Division under Article 83 EPC against claim 1 of all requests then on file (namely

the "exothermic transmutation", see decision, reasons, section 10), whereas the other two ("proton emission" (section 11) and "deactivation of radioactive material" (section 12)) were not based on document D7. Hence, even if the issue with regard to transmutation had been overcome, the other two would still have been remained, leading also to a refusal of the application.

27. With regard to the objections under Article 84 EPC, mentioned in the decision under section 15, these objections do not form part of the basis for the decision of refusal. As is evident from section 14 of the decision, the refusal was based on Article 83 EPC objections. The remark in section 15 is not part of the reasons for refusal. This is apparent from the fact that the refusal is given earlier in the decision, in section 14.

28. Therefore, and since the appeal is not allowable (see above), the appeal fee is not reimbursed (Rule 103(1)(a) EPC *e contrario*).

29. The argumentation above with regard to a possible procedural violation was provided in the preliminary opinion. During the following written proceedings and at oral proceedings, the appellants had opportunities to comment on it, but did not provide any counter-argument. No reason for deviating from the preliminary opinion is apparent to the Board.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

D. Meyfarth P. Scriven

Decision electronically authenticated