Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 11 February 2015

Case Number: T 0553/10 - 3.3.05

Application Number: 06834277.3

Publication Number: 1975129

IPC: C01G53/00, H01M4/02, H01M4/48, H01M4/58, H01M10/40

Language of the proceedings: EN

Title of invention:
LITHIUM NICKEL MANGANESE COBALT COMPOSITE OXIDE AND LITHIUM RECHARGEABLE BATTERY

Applicant:
JX Nippon Mining & Metals Corporation

Headword:
Composite oxide/Nippon Mining

Relevant legal provisions:
EPC Art. 83
RPBA Art. 13(1), 13(3)

Keyword:
Sufficiency of disclosure - main request (no)
Late-filed auxiliary requests - admitted (no)

Decisions cited:
T 0435/91, T 0409/91, T 0575/05, T 0817/11, T 1634/09

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 0553/10 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 11 February 2015

Appellant: (Applicant)	JX Nippon Mining & Metals Corporation 6-3, Otemachi 2-chome Chiyoda-ku Tokyo 100-8164 (JP)
Representative:	Hoarton, Lloyd Douglas Charles Forresters Skygarden Erika-Mann-Strasse 11 80636 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 2 November 2009 refusing European patent application No. 06834277.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	G. Raths
Members:	A. Haderlein
	C. Vallet

Summary of Facts and Submissions

I. The appellant (applicant) lodged an appeal against the decision of the examining division to refuse application No. 06 834 277.

The examining division held that the application did not meet the requirements of clarity (Article 84 EPC) and of novelty (Article 52(1) in conjunction with Article 54(1),(2) EPC) having regard to the following document:

D1: JP 2005 285572 A.

Under the section titled "Further remarks", the examining division raised doubts as to whether the requirement of sufficiency of disclosure was met.

II. The statement of grounds of appeal was accompanied by the following document:

D2: Declaration by Mr. Nagase Ryuichi.

III. In a communication pursuant to Rule 100(2) EPC, the board informed the appellant that, according to its preliminary opinion, the requirement of sufficiency of disclosure was not met.

IV. The appellant replied to the board's communication, but did not file an amended request.

V. The appellant was summoned to oral proceedings.

VI. In preparation for the oral proceedings, the appellant filed four auxiliary requests.

VII. The appellant informed the board that it would not be represented at the oral proceedings.

VIII. On 11 February 2015, oral proceedings were held in the absence of the appellant. At the end of the oral proceedings the board's decision was announced.

IX. The relevant claims of the main and auxiliary requests read as follows (amendments with respect to the main request underlined).

Claim 1 of the main request

"1. Lithium nickel manganese cobalt composite oxide having a composition of $LiaNixMnyCozO_2$ (x + y + z = 1, 1.05 < a < 1.3), wherein, in the data obtained by measuring a Raman spectrum of the composite oxide, the peak intensity of an Eg oscillation mode of a hexagonal crystal structure located at 480 to 495cm^{-1} and the peak intensity of an F2g oscillation mode of a spinel structure located at 500 to 530 cm^{-1} in relation to the peak intensity of an A1g oscillation mode of a hexagonal crystal structure in which the main peak is located at 590 to 610cm^{-1} are respectively 15% or higher and 40% or lower than the peak intensity of the A1g oscillation mode of a hexagonal crystal structure as the main peak."

Claims 1 and 3 of auxiliary request 1

"1. Lithium nickel manganese cobalt composite oxide having a composition of $LiaNixMnyCozO_2$ (x + y + z = 1, 1.05 < a < 1.3), wherein, in the data obtained by measuring a Raman spectrum of the composite oxide, the peak intensity of an Eg oscillation mode of a hexagonal crystal structure located at 480 to 495cm^{-1} and the peak

intensity of an F2g oscillation mode of a spinel structure located at 500 to 530 cm^{-1} in relation to the peak intensity of an A1g oscillation mode of a hexagonal crystal structure in which the main peak is located at 590 to 610cm^{-1} are respectively 15% or higher and 40% or lower than the peak intensity of the A1g oscillation mode of a hexagonal crystal structure as the main peak.

3. A method of identifying lithium nickel manganese cobalt composite oxides having a composition of $LiaNixMnyCozO_2$ (x + y + z = 1, 1.05 < a < 1.3), wherein the method comprises,
in the data obtained by measuring a Raman spectrum of the composite oxide,
identifying lithium nickel manganese cobalt composite oxides in which the peak intensity of an Eg oscillation mode of a hexagonal crystal structure located at 480 to 495cm^{-1} and the peak intensity of an F2g oscillation mode of a spinel structure located at 500 to 530 cm^{-1} in relation to the peak intensity of an A1g oscillation mode of a hexagonal crystal structure in which the main peak is located at 590 to 610cm^{-1} are respectively 15% or higher and 40% or lower than the peak intensity of the A1g oscillation mode of a hexagonal crystal structure as the main peak."

Claim 1 of auxiliary requests 2 and 3

"1. A method of identifying lithium nickel manganese cobalt composite oxides having a composition of $LiaNixMnyCozO_2$ (x + y + z = 1, 1.05 < a < 1.3), wherein the method comprises,
in the data obtained by measuring a Raman spectrum of the composite oxide,
identifying lithium nickel manganese cobalt composite

oxides in which the peak intensity of an Eg oscillation mode of a hexagonal crystal structure located at 480 to 495cm^{-1} and the peak intensity of an F2g oscillation mode of a spinel structure located at 500 to 530 cm^{-1} in relation to the peak intensity of an A1g oscillation mode of a hexagonal crystal structure in which the main peak is located at 590 to 610cm^{-1} are respectively 15% or higher and 40% or lower than the peak intensity of the A1g oscillation mode of a hexagonal crystal structure as the main peak."

X. Claim 1 of auxiliary request 4

"1. A use of lithium nickel manganese cobalt composite oxides having a composition of $Li_aNi_xMn_yCo_zO_2$ (x + y + z = 1, 1.05 < a < 1.3), wherein,
in the data obtained by measuring a Raman spectrum of the composite oxide,
the peak intensity of an Eg oscillation mode of a hexagonal crystal structure located at 480 to 495cm^{-1} and the peak intensity of an F2g oscillation mode of a spinel structure located at 500 to 530 cm^{-1} in relation to the peak intensity of an A1g oscillation mode of a hexagonal crystal structure in which the main peak is located at 590 to 610cm^{-1} are respectively 15% or higher and 40% or lower than the peak intensity of the A1g oscillation mode of a hexagonal crystal structure as the main peak,
wherein the composite oxide is used as a positive electrode material in lithium rechargeable batteries, producing superior rate characteristics."

XI. The appellant's arguments may be summarised as follows:

Main request

With respect to the requirement of sufficiency of disclosure, the question that needed to be answered was whether the skilled person could prepare lithium nickel manganese cobalt composite oxides falling within the present claims. Methods of preparing oxides falling within the claims of the main request were set out at least at page 5, line 9, to page 6, line 33. The methods for preparing the oxides of the comparative examples were described at page 10, lines 2 to 7. Based on X-ray diffraction alone, the layered structures of the crystal structure in both the examples and the comparative examples appeared to be equivalent. But according to the invention, it was possible to differentiate a structure that improved the battery characteristics, and a structure that did not. This could be done on the basis of the intensity ratio of the Raman spectrum. The application therefore disclosed an extra step which ascertained whether or not an oxide produced fell within the claims. The general manufacturing method for manufacturing a precursor and the range required for obtaining a layered structure were indicated in the application as filed, and it was shown that within these ranges the formation of oxides having the claimed Raman spectrum was possible. In any event, the skilled person would be able to determine whether an oxide would fall within the ambit of claim 1 or not.

Auxiliary requests

These requests were filed to address the objection under Article 83 EPC, which was to be considered to be

a fresh objection.

Claim 3 of auxiliary request 1 as well as claim 1 of auxiliary requests 2 and 3 were based on originally filed claim 1. Claim 1 of auxiliary request 4 was based on claim 1 as originally filed as well as on page 5, lines 32 to 34, and page 15, lines 32 and 33, as originally filed.

Claim 3 of auxiliary request 1 as well as claim 1 of auxiliary requests 2 and 3 recited a method of obtaining the composite oxides having the claimed properties. The claimed act of taking a Raman spectrum identified the oxides with improved battery characteristics and distinguished them from oxides which did not have those improved battery characteristics.

Claim 1 of auxiliary request 4 specified the use of the manufactured and identified composite oxides in rechargeable lithium batteries, with battery characteristics superior to previously disclosed lithium rechargeable batteries.

XII. The appellant requested that the impugned decision be set aside and that a patent be granted on the basis of the main request, i.e. the claims as originally filed, or, in the alternative, on the basis of any one of the first to fourth auxiliary requests filed under cover of its letter dated 9 January 2015.

Reasons for the Decision

1. Main request - sufficiency of disclosure

1.1 Statutory law and jurisprudence of the boards of appeal

A European patent application must 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).

According to the established jurisprudence of the boards of appeal, the requirement of sufficiency of disclosure is met only if the invention as defined in the independent claim can be performed by the person skilled in the art within the whole area claimed without the burden of an undue amount of experimentation, taking into consideration the whole information content of the patent in suit and common general knowledge (see also T 435/91, OJ 1995, 188, Reasons 2.2.1, third paragraph; T 409/91, OJ 1994, 653, Reasons 2, first paragraph, penultimate sentence). The requirement of sufficiency of disclosure is not met in particular if the patent lacks guidance and this lack of guidance cannot be overcome by drawing on common general knowledge (cf. also T 575/05, Reasons 1, fourth and fifth paragraphs; T 817/11, Reasons 2.3 to 2.6).

1.2 The present case

1.2.1 Disclosure of the application as filed

According to the description, the lithium nickel manganese cobalt composite oxides of the invention are

obtained by the same process as the composite oxides of the comparative examples, i.e. those which are not according to the invention (cf. page 10, line 2: "By the same method as Example 1"; lines 8, 14 and 20: "as with Example 1"). The structure of the oxides of the comparative examples is a layered structure of $Li_{1.1}Ni_{1/3}Mn_{1/3}Co_{1/3}O_2$ (see page 10, line 6) as is the structure of the oxides according to the examples of the invention (see page 6, line 23). The oxides according to the invention thus differ from those of the comparative examples only in their Raman spectra (see Table 1 on page 7).

1.2.2 Missing process step

The application as filed fails to disclose a process step that would be needed to allow the skilled person to prepare oxides having the properties as required by claim 1.

a) The taking of Raman spectra as additional step

According to the appellant, methods of preparing oxides falling within the claims of the main request were set out at page 5, line 9, to page 6, line 33. The methods for preparing the oxides of the comparative examples were described at page 10, lines 2 to 7. According to the invention, in comparison with the comparative examples, there was a further step, namely taking the Raman spectrum of the lithium nickel manganese cobalt oxides produced.

The board is not convinced by these arguments. The passage on page 5, line 9, to page 6, line 33 (examples according to the invention), refers to the process known from D1 (see in particular page 5, lines 9 to 13)

and the passage on page 10, lines 2 to 7 (comparative examples), also refers to this process (cf. page 10, line 2: "By the same method as Example 1..."). These passages are however not sufficient to teach the skilled person how to obtain the claimed oxides. In fact, both passages disclose a method for producing lithium nickel manganese cobalt oxides which fall either within the ambit of claim 1 or outside of it. An additional process step required when seeking to prepare oxides falling within the ambit of claim 1 is missing, however.

It is true that the application discloses as an additional step the taking of Raman spectra of the oxides obtained. This, however, does not amount to a process step which would be required to prepare the oxides in question but rather only serves the purpose of determining their presence.

b) Additional step of varying the calcinating conditions

The board observes that the oxides according to the examples are obtained by "oxidation treatment in the atmosphere at 800 to 1100^{o}C for 1 to 10 hours in order to prepare various types of active materials" (page 6, lines 20 to 22), whereas the comparative examples are said to be obtained "by changing the calcinating conditions to prepare various types of positive electrode active materials" (page 10, lines 4 and 5).

Even with this information at hand, the skilled person would not know which calcinating conditions would lead to the composite oxides of claim 1.

1.2.3 Product characterisation insufficient to compensate for a missing process step

Even if it were conceded that, as submitted by the appellant, the disclosure of the application as filed enabled the skilled person to determine whether or not an oxide fell within the ambit of claim 1, the skilled person would still be at a loss when wishing to actually prepare an oxide falling within the ambit of claim 1, i.e. to reproduce the oxides according to the examples and not according to the comparative examples.

1.2.4 No evidence showing that claimed oxides were produced in D1

For the sake of completeness, the board also notes that there is no evidence on file that would show that the process according to D1 would reliably produce a certain fraction of oxides covered by claim 1 along with a fraction of oxides not covered by claim 1.

1.2.5 Common general knowledge

There is no evidence on file that would show that this lack of guidance, i.e. the missing process step for obtaining the claimed oxides, could be overcome by drawing on common general knowledge. Nor has the appellant provided arguments in this respect.

As to declaration D2, which was filed in support of the novelty of the subject-matter of claim 1 as originally filed, it contains the following statement (point 3, last sentence): "I confirm that, from my background knowledge, and from the information given in the specification of [the patent application as filed], it would be possible for a skilled person to control the

general process of D1 used to create a composite oxide to arrive, consistently and reliably and without undue trial and error, at composite oxides having the properties listed above".

This statement, however, amounts to a mere allegation not supported by facts and/or evidence. Furthermore, the author of the declaration appears to be an employee of the appellant and, therefore, the declaration is of little probative value for establishing what was common general knowledge in the art.

1.3 Conclusion

Thus, the application lacks guidance, and this cannot be overcome by drawing on common general knowledge.

It follows from the above that the requirement of sufficiency of disclosure set forth in Article 83 EPC is not complied with.

2. Auxiliary requests - admissibility

2.1 The auxiliary requests were filed after expiration of the time limit set in the communication pursuant to Rule 100(2) EPC and after the oral proceedings had been scheduled. Hence, it was within the board's discretion to admit these requests.

2.2 The board's discretion is to be exercised *inter alia* in view of the complexity of the new subject-matter, the state of the proceedings and the need for procedural economy. According to an approach frequently adopted by the boards (see for instance T 1634/09, Reasons 3.2), a request filed at a very late stage in the proceedings may be admitted and considered at the board's

discretion (i) if sound reasons exist for filing it so far into the proceedings, (ii) if the auxiliary request does not extend the scope of discussion, and (iii) if the auxiliary request is clearly or obviously allowable.

2.2.1 As to (i) (lateness), according to the appellant, the auxiliary requests were filed "in order to address the fresh (sic) objection under Article 83 EPC".

While it is true that the objection of lack of sufficiency of disclosure had been raised by the examining division only by way of an obiter dictum in the decision under appeal, the appellant had been informed of the lack of sufficiency objection by the board in the communication under Rule 100(2) EPC. The appellant refrained from filing new (auxiliary) requests when replying to this communication. The board thus concludes that there were no sound reasons for filing these requests so late.

2.2.2 As to (ii) (scope of discussion), the board observes the following.

The main request contains a single independent claim and a single dependent claim directed to a lithium nickel manganese cobalt composite oxide and a lithium rechargeable battery respectively. The main request thus contains neither a method claim nor a use claim, whereas the auxiliary requests comprise a method and/or a use claim.

In terms of sufficiency of disclosure, the discussion would thus have been extended from the product, i.e. the lithium composite oxide, to the use thereof and to

the method for identifying it.

2.2.3 As to (iii) (allowability), the board had, at least on a *prima facie* basis, serious doubts as to the allowability of the auxiliary requests.

Firstly, the sole basis given by the appellant for the method claim (auxiliary requests 1 to 3) was claim 1 as originally filed. Clearly, this claim is directed to the oxide itself and not to a method for identifying it. In the description as originally filed there does not appear to be any basis for a claim directed to a method for identifying the oxide without including steps for its preparation (see page 5, lines 9 *et seqq.*).

Secondly, the passages relied upon by the appellant as a basis for the use claim (see in particular claim 1 of auxiliary request 4) appear to disclose that the oxide particles must undergo "appropriate size control" such as pulverisation and classification in order to be used as a cathode material (see the paragraph bridging pages 5 and 6). These passages therefore fail to serve as a basis for a use claim not limited to the use of the oxide particles having a controlled size.

Thirdly, it was also not apparent that the proposed amendments would be able to overcome the sufficiency objection. In particular, for the board it appeared inevitable to conclude that insufficiency of a product would result also in insufficiency of the use thereof.

2.3 The board therefore found that none of the conditions (i) to (iii) mentioned *supra* at 2.2 were fulfilled.

2.4 For the above reasons, the board did not admit the auxiliary requests into the proceedings.

Order

For these reasons it is decided that:

The appeal is dismissed

The Registrar: The Chairman:

C. Rodríguez Rodríguez G. Raths

Decision electronically authenticated