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**Datasheet for the decision
of 22 July 2024**

Case Number: T 0034/23 - 3.3.05

Application Number: 17160902.7

Publication Number: 3279978

IPC: H01M4/36, H01M4/525,
H01M10/0525, H01M4/02

Language of the proceedings: EN

Title of invention:

LITHIUM COMPLEX OXIDE FOR LITHIUM SECONDARY BATTERY POSITIVE
ACTIVE MATERIAL AND METHOD OF PREPARING THE SAME

Patent Proprietor:

ECOPRO BM CO., LTD.

Opponent:

JOHNSON MATTHEY PUBLIC LIMITED COMPANY

Headword:

LITHIUM COMPLEX OXIDE / ECOPRO

Relevant legal provisions:

EPC Art. 100(b), 111(1)

Keyword:

Grounds for opposition - insufficiency of disclosure (no)
Appeal decision - remittal to the department of first instance
(yes)

Decisions cited:

T 1076/21, T 1487/18, T 1596/16, T 0063/06

Catchword:



Beschwerdekammern

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Case Number: T 0034/23 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 22 July 2024

Appellant: ECOPRO BM CO., LTD.
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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 22 November
2022 revoking European patent No. 3279978
pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman E. Bendl
Members: J. Roider
P. Guntz

Summary of Facts and Submissions

I. The appeal lodged by the patent proprietor (appellant) lies from the opposition division's decision to revoke the patent EP 3 279 978 B1 because it was not sufficiently disclosed.

II. Reference is made to the following document, which is referred to in the decision under appeal:

D12 Experimental Report 2 filed by the patent proprietor on 12 August 2022

III. Claims 1 and 14 of the main request (patent as granted) read as follows:

F1.1 *"1. A lithium complex oxide secondary particle formed by coagulation of a plurality of primary particles, wherein:*

F1.2 *a primary particle locating on a surface part of the secondary particle comprises a Co-coated layer at a part that is in contact with a surface of the secondary particle;*

F1.3 *Co ions have a concentration gradient toward a center part of the primary particle from the Co-coated layer in the primary particle locating on the surface part of the secondary particle;*

F1.4 *the lithium complex oxide secondary particle is configured to satisfy the following Relation 1,*

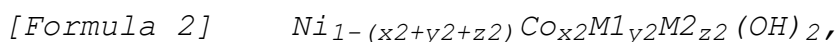
$$[\text{Relation 1}] \quad d_1 > d_2,$$

where the d_1 is an interplanar distance of a crystalline structure in a primary particle,

among the plurality of primary particles, locating in the internal part of the secondary particle and the d_2 is an interplanar distance of a crystalline structure in the primary particle locating on the surface part of the secondary particle; and

F1.5 the surface part of the secondary particle has a thickness of from 0.3 to 1 μm from the surface of the secondary particle."

"14. A method of preparing a lithium complex oxide secondary particle as defined in any one of the preceding claims, the method comprising: manufacturing precursors of lithium secondary battery positive active material given by the following Formula 2



wherein, in Formula 2, M1 is Mn or Al, and M2 is a metal selected from a group of Al, Ba, B, Ce, Cr, F, Li, Mg, Mn, Mo, P, Sr, Ti, and Zr, and wherein $0 \leq x \leq 0.20$, $0 \leq y \leq 0.20$, and $0 \leq z \leq 0.20$;

reacting the precursors of lithium secondary battery positive active material with a lithium compound and manufacturing a positive active material by first thermally treating the reactant; washing the positive active material with distilled water or an alkaline solution; reactively coating the washed positive active material with a solution containing Co; drying particles of the positive active material; and mixing the dried positive active material with M3 that is a metal selected from the group of Al, Ba, B, Co, Ce, Cr, F, Li, Mg, Mn, Mo, P, Sr, Ti, and Zr and doping the metal M3 into the particles by second thermal treating the mixture."

Dependent claims 2-13 concern particular embodiments of the invention.

- IV. The appellant's arguments are reflected in the decision.
- V. The respondent (opponent) neither filed a reply to the appeal nor submitted any requests.
- VI. Substantive requests

The appellant requests that the decision under appeal be set aside and the opposition be rejected or, in the alternative, that the patent be maintained on the basis of one of auxiliary requests 1 to 42 on which the decision under appeal was based.

Reasons for the Decision

- 1. Issuance of a decision in writing

The respondent was informed of the commencement of appeal proceedings by the registrar of the board on 12 January 2023 by means of a registered letter.

On 6 April 2023 a copy of the grounds of appeal was sent with a registered letter to the respondent with a set time limit of four months for reply.

However, although the respondent was duly informed about the filed appeal and given the opportunity to reply, it decided not to make any submissions. In particular it did not request oral proceedings.

Thus, in view of the circumstances in hand, the issuance of a written decision meets the requirements of Article 113(1) EPC.

2. Main request, Article 100(b) EPC

According to the impugned decision, claim 1 of the patent in suit is not sufficiently disclosed. However, the board does not agree with this conclusion.

2.1 In paragraphs 17 and 18 of the decision under appeal, the opposition division argued that the temperature of the second thermal treatment in the examples of the patent in suit was unusually low. D12, submitted by the appellant, showed that the particle properties claimed in claim 1 (features F1.4 and F1.5) could not be obtained by using the much higher temperature conventionally used for the second thermal treatment.

Claim 1 is a product claim in which the product is characterised by a number of parameters. Claim 1 does not specify the temperature of the second thermal treatment as a product-by-process feature.

However, the patent in suit discloses several examples where the second thermal treatment was carried out at 450°C. In contrast, the comparative example in D12 uses 750°C. This temperature difference is significant. According to the appellant, the claimed properties of the product were not obtained due to the much higher temperature used in the second thermal treatment step (see statement of grounds of appeal, page 43, paragraph extending to page 44).

It therefore does not follow from the comparative

example of D12 that the patent in suit is not sufficiently disclosed. On the contrary, if the temperature of the second thermal treatment used in the examples is much lower than normally used in the prior art for the second thermal treatment, then the skilled person would immediately recognise its potential significance.

- 2.2 In the decision under appeal, the opposition division argued that the examples showed that the second thermal treatment was only carried out with specific materials. No evidence was available that this treatment could be applied to the whole claimed range of materials (paragraph 19 of the decision).

In opposition, the opponent bears the burden to prove that the patent in suit is insufficiently disclosed (T 63/06, point 3.2.1). However, no verifiable facts are available which could raise serious doubts that the invention can be carried out over the whole claimed range of materials.

- 2.3 In the decision under appeal, the opposition division argued that the skilled person would also consider preparing the claimed particles using a second thermal treatment temperature of 700°C. In doing so, the manufacture of the particles would fail as shown in D12 (paragraph 20 of the decision). The skilled person would be unable to identify the cause of that failure.

The examples show that the claimed particles can be obtained by using a second thermal treatment temperature of 450°C. The skilled person thus has guidance in the patent in suit on how to identify a failure. There is no reason to disregard or doubt this from the outset (see T 1596/16, Reasons 2.2 and 2.3;

T 1076/21, Reasons 1.1.7).

2.4 In the decision under appeal, the opposition division argued that the location of the "surface part" of the secondary particle was unclear. The tables on pages 2 and 3 of D12 showed the Co concentrations for the example corresponding to embodiment 3 as well as a comparative example. Assuming that the Co concentration was proportional to the interplanar distances, it was possible to purposively select Co concentrations from the tables to support the conclusion that the comparative example satisfied relation 1 of feature F1.4. It was also possible to purposively select Co concentrations from the tables to support the conclusion that the inventive example did not fulfil this feature. The limits of the surface part, which implied that relation 1 was satisfied, could not be established.

The patent proprietor argued that the Co concentration was not the only factor influencing the interplanar distances (paragraphs 21-29 of the decision). It was wrong to replace the measurement of the interplanar distances with the Co concentration.

The opposition division was not convinced by this argument.

There is some doubt as to whether the Co concentration can be used instead of the interplanar distance measurement method disclosed in paragraph [0022] of the patent in suit. This doubt is not manifestly unfounded. If the opponent had wished to rely on this fact, it would have borne the burden to prove that the measurement methods gave interchangeable results. There

is no such evidence available.

- 2.5 In the decision under appeal, the opposition division argued that there was a lack of guidance concerning the crystallographic plane to be considered (paragraph 30 of the decision).

It is, however, not stated how this would lead to a lack of sufficiency of disclosure. Nor is it apparent that a lack of sufficiency of disclosure is the direct consequence. No evidence was cited to this effect.

- 2.6 Method claim 14 makes reference to the product according to claim 1. Thus, the method of claim 14 does not cover manufacturing conditions which do not lead to that product.

The description of the patent in suit contains a number of examples which give the skilled person guidance as to the process conditions for making the claimed product. There is no reason to disregard or doubt the sufficiency of that guidance *a priori*.

There is no available evidence to suggest that this guidance is not sufficient to enable the skilled person to carry out the invention over essentially the whole claimed range (see T 1596/16, Reasons 2.2 and 2.3, T 1076/21, Reasons 1.1.7).

- 2.7 There are therefore no serious doubts, substantiated by verifiable facts, which justify denying sufficiency of disclosure.

3. Remittal, Article 111(1) EPC

The appellant requested that the opposition be rejected but also that the case be remitted to the opposition division for a decision on patentability.

According to the decision under appeal, none of auxiliary requests 1 to 42 fulfilled the requirements of sufficiency of disclosure, with auxiliary request 42 not being admitted into the proceedings for this reason.

In particular, the decision did not deal with the ground of opposition under Article 100(a) EPC.

As expressed in Article 12(2) RPBA 2020, the primary object of the appeal proceedings is to review the decision under appeal in a judicial manner.

It is therefore not the function of the board to consider and decide on Article 100(a) EPC in view of the cited documents for the first time in appeal proceedings (see T 1487/18, Reasons 4).

The board therefore decides to remit the case to the opposition division.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division for further prosecution.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated