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Datasheet for the decision of 8 May 2015

Case Number: T 1004/12 - 3.3.05

Application Number: 01998506.8

Publication Number: 1343720

IPC: C01B25/45, C01B25/455, H01M4/58

Language of the proceedings: EN

Title of invention:
METHODS OF MAKING LITHIUM METAL COMPOUNDS USEFUL AS CATHODE ACTIVE MATERIALS

Patent Proprietor:
VALENCE TECHNOLOGY, INC.

Opponent:
Johnson Matthey Public Limited Company

Headword:
LITHIUM TRANSITION METAL PHOSPHATE/VALENCE TECHNOLOGY

Relevant legal provisions:
EPC Art. 54(1), 54(2)

Keyword:
Novelty - (no)

Decisions cited:

Catchword:

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Case Number: T 1004/12 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 8 May 2015

Appellant: (Patent Proprietor)	VALENCE TECHNOLOGY, INC. 301 Conestoga Way Henderson, NV 89015 (US)
Representative:	Adam, Holger Kraus & Weisert Patentanwälte PartGmbB Thomas-Wimmer-Ring 15 80539 München (DE)
Respondent: (Opponent)	Johnson Matthey Public Limited Company 5th Floor 25 Farringdon Street London EC4A 4AB (GB)
Representative:	Stolmár & Partner Patentanwälte PartG mbB Blumenstraße 17 80331 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 15 February 2012 concerning maintenance of the European Patent No. 1343720 in amended form.**

Composition of the Board:

Chairman	G. Raths
Members:	J.-M. Schwaller
	C. Vallet

Summary of Facts and Submissions

I. The present appeal lies from the interlocutory decision of the opposition division to maintain European patent No. 1 343 720 on the basis of the auxiliary request filed during the oral proceedings of 19 January 2012, independent claim 1 of which reads as follows:

"*1. A method of making lithium transition metal fluorophosphate reaction product having the nominal formula $LiMPO_4F$, where M is a metal selected from the group consisting of chromium, titanium, vanadium, manganese, and mixtures thereof comprising the step of: reacting a particulate admixture of starting materials at a temperature sufficient to form a lithium transition metal fluoro phosphate reaction product, wherein said admixture of starting materials comprises at least one first transition metal constituent, at least one phosphate compound, at least lithium fluoride, and at least one particulate reducing agent; wherein at least one particulate reducing agent is employed to reduce the transition metal; and wherein said heating is conducted in a non-oxidizing atmosphere.*"

II. The following documents cited in the opposition proceedings are relevant for the present decision:

E1: English translation of Japanese patent application Serial No. 11-099407

E3: English translation of Japanese patent application published as H9-134724

III. In the contested decision, the opposition division held that the subject-matter of claim 1 of the main request

then on file lacked novelty in the light of document E3.

IV. With its grounds of appeal dated 22 June 2012, the proprietor ("the appellant") filed a new set of claims, with claim 1 showing the features added with respect to claim 1 of the main request in bold reading as follows:

"*1. A method of making lithium transition metal phosphate compound comprising the step of:*

reacting a particulate admixture of starting materials at a temperature sufficient to form a lithium transition metal phosphate reaction product, wherein said admixture of starting materials comprises at least one first transition metal constituent, at least one phosphate compound, at least one lithium compound, and at least one particulate reducing agent other than carbon; wherein at least one particulate reducing agent is employed to reduce the transition metal; wherein said heating is conducted in a non-oxidizing atmosphere; ***and wherein the particulate reducing agent is selected from the group consisting of:***

elemental transition metals selected from the group consisting of Fe, Co, Ni, Mn, Cu, V, Ti, Cr, Zn, Cd, and mixtures thereof;

elemental non-transition metals selected from the group consisting of Mg, Ca, Sr, Pb, Sn, Ba, Be, Al, B, and mixtures thereof; and

mixtures thereof."

V. By letter of 8 April 2015, the opponent ("the respondent") held above claim 1 to infringe the

requirements of Articles 123(2), 84, 54 and 56 EPC. In particular, it argued that its subject-matter lacked novelty over the content of document E1.

VI. At the oral proceedings, which took place on 8 May 2015, the parties agreed with the board's proposal to start by discussing the novelty of claim 1 filed with the grounds of appeal in the light of document E1.

VII. After closing the debate, the chairman established the parties' requests as follows:

The appellant requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of the set of claims dated 22 June 2012.

The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. Novelty of claim 1 of the sole request on file

1.1 Document E1 (claim 1) discloses a method for synthesising $LiFePO_4$, the method comprising:

- a mixing step wherein a plurality of starting materials are mixed to give a precursor and

- a sintering step wherein said precursor is sintered and reacted;

with a reducing agent being added to said precursor in said mixing step.

In the specific embodiment disclosed at paragraph [0041], iron powders (Fe), iron oxalate (FeC_2O_4), ammonium hydrogen phosphate ($NH_4H_2PO_4$) and lithium carbonate ($LiCO_3$) are mixed together in a pre-set ratio to give a precursor. In the next step, the precursor is sintered in an atmosphere of inert gas, such as nitrogen, to synthesise $LiFePO_4$.

1.2 The appellant argued that the subject-matter of claim 1 at issue was novel because the purpose of elemental iron according to E1 was different from the one according to the invention. According to the appellant, in E1 the elemental iron was used as an oxygen scavenger for preventing the formation of Fe^{3+} impurities during the reaction, but not for reducing the transition metal as required by the subject-matter of claim 1 at issue.

1.3 The board cannot accept this argument because E1 (paragraph [0043]) clearly and unambiguously discloses that "*if Fe^{2+} in iron oxalate, as a bivalent iron compound, is oxidized to Fe^{3+} by oxygen in air contained in the precursor, the* ***iron powders contained in the precursor reduces this Fe^{3+} to Fe^{2+}***". So in E1 the purpose of the elemental iron powder is the same as in claim 1, namely "to reduce the transition metal".

The appellant further argued that according to the invention:

- the transition metal constituent was in a higher oxidation state so that it could be reduced; and

- iron reduced the transition metal constituent stoichiometrically,

For the board, these arguments are irrelevant since the underlined features are not recited in the claimed subject-matter.

1.4 It follows from the above considerations that the subject-matter of claim 1 at issue is not novel in the light of the disclosure of document E1. The set of claims filed with the grounds of appeal therefore does not meet the requirements of Article 54(1) (2) EPC.

2. Since the interlocutory decision of the opposition division to maintain the patent in amended form has not been appealed by the respondent, the principle of *reformatio in peius* applies, so that the decision of the opposition division becomes final.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz G. Raths

Decision electronically authenticated