Internal distribution code:

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

Datasheet for the decision of 3 March 2020

Case Number: T 2541/16 - 3.3.10

Application Number: 08852480.6

Publication Number: 2223906

IPC: C07C17/25, C07C21/18, C07B61/00, C07B39/00

Language of the proceedings: EN

Title of invention:
METHOD FOR PRODUCING FLUORINE-CONTAINING OLEFIN

Patent Proprietor:
Daikin Industries, Ltd.

Opponent:
ARKEMA FRANCE

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 2541/16 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 3 March 2020

Appellant: (Opponent)	ARKEMA FRANCE Département Propriété Industrielle 420, rue d'Estienne d'Orves 92700 Colombes (FR)
Representative:	Bandpay & Greuter 30, rue Notre-Dame des Victoires 75002 Paris (FR)
Respondent: (Patent Proprietor)	Daikin Industries, Ltd. Umeda Center Building 4-12, Nakazaki-Nishi 2-chome Kita-ku Osaka-shi Osaka 530-8323 (JP)
Representative:	Hoffmann Eitle Patent- und Rechtsanwälte PartmbB Arabellastraße 30 81925 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 4 November 2016 rejecting the opposition filed against European patent No. 2223906 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	P. Gryczka
Members:	R. Pérez Carlón
	W. Van der Eijk

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal against the decision of the opposition division rejecting the opposition to European patent No. 2 223 906.

II. Notice of opposition had been filed on the grounds of insufficiency of disclosure (Article 100(b) EPC) and lack of novelty and inventive step (Article 100(a) EPC).

III. The documents filed include the following:

D2 US 5,679,875 A

IV. On the issue of inventive step, the opposition division concluded that document D2 was the closest prior art. The problem underlying the claimed invention was the provision of a method for producing a fluorine-containing olefin by dehydrohalogenating a fluorine-containing halogenated propane having an improved selectivity. The claimed solution was characterised by a catalyst having a fluorine content of not less than 30% by weight. Example 1 and comparative example 1 showed that the problem had been credibly solved. The claimed solution was not obvious having regard to the prior art, and was thus inventive.

V. With its reply to the grounds of appeal, the respondent (patent proprietor) filed a main request, claim 1 of which reads as follows:

"*A method for producing a fluorine-containing olefin by dehydrohalogenating a fluorine-containing halogenated*

propane represented by the formula $CF_3CH_{(2-n)}X_nCH_{(3-m)}X_m$ wherein n = 0, 1 or 2; m = 1, 2 or 3; n+m ≤ 3; and X is independently selected from F, Cl and Br in the presence of a fluorochromium oxide as a catalyst;

characterised in that the fluorine content of the fluorochromium oxide catalyst is not less than 30% by weight, and the fluorochromium oxide catalyst has a specific surface area of 25-130 m^2/g measured by the BET method."

VI. The arguments of the appellant relevant to the present decision were as follows.

Document D2 was a suitable starting point for examining the inventive step of claim 1 of the main request. D2 disclosed dehydrofluorinating an olefin according to the general formula of claim 1 over a fluorinated trivalent chromium oxide catalyst, obtainable by heating a CrF_3 hydrate in the presence of oxygen. Such a catalyst inevitably had a fluorine content over the threshold set by claim 1. The method of claim 1 only differed from that of D2 by virtue of the specific surface area of the required catalyst. If the problem as defined by the respondent, namely the provision of a method which made it possible to improve the yield of product, were to be considered credibly solved by the claimed method, the claimed solution, characterised by using a catalyst having a higher specific surface area, was obvious for the person skilled in the art and thus not inventive.

VII. The arguments of the respondent relevant to the present decision were as follows.

Document D2 was the closest prior art. The embodiment relating to a reaction over a partially fluorinated

catalyst obtained by heating chromium fluoride with oxygen differed from the method of claim 1 of the main request by virtue of the required specific surface area of the catalyst. The problem underlying the claimed invention was to provide a method which made it possible to improve the yield of product. The claimed solution, characterised in that the catalyst had a higher specific surface area, would not have been obvious for the skilled person. D2 taught catalysts having the required specific surface area but lacking the required fluorine content. There was no obvious way to prepare a catalyst as required by claim 1 using chromium fluoride as the starting material, and the skilled person would have arrived at the claimed invention only with the benefit of hindsight. For that reason, the claimed method was inventive.

VIII. Oral proceedings before the board of appeal took place on 3 March 2020.

IX. The final requests of the parties were as follows:

- The appellant requested that the decision under appeal be set aside and that European patent No. 2 223 906 be revoked.

- The respondent requested that the decision under appeal be set aside and the patent be maintained in amended form according to its main and sole request, filed with the reply to the statement of grounds of appeal dated 28 July 2017.

X. At the end of the oral proceedings, the decision was announced.

Reasons for the Decision

1. The appeal is admissible.

Inventive step

2. Claim 1 of the main request relates to a method for producing a fluorine-containing olefin over a fluorochromium oxide catalyst. This catalyst is characterised by having a fluorine content of not less than 30% by weight, and by having a specific surface area of 25-130 m^2/g, measured by the BET method.

3. Closest prior art

The respondent argued that document D2 was the closest prior art for the method of claim 1 of the main request. The appellant conceded that this document can be a good starting point.

It was common ground that document D2, like the claimed invention, relates to the dehydrofluorination of 1,1,1,2,3,3-hexafluoropropane (236ea) to produce 1,1,1,2,3-pentafluoropropene (1225ye) over a fluorinated trivalent chromium oxide (column 4, lines 37 to 41). This catalyst can be obtained by heating a CrF_3 hydrate with oxygen (column 5, lines 20 to 22).

It was also common ground that this embodiment differs from the method of claim 1 only by virtue of the required specific surface area of the catalyst, which was lower than that required by claim 1 since chromium fluoride was crystalline (point 4.2 of the reply to the

grounds of appeal, second full paragraph).

4. Technical problem underlying the invention

The parties had different views as to the formulation of the technical problem effectively solved by the claimed invention. The respondent defined it as to provide a method which made it possible to improve the yield of product.

5. Solution

The solution to this technical problem is the claimed method, characterised in that the specific surface area of the catalyst used is 25-130 m^2/g.

6. Success

The experimental data on file do not allow a direct comparison with the closest prior art D2 reflecting the effect of the required specific surface area.

The respondent argued that the problem as formulated above had nevertheless been credibly solved, as it was well known that catalytic activity was directly linked to the specific surface area (last paragraph of the reply to the grounds of appeal). The board agrees.

7. It remains to be decided whether the proposed solution to the objective problem defined above would have been obvious for the skilled person in view of the prior art.

7.1 The board considers the problem as formulated by the respondent to be credibly solved by the claimed method, as it is well known that surface area is directly

linked to catalyst activity, i.e. the larger the surface area, the higher the catalyst activity.

For the same reason, enhancing the catalyst's specific surface area would have been an obvious option for the skilled person seeking a higher yield in a catalytic reaction, with the consequence that the method of claim 1 is not inventive (Article 56 EPC).

7.2 The respondent argued that the skilled person, seeking a more active catalyst, would have turned to the catalysts obtained by hydrofluorination of chromium oxide also disclosed in D2, but that they would not have considered increasing the specific surface area of those obtained from chromium fluoride.

However, the pointer to the claimed solution is not to be found in D2, but in the general knowledge of the person skilled in the art. This argument is thus unconvincing.

7.3 The respondent also argued that the skilled person would be bound by the starting material used in D2 for preparing the catalyst, namely chromium fluoride. There was no obvious way of obtaining a catalyst having the required specific surface area starting from crystalline chromium fluoride.

This argument, however, does not convince the board, since, as argued by the appellant, ways of enhancing the specific surface area of a catalyst, for example grinding, are known to the skilled person.

7.4 The respondent argued that the skilled person would have arrived at the claimed invention only with the benefit of hindsight.

Hindsight would mean that the skilled person would arrive at the claimed solution only with knowledge of the invention. However, this is not the case here, where the claimed solution to the technical problem was common general knowledge in the art of catalytic processes long before the filing date of the patent in suit. In addition, if, as the respondent argued, the skilled person would rely on such general knowledge to establish that the problem underlying the claimed invention has been credibly solved, the board cannot see why they would not take such knowledge into account when trying to solve the problem.

8. Therefore, the method of claim 1 of the sole request on file is not inventive (Article 56 EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

C. Rodríguez Rodríguez P. Gryczka

Decision electronically authenticated