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**Datasheet for the decision
of 8 April 2025**

Case Number: T 1003/23 - 3.3.02

Application Number: 12725933.1

Publication Number: 2709971

IPC: C07C17/354, C07C19/08,
B01J21/04, B01J23/44, B01J35/10

Language of the proceedings: EN

Title of invention:
PREPARATION OF PENTAFLUOROPROPANE BY CATALYTIC HYDROGENATION

Patent Proprietor:
The Chemours Company FC, LLC

Opponent:
ARKEMA FRANCE

Relevant legal provisions:
EPC Art. 84, 123(2)
RPBA 2020 Art. 11

Keyword:
Amendments - allowable (yes)
Claims - clarity (yes)



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Boards of Appeal
Chambres de recours

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Case Number: T 1003/23 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 8 April 2025

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 21 March 2023
revoking European patent No. 2709971 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman M. O. Müller
Members: P. O'Sullivan
B. Burm-Herregodts

Summary of Facts and Submissions

- I. The appeal of the patent proprietor (hereinafter appellant) lies from the decision of the opposition division to revoke European patent 2 709 971.
- II. An opposition was filed on the grounds of Article 100(a) EPC (lack of inventive step), Article 100(b) and 100(c) EPC. According to the contested decision, the subject-matter of claim 1 of the main request (patent as granted), and the respective claim 1 of auxiliary requests 1, 3 and 4 comprised added matter. Furthermore, claim 1 of auxiliary requests 2, 5 and 6 failed to meet the requirements of Article 84 EPC.
- III. In a communication pursuant to Article 15(1) RPBA, the board provided the preliminary opinion that claim 1 of the main request comprised added subject-matter, and hence the ground for opposition under Article 123(2) EPC prejudiced the maintenance of the patent as granted. Furthermore, claim 1 of auxiliary request 1 met the requirements of Article 123(2) and 84 EPC.
- IV. Oral proceedings by videoconference before the board took place as scheduled on 8 April 2025 in the presence of both parties.

V. Requests relevant to the present decision

The appellant requested:

- that the decision under appeal be set aside,
- that the claims of the patent as granted or of any one of auxiliary requests 1 to 6 submitted with the statement of grounds of appeal be found to fulfil the requirements of Article 100(c) or 123(2) EPC and Article 84 EPC, and
- that the case be remitted to the opposition division for further prosecution.

The respondent (opponent) requested that the appeal be dismissed, implying that the decision of the opposition division to revoke the patent be confirmed.

VI. For the relevant party submissions, reference is made to the reasons for the decision set out below.

Reasons for the Decision

Main request (patent as granted)

1. Amendments - Article 100(c) EPC

Independent claim 1 of the main request reads as follows:

*"A hydrogenation process comprising reacting a fluoroolefin ~~CF₃CF=CHF~~ with H₂ in a reaction zone in the presence of a palladium catalyst **and a diluent** to produce a hydrofluoroalkane product ~~CF₃CHFCH₂F~~, wherein said palladium catalyst comprises palladium supported*

on a carrier, **wherein the carrier is α -Al₂O₃**, wherein the palladium concentration is from ~~about 0.001 wt %~~ to ~~about 0.2 wt%~~ **0.08 wt %** based on the total weight of the palladium and the carrier, **wherein the diluent is co-fed to the reaction zone with the CF₃CF=CHF and H₂ starting materials, wherein the molar ratio of the diluent to the CF₃CF=CHF starting material is from 10:1 to 1:1, and wherein the diluent is the CF₃CHFCH₂F product.**"

(strike through and bold text respectively denoting deletion and addition compared to claim 1 of the application as filed)

- 1.1 The respondent argued that the amended features of claim 1 were not disclosed in combination with each other in the application as filed.
- 1.2 To arrive at granted claim 1, the following amendments to claim 1 of the application as filed have been introduced:
 - the fluoroolefin and hydrofluoroalkane product are CF₃CF=CHF and CF₃CHFCH₂F, respectively,
 - the presence of a diluent, wherein the diluent is the CF₃CHFCH₂F product, and the diluent is co-fed to the reaction zone with the CF₃CF=CHF and H₂ starting materials,
 - the upper limit of the palladium concentration is lowered from 0.2 wt% to 0.08 wt%,
 - the carrier is specified as α -Al₂O₃, and
 - the molar ratio of the diluent to the CF₃CF=CHF starting material is from 10:1 to 1:1.

- 1.3 It was undisputed that in isolation, the feature whereby the fluoroolefin and the hydrofluoroalkane product are $\text{CF}_3\text{CF}=\text{CHF}$ and $\text{CF}_3\text{CHFCH}_2\text{F}$, respectively, finds basis in claim 8 of the application as filed, which depends solely on claim 1 of the application as filed.
- 1.4 It was also undisputed that the next feature identified above, namely, the presence of a diluent, wherein the diluent is the $\text{CF}_3\text{CHFCH}_2\text{F}$ product, and the diluent is co-fed to the reaction zone with the $\text{CF}_3\text{CF}=\text{CHF}$ and H_2 starting materials, finds basis in claim 9 of the application as filed, which depends on claim 8.
- 1.5 However while claim 1 of the main request requires that the molar ratio range of the diluent to the $\text{CF}_3\text{CF}=\text{CHF}$ starting material is from 10:1 to 1:1, claim 9 of the application as filed discloses a different range for this feature, namely from 100:1 to 1:1.
- 1.6 The appellant submitted that the basis for the claimed ratio range of 10:1 to 1:1 was provided in the application as filed in the passage on page 11, lines 14-24.
- 1.7 The board disagrees for the reason submitted by the respondent. The passage of the application as filed provided as basis reads as follows:

*"In some embodiments of this invention, the **vapor phase** hydrogenation process is conducted in the presence of a diluent. In some embodiments of this invention, the diluent is co-fed to the reaction zone with the fluoroolefin and H_2 starting materials. In some embodiments of this invention, the molar ratio of the*

*diluent to fluoroolefin starting material co-fed to the reaction zone is from about **100:1 to about 1:1**. In some embodiments of this invention, the molar ratio of the diluent to fluoroolefin starting material co-fed to the reaction zone is from about **10:1 to about 1:1**. In some embodiments of this invention, the molar ratio of the diluent to fluoroolefin starting material co-fed to the reaction zone is from about **5:1 to about 1:1**." (emphasis added by the board).*

- 1.8 Although this passage discloses the claimed ratio range of 10:1 to 1:1, it refers exclusively to embodiments of the invention in which a "vapor phase hydrogenation process" is conducted (page 11, lines 14-15). On the other hand, claim 1 of the main request is not limited to vapour phase hydrogenation processes. Hence, the ratio range in claim 1 applies also to liquid phase hydrogenation processes, while according to the application as filed it is only disclosed in association with vapour phase hydrogenation processes. Claim 1 therefore comprises added subject-matter.
- 1.9 The appellant's arguments to the contrary failed to convince the board.
- 1.10 The appellant argued that the disclosure of a ratio of 100:1 to 1:1 in claim 9 in combination with claims 1 and 8 of the application as filed was not linked to any restrictions as to whether the process takes place in the vapour phase or the liquid phase. Since the ratio range of 100:1 to 10:1 was also mentioned in the above passage, it would have been clear to the skilled person that since the broader range of 100:1 was detached from any limitation to vapour phase hydrogenation processes, the same would apply to the narrower ratio range of 10:1 to 1:1.

- 1.11 The board disagrees. Even though the disclosure of the specific ratio range of 100:1 to 1:1 recited in claim 9 of the application as filed is not formally limited to vapour phase processes, the same cannot be said for the ratio range now recited in claim 1 of the main request. As stated by the respondent, the passage on page 11 of the application as filed makes it clear that the ratios mentioned are solely in the context of a vapour phase hydrogenation process. Specifically, on page 10, lines 8 to 10 of the application as filed, it is stated that "the hydrogenation process can be carried out in the liquid phase or vapor phase". This is followed in lines 11 to 27 by a description of embodiments exclusively carried out in the liquid phase. Subsequent to this, vapour phase processes are discussed from page 10, line 28 to page 12, line 25, and include the passage cited above. Hence, the specific claimed ratio range of 10:1 to 1:1 is only derivable from the application as filed in the context of the vapour phase hydrogenation process disclosed in the above-cited passage.
- 1.12 The appellant also argued that the generalisation of the molar ratio of the diluent to the starting material of 10:1 to 1:1 from the requirement that the reaction is conducted in the vapour phase is allowable since these features "do not share any clearly recognisable functional or structural relationship".
- 1.13 The board disagrees. The presence of the diluent in the specified ratio is specifically linked in the application as filed to the vapour phase process in terms of function. There is no reason to conclude, on the basis of the above-cited passage from the description, that the skilled person would consider the specific gas phase ratios to be equally applicable to

liquid phase hydrogenation processes. The board additionally notes in this context that liquid and vapour phase hydrogenation processes are different in many ways including but not limited to the pressure and temperature at which they are carried out. Hence there is no basis for concluding that there is no functional relationship between the ratio of the diluent to the reactant and the phase of the hydrogenation process.

- 1.14 Hence, in line with the contested decision (page 7, fourth full paragraph), in view of the generalisation of the molar ratio range taken from the application as filed as set out above, claim 1 of the main request comprises added subject-matter.
- 1.15 Consequently, the ground for opposition under Article 100(c) EPC prejudices the maintenance of the patent as granted.

Auxiliary request 1

2. Article 123(2) EPC
- 2.1 Claim 1 of auxiliary request 1 differs from claim 1 of the main request by the stipulation that the hydrogenation process is "carried out in the vapor phase". In all other respects, it is identical to claim 1 of the main request.
- 2.2 Since as set out above the feature whereby the molar ratio of the diluent to the $\text{CF}_3\text{CF}=\text{CHF}$ starting material is from 10:1 to 1:1 is disclosed in the application as filed (page 11, lines 14-24) only in the context of a vapour phase process, the reasons for the conclusion provided above for the main request no longer apply. Hence, the features addressed above for the main

request find basis in the application as filed in claims 1, 8 and 9 in combination with the passage on page 11, lines 14-24.

- 2.3 The remaining features of claim 1 of auxiliary request 1 compared to claim 1 of the application as filed, not addressed above for the main request are:
- the upper limit of the palladium concentration is lowered from 0.2 wt% to 0.08 wt%, and
 - the carrier is α -Al₂O₃.
- 2.4 In relation to the first amendment, as set out above, the palladium concentration range of 0.001 wt % to 0.2 wt% provided in claim 1 of the application as filed was limited to 0.001 wt % to 0.08 wt% in claim 1 of auxiliary request 1.
- 2.5 This limitation is based on claim 2 of the application as filed. The respondent argued however that the concentration range provided in claim 2 was not disclosed in the application as filed in combination with the other features of claim 1 of the first auxiliary request. This applied in particular to claims 8 and 9 of the application as filed as addressed above, which ultimately depended solely on claim 1, and not on claim 2 of the application as filed.
- 2.6 The board disagrees. The claim structure cannot be relied upon exclusively to support the assertion that the combination of features of claim 1 of auxiliary request 1 is not disclosed in the application as filed. The question under Article 123(2) EPC is whether the skilled person would derive the claimed subject matter directly and unambiguously, using common general

knowledge, from the originally filed application as a whole. While dependent claims 2, 8 and 9 of the application as filed are not directly interlinked in terms of their dependency, they nevertheless refer to preferred embodiments, rather than separate embodiments of the hydrogenation process disclosed in claim 1 of the application as filed. Hence, these features in combination form part of the disclosure of the application as filed. The upper limit of the palladium concentration of 0.08 wt% in claim 1 therefore finds basis in the application as filed.

2.7 Similarly, in relation to the second amendment set out above, namely that the carrier is α -Al₂O₃, the respondent argued that in the application as filed, dependent claim 11, disclosing that the carrier could be chosen from a list including Al₂O₃, and claim 12 dependent on claim 11, specifying that that carrier is α -Al₂O₃, were both ultimately dependent only on claim 1 of the application as filed. Hence the subject-matter of these claims could not be combined with the subject-matter of claims 2, 8 and 9, which also only depended on claim 1.

2.8 The board disagrees for the same reason as provided above for the concentration range of the catalyst amount. Additionally, α -Al₂O₃ is employed as the carrier in example 5 of the application as filed, in which the starting material and product are identical to those of claim 1 of auxiliary request 1, and is also mentioned in the introductory part of the application on page 1, lines 7 to 11. These disclosures confirm that α -Al₂O₃ is a preferred aspect of the invention. Indeed, the board notes that all examples of the application as filed employ this carrier, indicating

unambiguously the preference therefore in the application as filed.

2.9 In a further objection, the respondent argued that the expression "in the presence of a palladium catalyst" in claim 1 was not disclosed in the application as filed. According to the passage in the application as filed on page 6, lines 31-34, "the palladium catalyst in this disclosure is a finely divided zero valent palladium metal supported on a carrier". Since claim 1 of auxiliary request 1 did not specify that the catalyst was "finely divided" and "zero valent", it comprised added subject-matter.

2.10 The board disagrees. First, the expression "in the presence of a palladium catalyst" appears *expressis verbis* in claim 1 of the application as filed, without any requirement for the catalyst to be finely divided and zero valent. Second, as set out above, the further features of claim 1 find basis in the application as filed without requiring the passage cited by the respondent on page 6. The absence of the additional features present in this passage and referred to by the respondent in claim 1 of auxiliary request 1 therefore does not contravene Article 123(2) EPC.

Consequently, claim 1 of auxiliary request 1 fulfils the requirements of Article 123(2) EPC.

3. No objections in relation to Article 84 EPC were raised against the claims of auxiliary request 1, and the board sees no reason to differ.

4. The set of claims of auxiliary request 1 therefore meets the requirements of both Articles 123(2) and 84 EPC.

5. Remittal - Article 111(1) EPC and Article 11 RPBA
 - 5.1 The appellant requested in the event that one of the sets of claims of the main request or one of auxiliary requests 1 to 6 are considered to fulfil the requirements of Article 100(c) or 123(2) EPC and Article 84 EPC, that the case be remitted to the opposition division for further prosecution. The respondent did not object to the requested remittal.
 - 5.2 According to Article 11 RPBA, the board shall not remit a case to the department whose decision was appealed for further prosecution, unless special reasons present themselves for doing so.
 - 5.3 In view of the fact that further grounds for opposition were addressed neither in the contested decision nor in the submissions of the parties in appeal proceedings, there is no basis under Article 12(2) or (3) RPBA for the board to examine the further grounds for opposition in appeal proceedings. This constitutes a special reason in favour of remittal under Article 11 RPBA. Hence, in line with the appellant's request, the case is remitted to the opposition division for further prosecution.

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:



U. Bultmann

M. O. Müller

Decision electronically authenticated