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**Datasheet for the decision
of 3 March 2015**

Case Number: T 1950/11 - 3.3.06

Application Number: 99947318.4

Publication Number: 1115486

IPC: B01J23/50, B01J37/02,
B01J37/06, C07D301/10

Language of the proceedings: EN

Title of invention:

Process for preparing catalysts with improved catalytic properties

Patent Proprietor:

Shell Internationale Research Maatschappij B.V.

Opponents:

BASF SE
Scientific Design Company Inc.

Headword:

Silver containing catalyst / SHELL

Relevant legal provisions:

EPC Art. 84, 114(2), 123(2)
RPBA Art. 13(1), 13(3)

Keyword:

Admissibility of main request (yes)

Claims - clarity - main request (no)

Amendments -

extension beyond the content of the application as filed -
main request (yes)

Admissibility of first auxiliary request (no)

Decisions cited:

G 0009/91, T 0301/87

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

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Case Number: T 1950/11 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 3 March 2015

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 8 July 2011
rejecting the oppositions filed against European
patent No. 1115486 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman B. Czech
Members: L. Li Voti
 S. Fernández de Córdoba

Summary of Facts and Submissions

I. The present appeals by Opponents 01 and 02 are against the decision to reject the oppositions filed against European patent no. 1 115 486.

II. Claim 1 of the patent as granted reads as follows:

"1. A process for preparing a catalyst suitable for the vapour phase epoxidation of olefins, including the steps of:

*- selecting an α -alumina containing carrier which has been subject to washing, ion exchange, volatilization, and combinations thereof to lower the concentration of ionizable silicates on the surface of the carrier ; and
- depositing silver and optionally promoting materials on the carrier;*

the deposition being effected by an impregnation solution wherein the measured of said solution is at least 12.5."

III. In their notices of opposition the two Opponents had sought the revocation of the patent, *inter alia* on the grounds of Article 100(c) EPC.

IV. The Opposition Division decided that none of the grounds for opposition invoked was prejudicial to maintenance of the patent as granted.

V. In their respective statements of grounds the two Appellants (Opponents 01 and 02) maintained *inter alia* that claim 1 as granted was objectionable under Articles 100(c)/123(2) EPC.

VI. In its reply of 23 March 2012, the Respondent (Patent Proprietor) rebutted all the Appellants' arguments. With the same letter, it nevertheless filed nine sets of amended claims as 1st to 9th auxiliary request.

VII. The parties were summoned to oral proceedings. In a communication pursuant to Article 15(1) RPBA, dated 24 October 2014, the Board exposed *inter alia* its provisional view concerning the interpretation of claim 1 as granted, and invited the Appellants to take position with respect to the auxiliary requests on file.

In particular, the Board remarked (points 5.2.1 to 5.2.3) that the reference in the wording of claim 1 as granted to pretreatments ("*washing, ion-exchange, volatilization*") for lowering the concentration of ionizable silicates on the surface of the selected carrier was not drafted as a step of the process actually claimed and only defined a further characteristic of the alumina carrier to be used, said characteristic being achievable by steps formulated in a product-by-process type manner. The indicated pretreatments of the selected carrier did not appear to limit the extent of the claim in terms of the concentration of ionizable silicates on its surface.

VIII. In their respective letters of 3 February 2015 the Appellants maintained and expanded their objections in view of the Board's interpretation of claim 1. Moreover, they submitted that the pending auxiliary requests contravened the requirements of Rule 80 and/or Articles 84 and 123(2) EPC and did not overcome the objections raised against the main request.

IX. In its letter of 3 February 2015 the Respondent

disagreed with the Board's interpretation of the wording of claim 1 set out in the communication and maintained that the granted claims were allowable. It also filed three more amended sets of claims as 10th to 12th auxiliary requests.

X. Oral proceedings were held on 3 March 2015.

Following the debate concerning the proper interpretation of claim 1 as granted the Respondent turned its previously pending 10th auxiliary request into its main request and the pending 11th and 12th auxiliary requests into its 1st and 2nd auxiliary requests, respectively.

Following further debate regarding possible deficiencies of the respective claims 1 of these requests under Articles 84 and 123(2) EPC, the Respondent submitted an amended version of the earlier 11th auxiliary request to be considered as new main request.

Following the debate on said new main request, the Respondent submitted an amended version thereof as new 1st auxiliary request and withdrew all other requests.

XI. Claim 1 according to the new main request filed at the oral proceedings reads as follows (amendments compared to claim 1 of the 11th auxiliary request filed with letter of 3 February 2015 made apparent by the Board):

"1. A process for preparing a catalyst suitable for the vapour phase epoxidation of olefins, including the steps of:

- selecting an α -alumina containing carrier;

- lowering the concentration of ionizable silicates on the surface of the carrier by washing; and
- depositing silver and optionally promoting materials on the carrier;
the deposition being effected by an impregnation solution wherein the measured pH of said solution is in the range of from 12.5 to 13.7,
and wherein lowering the concentration of ionizable silicates on the surface of the carrier is carried out prior to the deposition step."

Claim 1 according to the new first auxiliary request differs from claim 1 according to the main request in that it additionally comprises the following wording inserted between "... range of from 12.5 to 13.7," and "and wherein lowering the concentration ...":

" and wherein said washing is performed with an aqueous and/or organic solvent-based solution selected from water, tetraethylammonium hydroxide, ammonium acetate, lithium carbonate, barium acetate, strontium acetate, crown ether, methanol, ethanol, dimethylformamide, and mixtures thereof;"

XII. Final requests

The Appellants requested that the decision under appeal be set aside and the patent be revoked.

The Respondent requested that the patent be maintained in amended form on the basis of the claims according to the main request or the 1st auxiliary request, both submitted during the oral proceedings.

XIII. The arguments of the Appellants of relevance here can be summarised as follows:

Both Appellants contested the admissibility of the new main request filed during oral proceedings since, in their view, this request could have been filed earlier in writing, together with the previously pending 11th auxiliary request, in reply to the Board's communication.

Moreover, the Appellants submitted that claim 1 according to the main request did not comply with the requirements of *inter alia* Articles 84 and 123(2) EPC.

As regards compliance with Article 84 EPC, they submitted *inter alia* the following:

- The wording of claim 1 did not indicate that the step of lowering the concentration of ionizable silicates on the surface of the carrier by washing had to be carried out as a separate step before the impregnation step including the deposition of silver on the carrier.
- As explained by the technical expert of Appellant 02, the step of impregnating a carrier with a silver solution implicitly led, at least to a certain degree, to the removal of ionizable species present on the surface of the carrier by means of the impregnation solution before the deposition of silver on the carrier. Said deposition of silver started only upon volatilization of the solvent.
- A step of separating the excess impregnation solution containing the species removed from the carrier surface was not only encompassed by the wording of the claim, but was actually described in the patent in suit and applied in its illustrative examples.
- Therefore, an impregnation step with a silver

solution could be considered to encompass both a carrier washing step and a silver deposition step as required in claim 1 at issue.

- The wording of claim 1 at issue could thus be interpreted in two different ways as relating either to a process wherein the carrier washing step occurred as a separate step before impregnation, as argued by the Respondent, or to a process wherein the carrier washing step was part of the impregnation step.

- Claim 1 thus lacked clarity.

As regards Article 123(2) EPC, they submitted *inter alia* the following:

- The application as filed did not contain any support for a process with all the features of claim 1 in combination.

- In particular, an impregnation solution having a measured pH in the range of 12.5 to 13.7 was disclosed only in the illustrative examples of the invention.

- Even though the examples of the invention included a step of washing the carrier before impregnation, they did not disclose that said washing step lowered the concentration of ionizable silicates on the surface of the carrier.

- Even though table I disclosed that the α -alumina carriers used contained, before washing, certain amounts of bulk acid-leachable SiO_2 , the indicated amounts did not correspond to the amount of ionizable silicates possibly present on the surface of the carrier. Furthermore, it was unknown whether the

washing step performed according to the examples actually did lower the concentration of ionizable silicates on the surface of the carrier, if present.

- Claim 1 thus contravened the requirements of Article 123(2) EPC.

The Appellants submitted also that, *prima facie*, claim 1 according to the 1st auxiliary request did not overcome the deficiencies of claim 1 according to the main request since the amendment made consisted essentially in the incorporation of a list of specific solvents for the carrier washing step, which list included, however, solvents that were also suitable for the impregnation step. Moreover, the amendment to claim 1 was *prima facie* not supported by the indicated part of the application as filed (description page 5, lines 27 to 32).

Hence, the 1st auxiliary request was not admissible since it was late filed, not clearly allowable and raised new issues concerning *inter alia* compliance of amended claim 1 with the requirements of Articles 84 and 123(2) EPC.

XIV. The arguments of the Respondent of relevance here were in essence as follows:

- The main request was admissible since it had been filed as a reaction to objections raised for the first time during oral proceedings against the then pending 11th auxiliary request.

- Even though the considerations concerning the impregnation and deposition mechanisms submitted by the technical expert of Appellant 02 were not contested, the skilled person would have understood from the

wording of claim 1 according to the main request that the carrier washing step had to be carried out as a separate step before the impregnation step. Therefore, claim 1 at issue was clear and complied with the requirements of Article 84 EPC.

- Amended claim 1 according to the main request also found support in the description of the application as filed. The carrier washing step was disclosed, for example, on page 5, lines 1 to 4, of the application as filed. Therefore, claim 1 at issue complied also with the requirements of Article 123(2) EPC.

- Amended claim 1 according to the 1st auxiliary request found support on page 5, lines 27 to 32, of the description of the application as filed and characterized further the carrier washing step, in order to express more clearly the distinction between the separated steps of carrier washing and impregnation. Moreover, the same amendment had already been made in the previous 9th auxiliary request filed with the reply of 23 March 2012 to the Appellants' statements of grounds.

- The 1st auxiliary request was thus admissible.

Reasons for the Decision

Main request

1. Admissibility of the request
 - 1.1 The set of claims according to the main request at issue was submitted during oral proceedings before the Board.

- 1.2 It is based on the 11th auxiliary request filed with the letter of 3 February 2015, i.e. one month before oral proceedings, in reply to the Board's communication (see VII and IX, *supra*).

The Board accepts that said 11th auxiliary request was filed in an attempt to overcome objections arising from the Board's interpretation of claim 1 as exposed for the first time in said communication.

- 1.3 During oral proceedings before the Board (see X, *supra*), objections were raised under Articles 123(2) and 84 EPC also against claim 1 of the 11th auxiliary request, which had become the 1st auxiliary request.

In order to take account of these new objections the Respondent submitted during oral proceedings an amended version of the original 11th auxiliary request to be considered as main request.

- 1.4 The Board cannot follow the Appellants' argument that the new main request could have been filed earlier in writing together with the previous 11th auxiliary request or, in any case, before oral proceedings.

In fact, the Appellants did not take position on any possible deficiency of said 11th auxiliary request in writing and raised the new objections for the first time during oral proceedings. The Respondent thus was confronted with these new objections for the first time during oral proceedings.

- 1.5 Moreover, the amendments made to claim 1 at issue are not of a complex nature and could be dealt with by the Appellants and by the Board at the oral proceedings.

1.6 Therefore, the Board decided to admit the Respondent's new main request into the proceedings despite its late filing (Articles 114(2) EPC and 13(1), (3) RPBA).

Main request

2. Clarity - Amended claim 1

2.1 The wording of claim 1 according to the main request (XI, *supra*) differs substantially from the wording of claim 1 as granted (II, *supra*) insofar as the measured pH of the used impregnation solution must be in the range of 12.5 to **13.7** and in that it requires explicitly, as a step of the claimed process, "*lowering the concentration of ionizable silicates on the surface of the selected α -alumina containing carrier by washing*" and, moreover, that this washing step "*is carried out prior to the deposition step*".

2.2 Clarity objections raised against claim 1 have to be considered if they arise out of the amendments made to the granted claim (see G 9/91, OJ 1993, 408, Reasons, 19; and, e.g. T 301/87, OJ 1990, 335, Reasons, 3.8).

2.3 According to the Respondent the wording of claim 1 was clear and concerned a sequence of process steps including a **separate** step of washing the α -alumina containing carrier in order to lower the concentration of ionizable silicates on its surface, which separate washing step is carried out prior to the impregnation step including the deposition of silver on the carrier. This sequence of process steps was illustrated by the examples of the patent in suit.

2.4 The Board remarks in this respect that the last sentence of claim 1 at issue reading "... *wherein*

lowering the concentration of ionizable silicates on the surface of the carrier is carried out prior to the deposition step" does not explicitly require that the carrier washing step for lowering the concentration of ionizable silicates on the surface of the carrier must be carried out as a **separate** step **prior** to the impregnation step necessary for the deposition of silver.

Moreover, the Board is convinced that the skilled person would not necessarily understand the wording "*prior to the deposition step*" in claim 1 to actually mean (implicitly) "*prior to the impregnation step*", since impregnation and deposition are two different sequentially distinct steps, as explained in more detail below (points 2.5 and 2.6, *infra*).

For this very reason, the Board is also convinced that, within the context of claim 1 at issue, the requirement that "*the deposition [is] effected by an impregnation solution*", does not necessarily imply that the carrier washing step, which has to be carried out **prior to** the **deposition** step, has necessarily to be carried out as a separate step **prior to impregnation**.

- 2.5 Appellant 02 pointed out that upon impregnation of a carrier with a silver containing solution, ionizable materials present on the surface of the carrier (for example ionizable silicates) were leached from the carrier by the impregnation solution before any deposition of silver on the carrier occurred. In fact, deposition of silver started only upon volatilization of the solvent and therefore after some ionizable materials have already been leached from the carrier surface.

These considerations concerning the impregnation and deposition mechanisms were not contested by the Respondent. Since they are technically plausible, there is no reason for the Board not to accept them.

- 2.6 In this respect, the Board cannot accept the Respondent's argument submitted during oral proceedings that the removal of ionizable species from the surface of the carrier during the impregnation step would not be considered by a skilled person to represent a washing step since the species leached from the carrier surface would redeposit from the impregnation solution onto the surface of the carrier.

As convincingly explained by the Appellants, the skilled person knew that such an impregnation step implicitly requires the removal of excess impregnation solution for avoiding the redeposition of the species leached from the carrier surface. This measure is not excluded by the wording of claim 1 and is, moreover, expressly mentioned in the description of the patent in suit (see paragraph [0024]) and applied in all the examples of the invention (see page 6, lines 33 to 34).

- 2.7 Therefore, in the Board's judgement, the wording of claim 1 at issue can also be understood to concern a process wherein the step of impregnating an α -alumina containing carrier with a silver solution amounts *de facto* to both a step of lowering the concentration of ionizable silicates on the surface of the carrier by washing and a subsequent silver deposition step.

- 2.8 It is thus not unambiguously clear

- whether the wording of claim 1 is indeed limited to the alternative invoked by the Respondent, according to

which a **separate** step of carrier washing **prior to impregnation** is an essential process step of the invention, as illustrated in examples 3 to 7, 10 and 13 of the invention (all relating to modifications of the catalyst preparation process of comparative example 1a, which includes a separate first washing step);

or

- whether the wording of claim 1 also encompasses a process wherein the step of washing the carrier occurs during the impregnation step, thereby including also processes referred to as "comparative" in the description, like those of examples 8a and 14a (no separate carrier washing step prior to impregnation; see page 7, lines 17 and 51 of the patent in suit).

2.9 In the Board's judgement, due to this ambiguity, the wording of claim 1 at issue does not clearly identify the matter for which protection is sought. Claim 1 thus lacks clarity (Article 84 EPC).

3. Allowability of the amendments under Article 123(2) EPC

3.1 It is undisputed that processes using impregnation solutions having a measured pH in the range of from 12.5 to 13.7 are only disclosed in examples 3 to 7, 10 and 13 of the application as filed (published as WO 00/15334 A1, referred to as D9 during the written procedure).

3.2 The Board remarks also that the preparations of all the catalysts of these examples are modifications of the catalyst preparation of comparative example 1a and comprise the same carrier washing step with boiling deionized water (see page 11, lines 9 to 20), with the

exception of example 5, according to which an additional preliminary carrier washing step with TEAH (tetraethylammonium hydroxide) is carried out.

- 3.3 The examples as such are, however, silent on a lowering of the concentration of ionizable silicates on the surface of the carrier as required by claim 1 at issue.

Table I (page 11 of the description) reports the characteristics of the carriers used in the examples, in particular, the amounts of "*bulk acid-leachable*" species, including "*SiO₂*". However, it remained undisputed that the indicated SiO₂ amounts do not correspond to the amount of "*ionizable silicates on the surface of the carrier*". The examples thus do not contain any disclosure or suggestion that ionizable silicates are removed from the surface of the carrier by means of the carrier washing step described on page 11.

- 3.4 The Board remarks also that "*ionizable silicates*" are only disclosed in the description of the application as filed as one type (amongst several) of ionizable species that may be lowered in surface concentration by a washing step (see page 8, lines 7 to 17), and that the use of a washing step with a solution suitable for lowering the concentration of ionizable silicates is presented as an alternative to an ion exchange treatment (page 9, lines 2 to 9).

- 3.5 Considering also the remainder of the application as filed, no specific, unambiguous and at least implicit disclosure can be found which could support the view that the washing steps described in the context of the examples actually result in lowering the concentration

of ionizable silicates on the surface of the carriers used.

- 3.6 Moreover, the passage of the description specifically invoked by the Respondent (page 5, lines 1 to 4) just reads "*Further improvement in properties may be achieved by lowering the concentration of ionizable species present on the surface of the carrier prior to the deposition step.*" Therefore, it neither concerns specifically a washing step, nor the lowering of the concentration of ionizable silicates.

Furthermore, as regards the lowering of the concentration of ionizable silicates from the surface of the carrier by washing, the description explicitly recommends to carry out a subsequent drying step (page 9, lines 8 to 9). Such a step is also part of the washing step described in the examples (page 11, lines 15 to 18). This process feature is, however, also not reflected in the wording of claim 1.

- 3.7 The Board thus concludes that the description of the application as filed does not contain an unambiguous basis for a process with the specific combination of features according to claim 1 at issue. The latter is thus directed to subject-matter extending beyond the content of the application as filed.
- 3.8 Hence, in the Boards' judgement, claim 1 at issue does not comply with the requirements of Article 123(2) EPC.

4. Conclusion regarding the main request

For the above reasons, the main request is not allowable.

First auxiliary request - Admissibility

5. This request was also filed during oral proceedings in reaction to the debate regarding the allowability of claim 1 according to the main request (X, *supra*).

5.1 The Board remarks that the additional limitation, in claim 1 (see wording under XI, *supra*), to specific solutions to be used in the carrier washing step does not, *prima facie*, overcome the objection under Article 84 EPC raised in respect of claim 1 according to the main request (point 2 et seq., *supra*), since some of the listed compounds, for example tetraethylammonium hydroxide, may also be used as component of the impregnation solution (see, for instance, examples 3 to 5 of the patent in suit).

Therefore, even this further amended wording does not, *prima facie*, clearly imply that the carrier washing step has to be carried out **separately** from and **before** the impregnation step.

5.2 Moreover, it appears to be *prima facie* questionable whether this amendment finds a proper basis in the application as filed (Article 123(2) EPC) considering

- that the list of solvents cited in the relevant passage of the description of the application as filed (page 5, lines 27 to 32) reading "*Examples of wash and ion exchange solutions include aqueous and /organic solvent based-solutions...*" does not appear to precise whether all the listed solutions are suitable for washing; and

- that there is no disclosure that all the listed solvents may be used for lowering, by washing, the

concentration of ionizable silicates present on the surface of the carrier.

5.3 Furthermore, the fact invoked by the Respondent that a similar amendment (incorporation of the list of possible washing solutions) was contained in claim 1 according to the previous 9th auxiliary request, filed with its letter of 23 March 2012, cannot justify admitting the request at issue considering

- that claim 1 according to the previous 9th auxiliary request, like granted claim 1, did not explicitly require, as a step of the claimed process, the lowering of the concentration of ionizable silicates on the surface of the selected α -alumina containing carrier by washing, to which the amendment concerned relates (see also 2.1, *supra*); and

- that the impact of the amendment in the context of the substantially different wording of claim 1 according to said 9th auxiliary request was thus necessarily different.

5.4 Since the further amendment to claim 1 does not *prima facie* appear to overcome the deficiencies identified in respect of claim 1 according to the main request and moreover raises further issues of a certain complexity under Articles 84 and 123(2) EPC, rather than promoting the convergence of the debate, the Board decided not to admit this late filed request into the proceedings (Article 114(2) EPC and Article 13(1), (3) RPBA).

Order

For these reasons it is decided that:

- The decision under appeal is set aside.
- The patent is revoked.

The Registrar:

The Chairman:



D. Magliano

B. Czech

Decision electronically authenticated