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Datasheet for the decision of 5 April 2016

Case Number: T 1510/14 - 3.3.06

Application Number: 97917586.6

Publication Number: 0888185

IPC: B01J23/72, C07C209/60

Language of the proceedings: EN

Title of invention:
PREPARATION OF Cu/Al CATALYSTS

Patent Proprietor:
BASF Corporation

Opponent:
Clariant Produkte (Deutschland) GmbH

Headword:
Cu/Al catalyst / BASF CORP.

Relevant legal provisions:
EPC Art. 123(2)
RPBA Art. 13(1)

Keyword:

Main Request - added subject matter (yes)
Auxiliary Request filed in the course of the appeal proceedings - not clearly allowable (not admitted)

Decisions cited:

Catchword:

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Case Number: T 1510/14 - 3.3.06

DECISION
of Technical Board of Appeal 3.3.06
of 5 April 2016

Appellant: (Patent Proprietor)	BASF Corporation 100 Park Avenue Florham Park, NJ 07932 (US)
Representative:	V.O. P.O. Box 87930 2508 DH Den Haag (NL)
Respondent: (Opponent)	Clariant Produkte (Deutschland) GmbH Brüningstrasse 50 65929 Frankfurt am Main (DE)
Representative:	Dannenberger, Oliver Andre Abitz & Partner Patentanwälte mbB Postfach 86 01 09 81628 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 29 April 2014 revoking European patent No. 0888185 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	B. Czech
Members:	P. Ammendola
	C. Heath

Summary of Facts and Submissions

I. This appeal lies from the decision of the Opposition Division to revoke European patent no. 0 888 185.

II. Claim 9 of the corresponding application as filed (below **original claim 9**) reads:

> "*9. A method of making a catalyst containing primarily oxides of copper and aluminum, comprising the steps of:*
> *co-precipitating a Cu-Al-O precipitate from a solution containing a soluble copper salt and a soluble aluminum compound in the presence of a precipitating agent;*
> *calcining the precipitate at an appropriate temperature for an appropriate length of time.*"

III. The granted patent had been opposed, *inter alia*, on the grounds of added subject-matter (Article 100(c)/123(2) EPC). During the opposition proceedings the Proprietor had filed, *inter alia*, a set of amended claims labelled First Auxiliary Request.

IV. Claim 1 of the First Auxiliary Request reads (the amendments vis-à-vis **original** claim 9 are made apparent by the Board):

"***1.*** *A method of making a* ***non-chrome, copper-containing*** *catalyst containing primarily oxides of copper and aluminum,* ***which has a homogeneous composition having an aluminum content expressed as*** Al_2O_3 ***greater than 20% by weight and a copper content expressed as CuO less than 80% by weight,*** *comprising the steps of*:
co-precipitating a Cu-Al-O precipitate from a solution

~~containing~~ ***consisting of*** *a soluble copper salt and a soluble aluminum compound,* ***wherein the soluble aluminum compound is an aluminate,*** *in the presence of a precipitating agent,* ***wherein the precipitating agent is added to the precipitation mixture to maintain a pH of 7.4 ± 0.5, thereby producing a Cu-Al-O slurry; and filtering the slurry to obtain a Cu-Al-O filter cake, washing the filter cake, and drying the filter cake to a dried powder; and***
calcining the ~~precipitate~~ ***dried powder*** *at ~~an appropriate~~ temperature* ***ranging from higher than 700 °C to 900 °C*** *for an appropriate length of time;*
wherein said catalyst calcined at temperatures lower than 700 °C shows no x-ray diffraction patterns characteristic of a spinel,
wherein the catalyst has less than 5% leachable copper ions as determined by reacting 100 ml 10% acetic acid with 10 g of powder catalyst for one hour with continuous stirring."

V. The Opposition Division admitted into the proceedings said First Auxiliary Request, but found claim 1 thereof not allowable under, *inter alia*, Article 123(2) EPC. Since none of the other pending versions of claim 1 was found allowable, the patent was revoked.

VI. The Proprietor (herein below **Appellant**) appealed this decision and filed with its statements of grounds of appeal of 29 August 2014 several sets of amended claims, including a set labelled "First Auxiliary Request", corresponding to the First Auxiliary Request considered by the Opposition Division in the decision under appeal.

VII. The Opponent (herein below **Respondent**) replied to the statement of grounds of appeal with letter dated

14 January 2015 raising objections under, *inter alia*, Article 123(2) EPC against all pending claim requests.

VIII. With its letter of 5 June 2015 the Appellant filed further sets of amended claims, including one labelled "Sixth Auxiliary Request". Claim 1 of this latter reads (differences vis-à-vis claim 1 of the First Auxiliary Request filed with the statement of grounds made apparent by the Board):

"*1. A method of making a non-chrome, copper-containing catalyst containing primarily oxides of copper and aluminum, which has a homogeneous composition having an aluminum content expressed as* Al_2O_3 *greater than 20% by weight and a copper content expressed as CuO ~~less than 80%~~* ***of 40% to 70%*** *by weight, comprising the steps of:*

co-precipitating a Cu-Al-O precipitate from a solution consisting of a soluble copper salt and a soluble aluminum compound, wherein the soluble aluminum compound is an aluminate, in the presence of a precipitating agent, wherein ***co-precipitating comprises separately dissolving the copper salt and the aluminum compound and mixing the resulting solutions into a aqueous precipitation mixture in 5 minutes to 12 hours, and adding*** *the precipitating agent ~~is added~~ to the precipitation mixture to maintain a pH of 7.4 ± 0.5, thereby producing a Cu-Al-O slurry; and*
filtering the slurry to obtain a Cu-Al-O filter cake, washing the filter cake, and drying the filter cake to a dried powder; and
calcining the dried powder at a temperature ranging from higher than 700 °C to 900 °C for an appropriate length of time;

wherein said catalyst calcined at temperatures lower than 700 °C shows no x-ray diffraction patterns characteristic of a spinel,
wherein the catalyst has less than 5% leachable copper ions as determined by reacting 100 ml 10% acetic acid with 10 g of powder catalyst for one hour with continuous stirring, ***wherein the copper salt is copper nitrate, the soluble aluminum compound is sodium aluminate, and the precipitating agent is sodium carbonate.***"

IX. With letter of 29 February 2016 the Respondent disputed the admissibility into the proceedings of, *inter alia*, the Sixth Auxiliary Request in view of its late filing.

X. At the oral proceedings held on 5 April 2106, the Parties' final requests were as follows:

The Appellant requested that the decision under appeal be set aside and the case be remitted to the Department of First Instance for further prosecution on the basis of the claims according to the request labelled "First Auxiliary Request" filed with the statement of grounds of appeal (below **Main Request**) or the request labelled "Sixth Auxiliary Request" filed with letter dated 5 June 2015 (below **Auxiliary Request**).

The Respondent requested the appeal to be dismissed.

XI. The Appellant's arguments of relevance here may be summarized as follows.

Main Request - Allowability (Article 123(2) EPC)

Amended claim 1 according to the Main Request related to a subset of the methods disclosed in the applications as filed characterized, in particular, in that the calcination temperature was required to be "*higher than 700°C*".

The further claim feature (already referred to in the opposition proceedings as **feature (i)**) reading

"*wherein the catalyst has less than 5% leachable copper ions as determined by ...*"

was based on the general teaching disclosed by the application as filed according to which those methods of the invention in which the calcination was carried at temperatures "*higher then 700 °C*" produced catalysts which also contained less than 5% leachable copper ions.

More particularly, the application as file considered as a whole and, in particular, the passage on page 7, lines 6 to 12, thereof (herein below **the passage on page 7**) taught to the skilled reader that the effect of using in the method of the invention calcination temperatures "*higher than 700 °C*" was the production of catalysts having a spinel structure and containing "lower" amounts of leachable cations. Thus, the skilled person reading the application as filed, and in particular reading the passage on page 12, lines 6 to 9, (below **the passage on page 12**) explicitly mentioning an upper limit of "*<5%*" for the amount of leachable copper ions "*if the catalyst is calcined at a temperature higher than 700°C*", would conclude that this upper limit was the effect corresponding to such high calcination temperatures in terms of the amount of leachable copper. In other words, the passage on page 12, read in the context of the whole application, and in particular in combination with the passage on page 7, conveyed to the skilled person the general teaching that catalysts with an amount of leachable copper of "*<5%*" were generally obtained when setting the calcination temperatures at "*higher than 700°C*". Hence, the application as filed provided a basis also for the combination of feature (i) with the other features of the method of claim 1 of the Main Request. Amended claim 1 thus met the requirements of Article 123(2) EPC.

Auxiliary Request - Admissibility

This request was filed in reply to objections raised by the Respondent in the reply to the statement of grounds of appeal. Compared to amended claim 1 of the Main Request at issue, claim 1 of this Auxiliary Request was directed to a more restricted subset of the methods of the invention, *inter alia,* because features and specifying starting ingredients and some processing conditions of the co-precipitation step were additionally incorporated. These additional features were disclosed *inter alia* on page 6 of the application as filed. The specified starting ingredients and processing conditions were the ones used according to the examples to which the passage on page 12 related. Hence, this latter provided a basis for, at least, the combination of feature (i) with the other features of claim 1 of the Auxiliary Request.

XII. The Respondent's arguments of relevance here may be summarized as follows.

Main Request - Allowability (Article 123(2) EPC)

The Respondent argued, *inter alia*, that feature (i) of claim 1 of the Main Request was disclosed in the application as filed only in connection with three specific examples (examples 5 to 7). The passage on page 12 merely provided a description of the level of leachable copper ions that had been observed in these examples, prepared as disclosed in the description part from page 10, line 1, to page 11, line 9, of the application as filed, i.e. using specific starting reagents, in specific amounts, under specific processing conditions, including a specific number of washing steps. In respect of this latter fact, the Respondent stressed that example 16 of the application itself explicitly acknowledged that the number of washing steps strongly influenced the amount of leachable copper ions in the final catalyst. Hence, the combination of feature (i) with the other features of claim 1 at issue did not find any basis in the passages on pages 7 and 12 of the original application. Thus, amended claim 1 did not meet the requirements of Article 123(2) EPC.

Auxiliary Request - Admissibility

Claim 1 of this request did still not mention all the features of the exemplified methods (disclosed on page 10, line 1 to page 11, line 9 of the application as filed),to which the passage on page 12 related. Hence, this Auxiliary Request was not only filed very late but also *prima facie* not allowable under Article 123(2) EPC. Thus, it should not be admitted into the proceedings.

Reasons for the Decision

Appellant's Main Request

1. Admissibility

The claims according to the Main Request at issue, (re-)filed under cover of the statement of grounds of appeal are the same as the ones according to the First Auxiliary Request decided upon by the Opposition Division.

The admissibility of the appellant's Main Request is thus not at issue.

2. Allowability of the amendments - Claim 1 - Article 123(2)EPC

2.1 Like original claim 9 (see II, *supra*), claim 1 at issue (see IV, *supra*) is essentially directed to a method of making a catalyst containing oxides of copper and aluminum, by calcining a Cu-O-Al co-precipitate obtained from a solution of a soluble copper salt and a soluble aluminum compound by adding a precipitating agent. Claim 1 at issue however comprises further features defining reagents and process conditions.

2.1.1 Thus, claim 1 at issue defines a subset of the methods defined in original claim 9 as filed (below **the method of original claim 9**) which provides the broadest definition of the methods to which the application as filed was directed.

2.1.2 In particular, claim 1 at issue differs from original claim 9 in that it additionally requires a calcination temperature in the range "*higher than 700°C*" and feature (i) (see XI, *supra*). The Respondent's objection under Article 123(2) EPC concerned, in particular, the incorporation of feature (i) into claim 1, considering that the application as filed would not disclose its combination with the other features of claim 1 under consideration.

2.2 As to feature (i), the Board notes preliminarily the following:

(a) This feature defines the catalyst produced according to claim 1 in terms of a property thereof (the leachable Cu ion content). Hence, it also contributes to defining the claimed subset of the methods encompassed by original claim 9, by implicitly restricting it to those methods that do result in catalysts with less than 5% of leachable copper ions. It is to be noted that this restriction may not only be relevant for identifying the (not further defined) "*appropriate time*" that claim 1 at issue requires for the calcination step, but may also imply certain requirements regarding

- on the one hand, appropriate starting reagents among all soluble copper salts, aluminates and precipitating agents, as well as appropriate relative amount thereof, and
- on the other hand, further appropriate processing conditions (for the co-precipitation, filtering, washing and drying steps also referred to in claim 1 at issue).

(b) In the application as filed it is not explicitly stated

- that it would always be sufficient to set the calcination temperature at "*higher than 700°C*" to ensure the presence in the obtained catalyst of "*less than 5% of leachable copper ions*",

- or that it was (generally) an aim of the (methods of the) invention to provide catalysts having "*less than 5% leachable copper ions*".

2.3 In this respect, the Board notes that, instead, the application as filed merely mentions explicitly (e.g. on page 5, lines 15 to 17) as an object of the invention the provision of catalysts with "*a* ***low*** *percentage* of *leachable* ***cations***" (emphasis added).

Accordingly, the Board holds that (as also argued by the Appellant), upon reasonable construction (in the context of the application as filed as a whole), the passage on page 7 provides the information that catalysts calcined at temperatures lower than about 700°C will contain unspecified "*higher*" amounts of leachable cations (but may nonetheless show remarkable catalytic activity and selectivity in various reactions), and, thus, implies that catalysts calcined at temperatures higher than about 700°C will have "lower" amounts of leachable cations.

Finally, claim 22 of the application as filed (dependent on claim 16, that on its turns depends on original claim 9 and additionally requires calcining at approximately 700°C to 900°C) defines a subset of the embodiments of the method of original claim 9 in terms of an upper limit for the relative amount of leachable cations that may be contained in the catalyst prepared. Said claim reads as follows:

"*22. The method of claim 16 wherein the catalyst has less than 5% leachable cations*".

Hence, the Board concludes that, as also argued by the Appellant (see XI, *supra*), the original application merely conveys the teaching that the effect achieved by using calcination temperatures "*higher than 700 °C*" in the methods of the invention was that the catalysts so-produced had (in addition to a spinel structure) a "lower" relative content of leachable cations of preferably, less than 5%.

2.4 However, this teaching of the application as filed relates the cumulative "*leachable cations*" content of the catalyst, i.e. to the relative amount of all leachable cations contained therein. Accordingly, the preferred limit of "*less than 5%*" (original claim 22) applies not only to the amount of leachable copper ions, but also

- to the leachable aluminum ions,
- to any other leachable cations intentionally added in the course of the catalyst preparation (e.g. promoters, see claim 46 of the application as filed),
- as well as to the sodium ions possibly remaining in the co-precipitate even after repeated washing (in this respect, see e.g. Example 16 of the application as filed)

contained in the final calcined catalyst.

2.5 Thus, for the Board, neither the preferred feature of the method of original claim 9 defined in original claim 22 nor the passage on page 7, which disclose that calcining at temperatures "*higher than 700 °C*" results in a "*lower*" amount of "*leachable cations*" in the produced catalysts, amount to an implicit teaching that calcining at temperatures "*higher than 700°C*" would ensure the presence in the produced catalysts of "*less than 5% of leachable copper ions*".

2.6 The sole passage in the application as filed mentioning catalysts with a content of less than 5% "*leachable copper ions*" is undisputedly the passage on page 12, referring to the results in terms of leachable copper ions reported in the preceding Table 1. These results are those measured on the catalyst samples 1 to 7, prepared from the same co-precipitate but calcined at different temperatures (ranging from 400 to 1000°C, see page 10, line 1, to page 12, line 5, of the application as filed).

The passage on page 12 reads as follows (emphasis added by the Board):

"*As illustrated in the above table, if the catalyst is calcined at 400° (Example 1), the leachable Cu is 27%.* ***The leachable Cu dropped to <5% if the catalyst is calcined at a temperature higher than 700°C (Example 5-7)****. Therefore, the leachable Cu content can be controlled by calcination temperature*".

2.6.1 According to Appellant (see XI, *supra*) this passage disclosed to the skilled person already aware (e.g. from the passage on page 7) that a calcination temperature higher than 700 °C resulted in "*lower*" levels of leachable cations, that the provision of catalysts containing leachable copper in a relative amount of "*<5%*" was <u>generally</u> obtained as an effect of setting the calcination temperatures higher than 700°C, i.e. implying that <u>any</u> embodiment of the method of original claim 9 in which the calcination temperature was "*higher than 700°C*" also resulted in catalysts with a content of leachable <u>copper</u> ions of "*<5%*".

2.6.2 For the Board, taking account of the wording used (see "*dropped*") and of the explicit reference to examples 5 to 7, the middle sentence of the passage of page 12 (emphasised under 2.6, *supra*) is *per se* just a description of the sequence of results reported in the Table. Only the last sentence of the passage on page 12 has a more general content, but it neither mentions nor necessarily implies a link between the two specific values "*higher than 700 °C*" (for the calcination temperatures) and "*<5%*" (for the amount of leachable copper ions to be controlled).

2.6.3 Hence, in the Board's judgement, the sole disclosure relevant to feature (i) contained in the passage on page 12 refers exclusively to the results observed in these three specific examples 5 to 7 in comparison to those observed in the preceding examples (i.e. examples 1 to 4 in which the calcination temperature was 400°C to 700°C).

2.6.4 The Board arrives at the same conclusions when also taking into consideration that the methods of original claim 9 using calcination temperatures "*higher than 700°C*" are disclosed in the original application (e.g. in the passage on page 7) to result in catalyst with "*lower*" content of "*leachable cations*" (see 2.3, *supra*). More particularly, the Board sees indeed no reason why such disclosure should change the understanding of the middle sentence of the passage on page 12.

2.6.5 Hence, the Board finds that the passage on page 12 only relates to the values measured on the specific catalysts produced by methods exemplified in examples 5 to 7 that have undisputedly been carried out as described from page 10, line 1 to page 12, line 5, of the application as filed. From this description it is apparent that the methods respectively used according to examples 5 to 7 appear to differ only in terms of the calcination temperatures used. They all comprise the preparation of the same co-precipitate, using three specific reagents in specific relative amounts following a certain mixing protocol, and subsequently washing the co-precipitate three or four times and drying it under certain specified conditions.

2.6.6 The Board considers it self-evident that the measured values of leachable copper ions in examples 5 to 7 will to some extent depend on the relative amounts of copper aluminum compounds used.

Moreover, Example 16 of the application as filed shows that the number of washing steps has an effect on the sodium content remaining in the product to be calcined. A lower sodium content is stated (page 19, lines 6 to 8, of the application as filed) to also have an effect on the final amount of leachable cations, including leachable copper). Hence, as stressed by the Respondent and not disputed by the Appellant, these indications render plausible that also the number of washing steps used may have substantial impact on the final content of leachable copper ions actually measured in the obtained catalysts.

2.6.7 Hence, for the Board, the examples to which the passage on page 12 relates can only be considered to be representative of a very limited subset of the methods encompassed by original claim 9. In other words, in the application as filed feature (i) is only disclosed in combination with further specific features such as, for instance, a specific ratio of the amounts of starting ingredients (Cu and Al compounds) and a specific number (3 or 4) of washing steps.

2.7 If only for the reason that these other specific features of the examples to which the passage on page 12 refers were not incorporated into claim 1 of the Main Request, the parts of the application as filed invoked as basis for the amendments by the Appellant do manifestly not providing a sufficient basis for the combination of feature (i) with the other features of the method of claim 1 at issue.

2.8 Thus, the Board comes to the conclusion that claim 1 is directed to subject-matter not directly and unambiguously derivable from the application as filed and thus extending beyond the content of the latter. Hence claim 1 does not meet the requirements of Article 123(2) EPC.

2.9 Therefore, the Main Request is not allowable.

Appellant's Auxiliary Request

3. Admissibility

3.1 This request was filed (as as "Sixth Auxiliary Request"), allegedly in reply to observations made by the Respondent in its reply to the statement of grounds of appeal, but before the issuance of the summons to oral proceedings. The admittance of this request into the proceedings is thus subject to the Board's discretion under Article 13(1) RPBA.

3.2 According to one of the criteria applied by the Boards of Appeal of the EPO in the exercise of said discretion, claims which are not *prima facie* clearly allowable may not be admitted. Claims are clearly allowable if the Board can quickly ascertain that they do not give rise to new objections and overcome at least the outstanding formal objections under the EPC.

3.3 Claim 1 of the Auxiliary Request at issue (wording under VIII, *supra*) differs from claim 1 of the Main Request in that it prescribes a narrower range for the copper content (expressed as CuO) of the catalyst produced, and also requires certain processing conditions in the co-precipitation step (separate dissolution of the copper salt and the aluminate, then mixing these solutions into a solution of the precipitating agent) and that the starting copper salt, aluminates and precipitating agent must, respectively, be copper nitrate, sodium aluminate and sodium carbonate (see under VIII, *supra*, the emphasized features in claim 1 of the Auxiliary Request).

3.4 It is apparent that these newly introduced features of claim 1 limit the claimed subject-matter to an even narrower subset of the methods encompassed by original claim 9, the methods of said narrower subset being more similar to the methods used according to examples 5 to 7, to which the passage on page 12 refers. In particular, the processing conditions and ingredients additionally specified at the end of claim 1 are the same ones that have been used in carrying out these examples (see under 2.6.5 *supra*).

3.5 However, claim 1 of the Auxiliary Request still does not comprise several other relevant features of the only examples for which feature (i) is disclosed.

In particular, as already indicated under 2.6.2 to 2.6.7, feature (i) is only disclosed in the application as filed in combination with, for instance, a specific ratio of the amounts of the starting ingredients and a specific number of washing steps.

Given that claim 1 at issue still does not specify these latter further features, its subject-matter is manifestly not limited to those embodiments of the method original claim 9 in connection with which the passage on page 12 also discloses feature (i).

3.6 If only for this reason, claim 1 of the Auxiliary Request does not, *prima facie*, appear to overcome all outstanding objections under Article 123(2) EPC identified with respect to claim 1 of the Main Request. Claim 1 is, consequently, not clearly allowable.

3.7 Accordingly, the Board, in the exercise of its discretion under Article 13(1) RPBA, decided not to admit this request into the proceedings.

Conclusion

4. None of the Appellant's claim requests is both admissible and allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

Beschwerdekammern des Europäischen Patentamts
Boards of Appeal of the European Patent Office
Chambres de recours de l'Office européen des brevets

D. Magliano B. Czech

Decision electronically authenticated