BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

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

Datasheet for the decision of 14 October 2008

Case Number: T 0946/06 - 3.3.10

Application Number: 98120248.4

Publication Number: 0913388

IPC: C07C 209/48

Language of the proceedings: EN

Title of invention:
Hydrogenation of nitriles to produce amines

Patentee:
AIR PRODUCTS AND CHEMICALS, INC.

Opponent:
BASF SE

Headword:
-

Relevant legal provisions:
EPC Art. 54, 56, 113(2), 123(2)
RPBA Art. 15(5)

Keyword:
"Main request and auxiliary requests 3 and 4"
"Novelty (yes): specific combination - selection from 2 lists - no modification of examples ex post facto"
"Inventive step (no): improvement (no) - no fair comparison with prior art - obvious alternative"
"Auxiliary requests 1, 2 and 2a: amendment extends beyond application as filed"
"Decision on request as a whole"
"Oral proceedings: reopening of debate to file fresh request (no)"

Decisions cited:
T 0012/81, T 0020/81, T 0007/86, T 0332/87, T 0197/96, T 0199/00, T 0235/04

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0946/06 - 3.3.10

D E C I S I O N
of the Technical Board of Appeal 3.3.10
of 14 October 2008

Appellant: (Opponent)
BASF SE
D-67056 Ludwigshafen (DE)

Representative:
Isenbruck, Günter
Isenbruck, Bösl, Hörschler, Wichmann, Huhn
Patentanwälte
Theodor-Heuss-Anlage 12
D-68165 Mannheim (DE)

Respondent: (Patent Proprietor)
AIR PRODUCTS AND CHEMICALS, INC.
7201 Hamilton Boulevard
Allentown, PA 18195-1501 (US)

Representative:
Kador & Partner
Corneliusstrasse 15
D-80469 München (DE)

Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 10 April 2006 concerning maintenance of European patent No. 0913388 in amended form.

Composition of the Board:

Chairman: R. Freimuth
Members: P. Gryczka
D. S. Rogers

Summary of Facts and Submissions

I. A notice of opposition was filed in which revocation of European patent 0 913 388 based on the patent application 98120248.4 in its entirety was requested on the grounds of lack of novelty and inventive step (Article 100(a) EPC).

II. In an interlocutory decision issued in writing on 10 April 2006, the Opposition Division found that the European patent could be maintained in amended form on the basis of claims 1 to 23 of the then pending and present main request.

Claim 1 of said request read as follows:

"1. A process for the catalytic hydrogenation of nitriles which comprises contacting the nitrile with hydrogen in the presence of a sponge cobalt catalyst under conditions for effecting conversion of the nitrile group to the primary amine, characterized in that the contacting is effected in the presence of a sponge cobalt catalyst treated with a catalytic amount of lithium hydroxide and in the presence of water."

Claim 23 of said request read as follows:

"23. A sponge cobalt catalyst having incorporated therein from 2 to 30 millimoles lithium hydroxide per gram of sponge cobalt catalyst."

The Opposition Division came to the conclusion that the claims defined subject-matter which was novel with regard to the disclosure, *inter alia*, of document

(2) GB-A-1 164 354.

For the assessment of inventive step this document represented the closest prior art. In the light thereof, the problem to be solved by the invention was the provision of a process for hydrogenating nitriles providing high conversion and high selectivity to primary amines and wherein the catalyst could be used over an extended period of time in the absence of ammonia. This problem was effectively solved as shown by the examples and comparative examples described in the patent in suit. The claimed process involved an inventive step, since the prior art documents did not suggest that these effects could be achieved by a combination of a sponge cobalt catalyst treated with lithium hydroxyde.

III. The Opponent (Appellant) lodged an appeal against the above decision. With a letter dated 13 October 2008 the Appellant filed a new document

(10) "The Raney Cobalt Catalyst Family", W.R. Grace and Co.

IV. With a letter dated 12 September 2008 the Proprietor of the patent in suit (Respondent) filed four sets of claims as first to fourth auxiliary requests. With a letter dated 13 October 2008 he filed a further set of claims as auxiliary request 2a to be placed chronologically before the third auxiliary request. Finally, at the oral proceedings which took place in front of the Board on 14 October 2008, the Respondent

replaced the auxiliary requests 3 and 4 previously filed by fresh auxiliary requests 3 and 4.

Claim 1 of the first auxiliary request differs from claim 1 as maintained by the opposition division (present main request) by the indication that "the lithium hydroxyde is present in the lithium hydroxyde promoted sponge catalyst in an amount from 2 to 30 millimoles lithium hydroxide per gram of sponge cobalt catalyst".

Claim 1 of the second auxiliary request differs from claim 1 of the first auxiliary request by the feature requiring that "water is present in an amount of 0.1 to 25% by weight of the nitrile to be hydrogenated".

Claim 1 of the auxiliary request 2a differs from claim 1 of the first auxiliary request by the feature requiring that "the water concentration in the reactor is maintained between 0,1 % by weight but less than 25% by weight of the nitrile to be hydrogenated".

Claim 1 of the third auxiliary request differs from claim 1 of the main request by the feature requiring that the "nitrile is an aliphatic beta-aminonitrile or a beta-alkoxynitrile".

Claim 1 of the fourth auxiliary request differs from claim 1 of the main request by the feature requiring that the "nitrile is an aliphatic beta-aminonitrile or a beta-alkoxynitrile selected from the group consisting of beta-aminopropionitrile, di-(2-cyanoethyl)amine, N-methyl-beta-aminopropionitrile, N,N-dimethyl-beta-aminopropionitrile, N-ethyl-beta-aminopropionitrile,

N,N-diethyl-beta-aminopropionitrile, mono-(2-cyanoethyl)methylamine, di-(2-cyanoethyl)methylamine, N-(2-cyanoethyl)ethanolamine, N,N-di-(2-cyanoethyl)ethanolamine, N-(2-cyanoethyl)diethanolamine and N-(2-cyanoethyl)propanolamine
or a beta-alkoxynitrile represented by the formula $R\text{-}O(\text{-}CR'HCR'H\text{-}O)_n\text{-}CH_2CH_2CN$ where R=C_1 to C_{30} alkyl radical, R'=H or C_1 to C_8 alkyl radical and n=1 to 30".

Whereas the main request and the auxiliary requests 1, 2 and 2a comprised an independent claim to the particular sponge catalyst as such, this claim has been omitted in the auxiliary requests 3 and 4.

V. According to the Appellant document (10) was filed late and should not be admitted into the proceedings. Document (2) did not disclose *expressis verbis* as catalyst the combination of cobalt and lithium hydroxyde required in the present claims. However, this catalyst resulted from a selection operated within two small lists disclosed in document (2), one concerning the metals and the other one the strong bases which could be incorporated into the catalysts. In addition, by replacing in the catalyst of the examples of document (2) nickel by cobalt, as envisaged by the description of said document, the skilled person would arrive directly to the claimed process. Therefore, the subject-matter of claim 1 of the main request lacked novelty, *inter alia*, in view of the process described in document (2). This document illustrated also the closest prior art for the assessment of inventive step. Since none of the examples and comparative examples presented by the Respondent provided a fair comparison of the claimed process with that according to the

closest prior art, the sole problem solved by the invention could be formulated as the provision of a further process for hydrogenating nitriles. Since document (2) itself disclosed all the features of the claimed process and already taught that the catalyst could comprise a combination of Raney cobalt and lithium hydroxide no inventive step could be acknowledged for the claimed process. Amended claim 1 of the auxiliary requests 1, 2 and 2a all required that the lithium hydroxyde was present in the lithium hydroxyde promoted sponge catalyst in an amount from 2 to 30 millimoles lithium hydroxide per gram of sponge cobalt catalyst. However, this feature was not disclosed in the patent application as filed with the consequence that the amended claim 1 of those requests did not comply with the requirements of Article 123 (2) EPC. No inventive step could be based on the fact that particular nitriles were hydrogenated in accordance with claim 1 of the auxiliary requests 3 and 4 since these particular nitriles were encompassed by the process disclosed in document (2) and were also disclosed as possible candidates for a hydrogenation, for example, in document

(7) US-A-4 375 003

which was already cited in the opposition proceedings.

Thus, also auxiliary requests 3 and 4 had to be rejected with the consequence that the patent should be revoked.

VI. According to the Respondent, the claimed process was novel, *inter alia*, with regard to document (2) which

did not disclose a process in which the catalyst was a combination of Raney cobalt and lithium hydroxide. Document (2) represented an adequate starting point for the assessment of inventive step. With regard to that prior art, the technical problem underlying the invention was to provide a process for hydrogenating nitriles with an improved conversion and selectivity to primary amines. Table 15 of the patent specification reproduced in part on page 22 of the letter dated 22 December 2006, as well as the comparison of example 2 with example 37 of the patent specification and the experimental report filed on 8 February 2006 showed that these effects were achieved by replacing nickel by cobalt in a catalyst containing lithium hydroxide. In addition the comparison of example 47 with example 48 in tables 17 and 18 of the patent specification demonstrated that the improvements were also obtained by replacing sodium hydroxide by lithium hydroxide in a Raney cobalt catalyst. Although, apart from the catalyst, the other process conditions in the comparative examples representing the prior art were not identical to those in accordance with the invention the improvement was nevertheless sufficiently demonstrated. This was particularly true with respect to the quantity of water in the reaction medium since a larger amount of water than that required had no impact on conversion and selectivity. With regard to the different quantities of strong base, the fact that more sodium hydroxide was used in the comparative example than potassium hydroxide in the example reflecting the invention showed even more the beneficial effect of the invention since the skilled person expected better conversions and selectivity by using higher amounts of strong base. The improvement in conversion and

selectivity was thus made credible. Since none of the prior art documents suggested that these positive results could be achieved by the combination of cobalt and lithium hydroxide, the claimed process involved an inventive step. An inventive step had also to be acknowledged if the problem underlying the invention would have only been the provision of a further process, since lithium hydroxide was not disclosed in document (2) as a preferred strong base. In addition, document (2) did not teach that the presence of water in the reaction medium, as required by the claimed process, was essential to the catalytic activity. In fact, the skilled person would have even been discouraged from carrying out the hydrogenation in the presence of water since the starting nitrile compound could be subject to detrimental hydrolysis. The amendment to claim 1 of the auxiliary requests 1, 2 and 2a specifying that the lithium hydroxyde was present in the lithium hydroxyde promoted sponge catalyst in an amount from 2 to 30 millimoles lithium hydroxide per gram of sponge cobalt catalyst was based on page 6, lines 1 and 2 and on claim 9 of the application as filed. Thus, this amendment fulfilled the requirements of Article 123 (2) EPC. Claim 1 of the auxiliary requests 3 and 4 was restricted to a process for hydrogenating aliphatic-beta-aminonitriles or beta-alkoxynitriles. Since these types of nitriles might undergo a "Michael addition" leading to by-products, it was surprising that the claimed process nevertheless could be applied to these particular nitriles. Therefore, the process according to claim 1 of these requests involved an inventive step. Claim 23 as maintained by the opposition division did not form part of these appeal proceedings since the

extent of the appeal had been limited according to the Appellant's submissions to claims 1 to 22.

VII. At the beginning of the oral proceedings, the Board informed the parties on how it would proceed, i.e. that the discussion would concern the process in accordance with claim 1 of all requests and that the independent claim to the catalyst as such present in the main request as claim 23 and in the auxiliary requests 1, 2 and 2a respectively as claim 21, 20 and 20, would be discussed later if it proved necessary to do so in order to reach a final decision. At the end of the discussion concerning process claim 1 of all requests the Board stated the final requests and again informed the parties on how the proceedings would continue, i.e. if the Board during its deliberation arrived at a positive conclusion with regard to any process claim 1, the debate would be reopened in order to discuss the outstanding issues, or, if the Board arrived at a negative conclusion with regard to process claim 1 of all claim requests, it would deliver its final decision on all requests without any further discussion. After a negative answer from both parties to the question whether they wanted the floor for any further submission or request, the Board closed the debate and adjourned the proceedings for deliberation. After deliberation the Board resumed the oral proceedings. Upon resumption of the oral proceedings the Respondent stated that he wished to submit a fresh additional auxiliary request based on a sole claim directed to the catalyst *per se*. After hearing the Parties on the issue of reopening the debate and further deliberation, the Board announced its decision that it would not reopen the debate.

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

The Respondent requested that the appeal be dismissed (main request), or that the patent be maintained on the basis of auxiliary request 1 or 2 both filed with a letter dated 12 September 2008, or on the basis of auxiliary request 2a filed with a letter dated 13 October 2008, or on the basis of auxiliary requests 3 or 4, both filed during the oral proceedings before the Board. The Respondent requested further that the Board rules that claim 23 as maintained by the Opposition Division did not form part of the appeal proceedings.

IX. At the end of the oral proceedings the final decision of the Board was announced.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Novelty*

2.1 According to the Appellant the claimed process was not novel with regard, *inter alia,* to the process disclosed in document (2).

Claim 1 of the main request is directed to a process for the catalytic hydrogenation of nitriles to produce primary amines which comprises contacting the nitrile

with hydrogen in the presence of a sponge cobalt catalyst treated with a catalytic amount of lithium hydroxide and in the presence of water.

2.2 Document (2) discloses a process for the hydrogenation of nitriles to produce primary amines in the presence of water, a base and a hydrogenation catalyst (claim 1). The catalyst is a Raney type nickel or a Raney type cobalt catalyst (claim 6, page 2, lines 56 and 57). The base is selected from a list of different compounds including, *inter alia*, alkali metal hydroxides, such as lithium hydroxide, sodium hydroxide and potassium hydroxide (page 2, lines 76 to 103). Only examples 4 to 7, 9 and 10 relate to a process in the presence of a cobalt catalyst. However, in these examples the base is not lithium but sodium or potassium hydroxide. Example 12 describes a process in which the base used is lithium hydroxide but the catalyst is Raney nickel and not Raney cobalt. The specific combination of cobalt catalyst and lithium hydroxide is thus not disclosed in document (2).

In addition, it is established jurisprudence of the Boards of Appeal that subject-matter resulting from a specific combination requiring the selection of elements from at least two lists is normally regarded as novel (see e.g. T 12/81, point 13 of the reasons, OJ EPO 1982, 296). Applying this principle in the present case, to arrive at the claimed subject-matter a double selection is necessary, namely in a first step selecting a cobalt catalyst and discarding a nickel catalyst and, in a second step specifically selecting lithium hydroxide from the different bases envisaged in document (2). However, document (2) does not contain

any specific disclosure leading the skilled person directly and unambiguously to that particular selection of compounds. For these reasons, the claimed process is novel with regard to the disclosure of document (2).

2.3 The Appellant argued in support of its objection of lack of novelty that each of the two features, i.e. cobalt catalyst and lithium hydroxide base, to be combined would merely have to be selected from a short respective list, i.e the list of catalysts comprising only two alternatives and the list of bases comprising only a few alternatives. However, the length of a list of alternatives is not a decisive criteria for the assessment of novelty, since even two short lists can result in multiple combinations and do not specifically disclose a particular individualised combination (decision T 7/86, point 5.1, OJ EPO 1988, 381).

The Appellant also based its objection of lack of novelty on a combination of the examples of document (2) with the general part of the description arguing that the replacement of the base used in the examples 4 to 7, 9 and 10 by lithium hydroxide envisaged as a possible base in the description of said document would lead to the claimed process. The same applied also to example 12 where merely replacing nickel by cobalt would also result in a process falling under present claim 1.

In this context, the Board firstly notes that according to the established case law of the Boards of Appeal regarding the examination of novelty, the teaching of a document is not confined to the detailed information given in the examples, but embraces the whole

disclosure of that document (decision T 332/87, not published in OJ EPO, point 2.2). Nevertheless, the general principle consistently applied by the Boards of Appeal for concluding lack of novelty is that there must be a direct and unambiguous disclosure in the state of the art which inevitably leads the skilled person to subject-matter falling within the scope of what is claimed.

In the present case, there is no specific disclosure in document (2) to combine those examples with particular parts of the description for replacing either the base used in the examples by lithium hydroxide, or the catalyst used therein by a cobalt catalyst. This modification of the examples by the Appellant can thus only be seen as the result of an *ex post facto* interpretation of document (2), i.e an interpretation made with the knowledge of the invention in mind and with the aim of reconstructing on purpose the claimed process (see for example decisions not published in OJ EPO, T 199/00, point 4.2.1 and T 235/04, point 3). For this reason, this line of argument of the Appellant must be rejected.

2.4 Therefore, the Board concludes that the process of claim 1 is novel with regard to the disclosure of document (2).

2.5 According to the Appellant further documents also disclosed the claimed process. However, it is not necessary in view of the negative outcome with respect to the inventive step of the claimed process when starting from the state of the art illustrated by document (2) (see point 3 below) to consider the

novelty objections based on further documents in more detail.

3. *Inventive step*

3.1 The patent in suit is directed to a process for the catalytic hydrogenation of nitriles to produce primary amines. The hydrogenation of nitriles to produce primary amines already belongs to the state of the art as illustrated by document (2) (see point 2.2 *supra*) which was considered in the decision under appeal and by both parties in the appeal proceedings as representing the closest prior art document for the assessment of inventive step. The Board sees no reason to depart from this finding.

3.2 Having regard to this prior art, the Respondent submitted that the technical problem underlying the patent in suit was to provide a process with improved conversion rate and selectivity to primary amines (patent specification page 2, line 57 and page 3, lines 1 and 2). To carry out the process in the absence of ammonia cannot be part of the problem to be solved since the presence of ammonia was already avoided in the process of the closest prior art (document (2), page 2, lines 38 to 41).

3.3 As the solution to this problem the patent in suit proposes the process according to claim 1, which is characterized by the combination of a sponge cobalt catalyst treated with lithium hydroxide. The fact that the process is carried out in the presence of water is already known from the closest prior art and, thus,

cannot characterise the claimed solution (see claim 1 in document (2)).

3.4 The Appellant and the Respondent were divided as to whether or not the evidence presented, namely table 15 in the patent specification reproduced in part on page 22 of the letter dated 22 December 2006, as well as the comparison of example 2 with example 37 of the patent specification and the experimental report filed on 8 February 2006, convincingly showed that the technical problem defined herein above was successfully solved by the claimed process.

3.4.1 According to the established case law of the Boards of Appeal, for a comparative test to demonstrate an inventive step with an improved effect over a claimed area, the nature of the comparison with the closest state of the art must be such that the effect is convincingly shown to have its origin in the distinguishing feature of the invention. For this purpose it may be necessary to modify the elements of comparison so that they differ only by such a distinguishing feature (see T 197/86, point 6.1.3, OJ EPO, 1989, 371).

However, none of the evidence upon which the Respondent relies satisfies this criteria, since no comparison was made in which the process illustrating the invention and that illustrating the closest prior art differ only by the feature distinguishing the invention from that prior art, namely substituting sodium /potassium for lithium hydroxide on a sponge cobalt catalyst or substituting nickel for cobalt in a catalyst treated with lithium hydroxide.

3.4.2 The Respondent nevertheless referred to the comparative examples described in table 15 in the patent specification. However, the "runs" illustrating the claimed process (runs D1, D9 and D10) were carried out using different amounts of catalyst (third column), different amounts of base (fifth and sixth column) and different reaction times (eighth column) than the "runs" D2 to D8 intended to illustrate the prior art, apart from substituting lithium for sodium/potassium hydroxide, i.e. the distinguishing feature of the claimed invention. Thus, due to those additional variations it remains impossible to establish that any technical effect has its origin in the distinguishing feature. In addition, the runs D2 to D7 were performed with a comparative catalyst which did not provide any significant conversion rate since 86% or more of the starting nitrile (dmapn) did not react but was left in the reaction medium, i.e. from a technical point of view the catalyst used was totally unsuited for that reaction. These runs, therefore, are not a fair illustration of the prior art which achieved yields in primary amine of over 90% (see document (2), page 2, lines 48 to 53; examples). Comparative tests using an unsuitable catalyst while suitable catalysts are described in the closest prior art document are unconvincing. For these reasons, the results described in table 15 of the patent specification do not allow a fair comparison between the closest prior art and the claimed invention. It is thus not necessary to discuss a further objection of the Appellant with regard to these comparative tests, namely that they do not indicate the selectivity for obtaining the desired

primary amine but only that observed for one given by-product.

3.4.3 The Respondent relied also on the comparison of example 2 with comparative example 37 of the patent in suit. However, example 2 illustrating the claimed process was carried out with 11,9 mmoles LiOH /g of cobalt catalyst and a water content of 5,73% whereas comparative example 37 was carried out with 23,5 mmoles of LiOH/g of nickel catalyst and 9,0% of water. Since these two examples differ substantially with regard to the amount of base and water they cannot demonstrate that the alleged improvement finds its origin in the feature distinguishing the claimed invention from the prior art, namely the combination of cobalt and lithium hydroxide.

The Respondent argued that the water content had no impact on selectivity and conversion, as soon as the minimum amount of water required for maintaining the catalyst activity was present in the reaction medium. However, this argument has not been substantiated with corroborating facts or evidence and therefore is pure speculation. On the contrary, the patent specification indicates the amount of water to be used, even specifying a particular upper limit (paragraph [0020]), and thus revealing that the amount of water has an impact on the operation of the catalyst.

The Respondent also argued that since comparative example 37 was carried out with a higher amount of base than that used in example 2 illustrating the invention, an even lower conversion and selectivity would have been observed if the comparative example had been

carried out with the same amount of base as in example 2. This argumentation is not corroborated by substantiating facts and evidence; rather the patent specification gives an opposite teaching in its table 15 in which run D9 with an amount of LiOH of 2,81 mmoles/g resulted in a lower conversion than run D10 with a lower amount of only 1,35 mmoles/g. This comparison shows in fact that a higher amount of base does not necessarily lead to a better selectivity and conversion rate contrary to the Respondent's allegations. For these reasons, the Board cannot accept that variations of the amount of base or water have no impact on selectivity and conversion rate. Therefore, the conclusion of the Respondent that the comparison of example 2 with example 37, regardless of these additional variations, was nevertheless fair and pertinent must be rejected.

3.4.4 The Respondent also compared in tables 17 and 18 of the patent specification, example 47 illustrating the claimed process with example 48 according to the prior art, these examples differing from each other by substituting lithium for sodium/potassium hydroxide. However, whereas the conversion rate is indicated for both examples in table 17, the selectivity is only given for example 47 in table 18, but not for example 48. Since the improvement of both conversion rate and selectivity form the technical problem underlying the patent in suit (see point 3.2 *supra*), otherwise an overall improvement of the process would not be achieved, it is not possible in the absence of a comparison as regards selectivity to establish that the technical problem has effectively been solved.

3.4.5 Finally, according to the Respondent the comparison of the two last examples (Ni MC-500 and Co2724) in the experimental report filed on 8 February 2006 showed also that the technical problem underlying the patent in suit was effectively solved. However, in this report the presence of water in the process is not indicated. The Respondent argued that water came from the Raney catalyst used in both examples. However, the test report is silent about any water content in the catalysts, let alone about any amount of water. Thus, it cannot be concluded therefrom that both examples were performed under the same reaction conditions. For these reasons, this comparison also fails to show that the improvement in conversion rate and selectivity was effectively achieved by the claimed process vis-à-vis the closest prior art.

3.4.6 Consequently, the alleged improvement of conversion rate and selectivity over the closest prior art is not adequately supported by the evidence on which the Respondent relies.

3.5 According to the jurisprudence of the Boards of Appeal, alleged but unsupported advantages cannot be taken into consideration for the determination of the problem underlying the claimed invention (see e.g. decision T 20/81, OJ EPO 1982, 217, point 3, last sentence). Since in the present case the alleged advantage, i.e. improved conversion rate and selectivity, lacks the required experimental support, the technical problem as defined above (see point 3.2) needs to be redefined in a less ambitious way, and in view of the teaching of document (2) can merely be seen in providing an alternative process for the hydrogenation of nitriles.

3.6 It remains to be decided whether or not the proposed solution to that objective technical problem, namely the process according to claim 1, is obvious in view of the state of the art.

3.6.1 The skilled person looking for an alternative to the process disclosed in document (2) would turn his attention to the teaching of document (2) itself from which he learns that Raney cobalt catalysts combined with lithium hydroxyde may be used in the hydrogenation of nitriles in the presence of water to provide primary amines in high yield (page 2, lines 57, 77 and 78).

The Board concludes from the above that document (2) gives a clear incentive on how to solve the technical problem underlying the patent in suit of providing an alternative process for hydrogenating nitriles, namely by combining the Raney cobalt catalyst with lithium hydroxide, thereby arriving at the solution proposed by the patent in suit.

For these reasons, the subject-matter of claim 1 of the main request turns out to be merely the result of an arbitrary choice made within the ambit of document (2) and thus lacks the required inventive step.

3.6.2 The Respondent argued in support of inventive step that document (2) did not disclose lithium hydroxide as the preferred base. However, when solving the problem of providing merely an alternative process the skilled person does not restrict the teaching of document (2) to preferred embodiments but takes into consideration all features taught in that document, among them,

lithium hydroxide which is described there as a base suitable for use in the hydrogenation process. Therefore, this argument cannot convince the Board.

3.6.3 Furthermore, according to the Respondent the skilled person would not carry out the hydrogenation process in the presence of water as required by the claimed process, since he would expect a detrimental side reaction, namely the hydrolysis of the nitrile as shown by the scheme on page 3, lines 8 to 11 of document (2). In addition document (2) did not teach that the presence of water was essential for the catalyst activity.

The Board cannot follow this argument since the presence of water is already a mandatory feature of the process disclosed in document (2) (see claim 1; page 2, line 51; page 4, line 11). Therefore, when following the teaching of the closest prior art document (2) the skilled person would not refrain from using water. Therefore, this argument of the Respondent is not supported by the facts and is to be rejected.

3.7 To summarize, the process according to claim 1 does not involve an inventive step. Therefore, the main request must be refused. In these circumstances it is not necessary to discuss and consider any other claim of this request, including independent claim 23, since a decision can only be taken on the request as a whole.

Auxiliary requests 1, 2 and 2a

4. *Amendments*

Claim 1 of the auxiliary requests 1, 2 and 2a was amended, *inter alia*, by specifying that "the lithium hydroxyde is present in the lithium hydroxyde promoted sponge catalyst in an amount from 2 to 30 millimoles lithium hydroxide per gram of sponge cobalt catalyst".

The Respondent argued that this amendment was based on page 6, lines 1 and 2 and on claim 9 of the application as filed

According to page 6, lines 1 and 2, the lithium hydroxyde is added to provide a level from 2 to 30 millimoles per gram of sponge cobalt catalyst. This passage of the description as filed does not however disclose that this amount of lithium hydroxide is present in the catalyst as required by the amended claim 1. Adding a specific amount of lithium hydroxide, is not tantamount to incorporating that very same amount into the catalyst so as to be "present in the catalyst" at this level. The same conclusion applies to original claim 9 which specifies that the lithium hydroxide is present in the process in an amount of 2 to 30 millimoles per gram of sponge cobalt catalyst but not as required by amended claim 1 that it is "present in the catalyst" at this level.

Therefore, neither claim 9, nor the passage of the description of the application as filed at page 6, line 1 and 2 provide a basis for the amendment made to claim 1. Nor can the Board find any other basis for this amendment in the application as filed.

Hence, this amendment to claim 1 generates subject-matter which is not clearly derivable from the content

of the application as filed, contrary to the requirements of Article 123(2) EPC.

Therefore, the auxiliary requests 1, 2 and 2a must also be refused. In these circumstances it is not necessary to consider any other claim of these requests, including the independent claim to the catalyst as such, since a decision can only be taken on a claim request as a whole.

Auxiliary requests 3 and 4

5. *Amendments*

Claim 1 of auxiliary requests 3 and 4 has been amended respectively by indicating that the "nitrile is an aliphatic beta-aminonitrile or a beta-alkoxynitrile" or more precisely by indicating that the nitrile is an aliphatic beta-aminonitrile or a beta-alkoxynitrile selected from the group consisting of a list of particular compounds, as disclosed respectively in claims 7, 8 and 10 of the application as filed. These amendments which also restrict the scope of protection conferred by the patent as granted fulfil, therefore, the requirements of Article 123 (2) and (3) EPC. This was not contested by the Appellant.

6. *Inventive step*

6.1 Since document (2) is not restricted with regard to the nitriles to be hydrogenated, this document remains also the closest prior art for the assessment of inventive step in relation to claim 1 of the auxiliary requests 3 and 4. This was not contested by the Parties. In addition, the Respondent did not rely for these

requests on any other comparative experiment than those already addressed for the main request. Therefore, also in relation to the subject-matter of claim 1 of the auxiliary requests 3 and 4, the technical problem solved by the invention remains the same as for the main request, i.e. the mere provision of an alternative process for the hydrogenation of nitriles (point 3.5 above).

6.2 The teaching of document (2) applies to any type of nitriles, the document giving no restrictions in this respect. In addition, the particular nitriles specified in claim 1 of the auxiliary requests 3 and 4 are known as possible candidates for hydrogenation for example from document (7) (page 9, lines 18 and 19). Therefore, no inventive step can be acknowledged for the mere indication of nitriles conventional in the art to be hydrogenated. In these circumstances, the hydrogenation of the nitriles specified in claim 1 of the auxiliary requests 3 and 4 can only be seen as an arbitrary selection within the disclosure of document (2). Therefore, the assessment of inventive step given in point 3 above in respect of the main request is not affected by the fact that the process is directed to the hydrogenation of the particular nitriles indicated in claim 1 of the auxiliary requests 3 and 4 and the conclusions drawn for the main request still apply.

6.3 According to the Respondent beta-aminonitrile or a beta-alkoxynitrile could easily be subject to a "Michael addition" leading to unwanted by-products. It was thus surprising that the claimed process could nevertheless be applied to these nitriles.

However, according to document (2) any type of nitrile can be subjected to the hydrogenation process disclosed therein. In addition, document (7) which relates also to the hydrogenation of nitriles foresees particularly the hydrogenation of those nitriles specified in claim 1 of the auxiliary requests 3 and 4. The Board sees therefore no reason which would have deterred the skilled person from not applying this clear teaching thereby arriving without an inventive step at the claimed invention.

6.4 In conclusion, the subject-matter of claim 1 of auxiliary requests 3 and 4 does not involve an inventive step and therefore these requests must also be refused.

Late filed document (10)

7. The Respondent objected to the introduction into the proceedings of document (10) filed by the Appellant one day before the oral proceedings. Since it was not necessary for the Board to consider this document for the outcome of the present appeal, it was not necessary to take a decision on the admissibility of said document into the proceedings.

Competence of the Board (Article 113 (2) EPC)

8. Article 113(2) EPC stipulates that the instances of the EPO shall consider and decide upon the European patent in suit only in the text submitted to it, or agreed, by the Proprietor of the patent. In the present case, the Respondent-Proprietor during the course of the debate of the oral proceedings before the Board agreed only to

the text of the patent in suit submitted as main request and auxiliary requests 1, 2, 2a, 3 and 4 (see point IV *supra*). However, that main request and those auxiliary requests have to be rejected for not being allowable since they all comprise a process claim 1 the subject-matter of which lacks the required inventive step (see points 3 and 6 *supra*) or extends beyond the content of the application as filed (see point 4 *supra*). Following the disposition principle enshrined in Article 113 (2) EPC the Board is bound to the claim requests submitted to it. Thus, in the absence of any allowable claim request in the proceedings, i.e. a text of the patent submitted or agreed to by the Respondent-Proprietor, the patent in suit must be revoked since there is no text qualifying under Article 113(2) EPC on which the patent in suit may be maintained.

In these circumstances no purpose is served by the Board taking a position on the request of the Respondent to state whether or not claim 23 of the main request, i.e. a claim directed to a catalyst *per se,* forms part of the appeal proceedings. This issue has no impact on the decision to be taken by the Board on the claim requests on file pursuant to Article 113(2) EPC as none of the claim requests on file, including the main request, are allowable due to the deficiencies of the process claim 1 present in all claim requests. Thus, whether or not claim 23 is subject to the appeal proceedings is immaterial to reach a final decision on the patent in suit as a whole, i.e. on any of the texts of the patent submitted or agreed to by the Respondent-Proprietor.

9. *Procedural matters*

9.1 With a letter dated 12 September 2008, i.e. one month before the oral proceedings, the Respondent filed four sets of claims as first to fourth auxiliary requests. With a letter dated 13 October 2008, i.e. one day before the oral proceedings in front of the Board, he filed a further set of claims as auxiliary request 2a. At the oral proceedings before the Board, the Respondent filed fresh auxiliary requests 3 and 4.

9.2 At the end of the oral proceedings, after the Board stating the final requests and after the Board's clarification on how the proceedings would continue (point VII supra), the Board closed the debate and adjourned the proceedings for deliberation since the parties gave a negative answer to the question of the Board whether they wanted the floor for any further submission or request. After deliberation of the Board, the oral proceedings were resumed. It was only then, i.e. just before the Board could deliver its decision, that the Respondent wanted to submit a further fresh additional auxiliary request. In support of the late filing of such a fresh additional auxiliary request the Respondent argued that he thought that the discussion would continue after deliberation of the Board on the basis of catalyst claim 23 of the main request and that he wanted therefore to file a fresh auxiliary request restricted to that sole claim.

After hearing the Parties on the issue of reopening the debate and after further deliberation, the Board following the objections of the Appellant, announced that it would not exercise its discretionary power to

reopen the debate in order to give the Respondent the opportunity to introduce such a late request into the appeal proceedings, based on the following reasons.

First, the Board made it clear to the parties before closing the debate that it could during its deliberation arrive at a final decision on all claim requests on file and thus on the patent in suit as a whole in the case of a negative conclusion with regard to process claim 1 of any request and, that the debate would only be reopened for discussing further issues if a positive conclusion on any process claim 1 of the requests on file would be reached during deliberation. The parties were, thus, fully aware of how the proceedings would continue. Furthermore, the Respondent by arguing that he expected the matter of claim 23 to be discussed and decided on the basis of the pending requests and at the same time seeking to introduce a fresh auxiliary request restricted to that claim immediately after resumption of the oral proceedings, in order to get a decision on that issue, is inconsistent.

Second, the Respondent, in the appeal proceedings, had the benefit of multiple opportunities to submit fresh requests based on amended claims and he did so in filing overall seven different auxiliary requests at different stages of the proceedings, the last during the oral proceedings in front of the Board without, however, submitting one based solely on a catalyst claim. On the contrary, the auxiliary requests 3 and 4 filed as fallback positions did not even contain a claim directed to the catalyst as such, with the consequence that any fresh auxiliary request directed

solely to the catalyst as such deviates from the converging line of restrictions made so far by the Respondent in the preceding auxiliary requests and at such a very late stage of the proceedings would be contrary to procedural economy.

Thus, in the absence of any convincing justification for such a late filing, it would have been improper to reopen the debate and to give the Respondent a further opportunity to amend the claims since the intended submission of a fresh request after the debate was closed would in the present case unduly delay the conclusion of the proceedings (Article 15 (5) of the Rules of Procedure of the Boards of Appeal as entered into force on 13 December 2007).

9.3 Therefore, the Board at the oral proceedings made proper use of the discretionary power conferred on it to not reopen the debate and, after deliberation, announced its final decision on the patent in suit.

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 | R. Freimuth