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**Datasheet for the decision
of 19 December 2007**

Case Number: T 0150/04 - 3.3.07

Application Number: 95203469.2

Publication Number: 0716884

IPC: B01J 23/66

Language of the proceedings: EN

Title of invention:

Process for preparing ethylene oxide catalysts

Patent Proprietors:

SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.

Opponent:

Van de Zandt, Wilhelmus Martinus

Headword:

-

Relevant legal provisions:

EPC Art. 54

Keyword:

"Novelty - (yes)"

"Remittal - (yes)"

Decisions cited:

-

Catchword:

-



Case Number: T 0150/04 - 3.3.07

D E C I S I O N
of the Technical Board of Appeal 3.3.07
of 19 December 2007

Appellants: SHELL INTERNATIONALE RESEARCH MAATSCHAPPIJ B.V.
(Patent Proprietors) Carel van Bylandtlaan 30
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Representative: -

Respondent: Van de Zandt, Wilhelmus Martinus
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 1 December 2003
revoking European patent No. 0716884 pursuant
to Article 102(1) EPC.

Composition of the Board:

Chairman: S. Perryman
Members: F. Rousseau
G. Santavicca

Summary of Facts and Submissions

- I. The appeal lies from the decision of the Opposition Division dated 1 December 2003 revoking European patent No. 716 884. That decision was based on two sets of claims, which had been submitted with letters dated respectively 01 July 2002 and 17 October 2003, and which respectively formed the main and the auxiliary request of the Patent Proprietors.
- II. A notice of Opposition had been filed by the Opponent (Respondent) to request the revocation of the patent in its entirety on the grounds of lack of novelty and inventive step (Article 100(a) EPC). The opposition was supported inter alia by the following documents:
- (3) EP-A-0 315 911 and
(10) EP-A-0 266 015
- III. In their decision, the Opposition Division held that the subject-matter of claim 1 of the main request was not novel having regard to the process disclosed in either document (3) or (10). The Opposition Division also came to the conclusion that the process according to the auxiliary request was anticipated by that described in document (10).
- IV. The Appellants (Patent Proprietors) lodged an appeal on 30 January 2004 against the decision of the Opposition Division. A written statement setting out the grounds of appeal was filed on 5 April 2004.
- V. In a letter dated 19 November 2007, filed in response to the summons to attend oral proceedings, the

Appellants submitted amended claims 1 for a new main request and a new auxiliary request. According to the Appellants, amendments in claim 1 of the main request had been occasioned by a new prior art document which had come to their attention only recently, namely (14) JP-A-04-346835. An English translation thereof was also annexed.

VI. At the oral proceedings before the Board, held on 19 December 2007, the Appellants submitted a set of nine claims superseding any previous set of claims. The sole independent claim of this request reads as follows:

"1. A process for preparing a catalyst for the vapour phase production of ethylene oxide from ethylene and oxygen which process comprises depositing a predopant amount of at least one alkali metal, preferably selected from the group consisting of lithium, potassium and cesium, on a shaped porous refractory support, in salt, compound or potassium complex form which has been dissolved in an aqueous or essentially aqueous solution, drying the support to a degree sufficient to fix the alkali metal on the support before deposition of the other catalyst components at a temperature in the range of from 200°C to 1000°C , and thereafter depositing a catalytically effective amount of silver, a promoting amount of alkali metal and a promoting amount of rhenium on said support, and optionally a promoting amount of a rhenium copromoter selected from sulphur, molybdenum, tungsten, chromium, phosphorus, boron and mixtures thereof and thereafter drying the support".

The dependent claims 2 to 9 were directed to preferred embodiments within the ambit of claim 1.

VII. The Appellants submitted during the oral proceedings before the Board that claim 1 according to the main request was based on the application as filed and thus complied with the requirements of Article 123(2) EPC. The requirements of Article 123(3) EPC were also met as the scope of the claims as granted had been restricted, in particular by the introduction of the range of temperature used for drying the support after deposition of the predopant. The Respondent did not raise any formal objection against the amended claims under article 123, paragraphs (2) and (3), or article 84 EPC.

VIII. In response to the new main request, the Respondent's objection for lack of novelty was maintained only in view of document (10). The Respondent's arguments in support of this objection submitted both in writing and during the oral proceedings can be summarized as follows:

Document (10) disclosed catalysts on a shaped carrier which are used for the production of ethylene oxide from ethylene and oxygen. The catalysts of document (10) included silver, rhenium, and at least one further metal which might be an alkali metal. According to document (10), the catalyst could be obtained by a process in which the alkali metal as predopant, silver and the mixture of alkali metal and rhenium as promoters were deposited on the carrier/the catalyst in the order claimed in the disputed patent, i.e. a first alkali metal is deposited in a separate deposition step

on the carrier prior to the deposition of the silver, second alkali metal and rhenium. Document (10) also specified a temperature to be used for heating the impregnated carrier, which was comprised between 50°C and 600°C, preferably between 75°C and 400°C. Example 11 of document (10) illustrated the above described multiple deposition steps. More specifically, the carrier would be first impregnated with barium, then dried and calcined at 800°C. The product obtained was then impregnated with a mixture comprising silver, cesium and rhenium, followed by a heat-treatment in air at a temperature of 250-270°C. Although barium was an alkaline earth metal, document (10) disclosed that alkaline earth metals and alkali metals could be used interchangeably. Thus, the subject-matter of claim 1 under dispute was anticipated by example 11 in the light of the entire disclosure of document (10), as there was nothing which would prevent the skilled reader from carrying out the teaching of example 11 with an alkali metal instead of barium.

IX. The Appellants took the view that it was not permissible, as the Respondent did, to read document (10) with the hindsight knowledge of the present invention. The Appellants argued that multiple selections of features would have to be made from the disclosure of document (10) in order to arrive at the subject-matter of disputed claim 1. More specifically, document (10) did not disclose any range of temperature for drying the support after deposition of a predopant amount of an alkali metal. The range of temperature indicated by the Respondent for the drying step only referred to the step of heating after application of silver, but did not refer to the step of drying the

alkali metal added to the support in the first step. Furthermore, among the large number of worked examples in document (10), only example 11 disclosed the use of an alkaline earth metal. The skilled person would not have combined the specific disclosure of Example 11 concerning barium with a general disclosure of document (10) restricted to alkali metals and rhenium promoters. There was no disclosure in document (10) for the alleged interchangeability of alkaline earth metals and alkali metals. Document (10) did not teach the skilled person the possibility of varying the one specific disclosure concerning an alkaline earth metal by substituting an alkali metal. Thus, novelty was given.

- X. The Appellants requested that the decision under appeal be set aside and the case be remitted to the first instance for further prosecution on the basis of claims 1 to 9 according to the main request submitted at the oral proceedings held on 19 December 2007.
- XI. The Respondent requested that the appeal be dismissed.
- XII. At the end of the oral proceedings the decision of the Board was announced.

Reasons for the Decision

- 1. The appeal is admissible.

Amendments

- 2. The Respondent did not raise formal objections against the amended claims. The Board has no reason to take a

different position. The subject-matter of claim 1 is based on claim 1 and the passages at page 5, line 11 and page 6, lines 4 to 15 of the application as filed. Dependent claims 2 to 9 are furthermore supported by original claims 2 to 9. In claim 9, the presence of rhenium has been made mandatory, in line with amended claim 1. The present claims also restrict the scope of protection compared to that conferred by the granted claims, in particular because the presence of rhenium is not optional but mandatory, and also because the temperature used for drying the support has been specified. The amendments therefore satisfy the requirements of Article 123, paragraphs (2) and (3), EPC.

Novelty

3. Since the Respondent challenged the novelty of the claimed invention exclusively having regard to document (10), and since it has not been shown that documents (3) and (14) disclose the use of rhenium, the following reasoning is limited to the assessment of the novelty over document (10).

4. There is a generally applicable principle that for lack of novelty, there must be a direct and unambiguous disclosure of the claimed subject-matter in the state of the art. In the present case, any anticipatory disclosure should, at least, directly and unambiguously disclose a process for preparing a catalyst, which at least, includes:

(A) deposition of a predopant amount of at least one alkali metal on a support and a drying step at a

temperature in the range of from 200°C to 1000°C and thereafter

(B) deposition of silver, an alkali metal and rhenium.

5. Document (10) discloses in independent claim 1 catalysts for the manufacture of ethylene oxide from ethylene and oxygen which contain a support, a catalytically effective amount of silver, rhenium as a first promoter and at least one further metal as second promoter (page 5, lines 51 and 52). According to claim 2, the further metal is selected from alkali metals, earth alkaline metals, molybdenum, tungsten, chromium, titanium, hafnium, zirconium, vanadium, thallium, thorium, tantalum, niobium, gallium and germanium. The preferred further metals are earth alkali metals and alkali metals, alkali metals being most preferred (page 6, line 6 to line 9).
- 5.1 The process disclosed in document (10) for the deposition on the support of silver, rhenium and at least one further metal is defined in general terms on page 3, from line 9 to line 19, page 5, from line 17 to line 29, page 7, from line 31 to line 35 and on page 10, from line 41 to line 49. The preferred method is to deposit silver, the further metal and rhenium simultaneously on the support (page 5, lines 20 and 21). This method is illustrated in all of the examples of document (10), except in example 11. The non simultaneous deposition on the support of silver, rhenium and at least one further metal, which in contrast is less preferred, is disclosed on page 10, from line 11 to line 21. The promoters may in this case be deposited on the support or on the catalyst

depending upon the particular impregnation technique or sequence utilized. As used in document (10), the term "on the catalyst" when referring to the deposition of promoters refers to the catalyst which comprises the combination of support and silver (page 10, lines 12-14). The promoters, i.e., alkali metal and rhenium may according to page 10, lines 14-16, be found individually or in a mixture thereof on the catalyst, on the support or on both the catalyst and the support. Document (10) provides in the following sentence nine concrete ways to deposit silver, rhenium and the other metal, namely (i) alkali and rhenium on the catalyst, (ii) alkali and rhenium on the support, (iii) alkali on the support and rhenium on the catalyst, (iv) alkali on the support and a mixture of alkali and rhenium on the catalyst (page 10, lines 17 and 18), (v) rhenium on the support and a mixture of alkali and rhenium on the catalyst, (vi) rhenium on the support and alkali on the catalyst, (vii) a mixture of alkali and rhenium on the support and a mixture of alkali and rhenium on the catalyst (page 10, lines 19 and 20), (viii) a mixture of alkali and rhenium on the support and alkali on the catalyst and (ix) a mixture of alkali and rhenium on the support and rhenium on the catalyst.

- 5.2 Among the deposition processes described above, only possibilities (iv) and (vii) deal with the sequential deposition of an alkaline metal on the support, followed by a deposition of silver, an alkali metal and rhenium as is required by the claims under dispute. None of the illustrative embodiments presented in the examples of document (10) however corresponds to possibility (iv) or (vii), as the only example dealing with the sequential deposition of the different metals,

namely example 11, does not disclose a first deposition step with an alkali metal, but with barium, i.e. with an alkaline earth metal.

5.3 The skilled person reading the information given for possibilities (iv) and (vii), however, would not find the information that the support after deposition of the alkali metal should be heat treated at a temperature of 200°C to 1000°C before depositing the additional metals. It has neither been argued by the Respondent, nor shown anywhere in the cited documents that a skilled person could only use a temperature within this range. Hence, the deposition processes (iv) and (vii) disclosed in document (10) when read in isolation do not constitute themselves a direct and unambiguous disclosure for claim 1 under dispute.

5.4 The Respondent's argument that the passage disclosing possibility (iv) should however be read in combination with the passage of the same document (page 10, lines 39-40) which specifies the temperature to be used for heating the impregnated carrier, namely between 50°C and 600°C, preferably between 75°C and 400°C, is not convincing. The passage of document (10) selected by the Respondent which discloses a range of temperatures overlapping with the range of temperatures specified in the claims under dispute, refers to a process using simultaneous deposition of all metals applied on the support (see whole paragraph starting on page 10 at line 46), but not to a process using a sequential deposition process as disclosed for possibility (iv) or (vii). Furthermore, no indication can be found in document (10) that the temperature used for the heat treatment of a support which has been simultaneously

impregnated with a mixture of silver, rhenium and an alkali metal is necessarily the same as that employed for heat treating a support which has been impregnated with an alkali metal promoter, before silver and rhenium are also deposited.

- 5.5 The Respondent also has argued that example 11 of document (10), which deals with a sequential deposition process in which barium is applied first, followed by an heat treatment at 800°C and silver, rhenium and cesium are applied in a second step, should be read in combination with the information at page 6, lines 6 to 9, that alkaline earth metals such as barium and alkali metals can be used interchangeably. As in his opinion there is nothing which would prevent the skilled person to carry out the teaching of example 11 with an alkali metal instead of barium, document (10) should be considered to disclose the subject-matter of disputed claim 1. The Respondent's argumentation fails to convince. First of all, document (10) does not disclose that alkali metal and barium are interchangeable in the process illustrated by example 11. Furthermore, contrary to the Respondent's submissions, the issue to be decided for assessing novelty over document (10) is not whether there is nothing which would prevent the skilled person to substitute in the process of example 11 an alkali metal for barium, which is rather an issue concerning inventive step, if the process of example 11 were to be considered as the process constituting the closest state of the art, but whether the skilled person is given in document (10) a direct and unambiguous information to do so. In other words, an objection to lack of novelty over document (10) based on a specific combination of different parts of this

document can be convincing only if the skilled reader is given clear and direct information to obtain this specific combination. In order to arrive at the subject-matter of the claim under dispute, the skilled person would need first to select the process described in example 11, secondly to modify this process by changing the type of promoter used for the first deposition step, although other modifications such as substitution of other alkali metals for cesium in the second step could be envisaged, and thirdly to substitute an alkali metal for barium, in preference to substituting other earth alkali metals. There is however absolutely no disclosure in document (10) that the process described in example 11 could be exactly repeated with an alkali metal instead of barium, while keeping the order of addition and type of the various metal used and an identical thermal treatment after the first deposition step.

5.6 Hence, the Board concurs with the Appellants' view that reading into document (10) of the process according to the disputed claims would be using hindsight knowledge of the present invention.

6. The subject-matter of claim 1 under dispute, and that of dependent claims 2 to 9 thereof, is therefore considered to be novel.

Remittal

7. The decision under appeal was solely based on lack of novelty, which objection is no longer pertinent due to the amendments made to the claims. As the Opposition Division has not yet decided on inventive step, which

was the other ground for opposition, and the Appellants have requested remittal, the Board considers it appropriate to exercise its power conferred on it by virtue of Article 111(1) EPC to remit the case to the Opposition Division for further prosecution on the basis of the claims according to the main request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance for further prosecution on the basis of claims 1 to 9 according to the main request submitted at the oral proceedings held on 19 December 2007.

The Registrar

The Chairman

C. Eickhoff

S. Perryman