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Anmeldenummer / Filing No / N^o de la demande : 84 105 611.2

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Bezeichnung der Erfindung: Catalyst and method for ortho-alkylation of
Title of invention: hydroxyaromatic compounds
Titre de l'invention :

Klassifikation / Classification / Classement : B01J 23/74

ENTSCHEIDUNG / DECISION

vom / of / du 20 November 1990

Anmelder / Applicant / Demandeur : General Electric Company

Patentinhaber / Proprietor of the patent /
Titulaire du brevet :

Einsprechender / Opponent / Opposant :

Stichwort / Headword / Référence :

EPU / EPC / CBE Article 54, Rule 88

Schlagwort / Keyword / Mot clé : "Novelty (affirmed), after amendment of the
claims"
"Request for correction of errors (not
allowable), two equally plausible possibilities
of correction"

Leitsatz / Headnote / Sommaire

Europäisches
Patentamt
Beschwerdekammern

European Patent
Office
Boards of Appeal

Office européen
des brevets
Chambres de recours



Case Number : T 158/89 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 20 November 1990

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Decision under appeal : Decision of Examining Division 033 of the European
Patent Office dated 8 December 1988 refusing
European patent application No. 84 105 611.2
pursuant to Article 97(1) EPC

Composition of the Board :

Chairman : P.A.M. Lançon

Members : M.M. Eberhard

M. Aúz Castro

Summary of Facts and Submissions

- I. European patent application No. 84 105 611.2 (publication No. 129 065) was refused by a decision of the Examining Division. The decision was based on Claims 1 to 18 received on 19 December 1987.

Independent Claim 1 read as follows:

"A solid catalyst composition for the alkylation of hydroxyaromatic compounds with primary or secondary alkanols, characterised in that it comprises magnesium oxide and up to 0.1% by weight, based on said magnesium oxide, of copper, said copper being deposited on said magnesium oxide in elemental or chemically combined form."

Independent Claims 4 and 14 were directed to respectively the preparation of such a catalyst composition and a method for alkylating at least one hydroxyaromatic compound in the presence thereof.

- II. The grounds for refusal were that the catalyst composition of Claim 1 lacked novelty with respect to GB-A-1 153 890, document (1), and the method according to Claim 4 did not involve an inventive step. It was held that the mention of the particular use in Claim 1 was not restrictive on the composition of the claimed catalyst and, therefore, it was not of relevance in determination of novelty. Document (1) was regarded as a disclosure of magnesium oxide, calcium oxide and zinc oxide, each compounded with 0.1 wt% of copper oxide (indicated as the end-point of a range and thus specifically disclosed). According to the decision, as the copper metal content corresponding to 0.1 wt% copper oxide had to be less than 0.1 wt% the composition of Claim 1 could not be considered as novel.

- III. The Appellant lodged an appeal against this decision. He submitted two new sets of claims (Annex A and Annex B) with the Statement of Grounds of Appeal. Claim 1 of Annex A was identical to Claim 1 of the decision under appeal and Claim 1 of Annex B was limited to a copper content of up to 0.06 wt% based on magnesium oxide. The Appellant contended, amongst other, that the 0.06% value could be found in example 1 of the application as filed.
- IV. In a Board's communication, the question of conformity with the requirements of Article 123(2) was raised in connection with both sets of claims. It was further referred to US-A-3 446 856, document (2), and Derwent Abstract JP-A-4 427 367 (3) cited in the search report.
- V. Oral proceedings were held on 20 November 1990. During the proceedings the Appellant submitted several sets of claims which were successively discussed as to their formal allowability under Article 123(2). He also requested correction of errors in the application. An English translation of JP-A-4 427 367, document (3a), was handed to the Board.

In connection with the request for correction of errors the Appellant pointed out that the application as originally filed contained formal errors in example 1 with regard to the copper content of the catalyst. He put forward that the content of 0.25% stated at page 5, line 12 was not correct and that two errors had in fact occurred in this line, the first one in the value of the copper content and the second one in the compound with respect to which this content was expressed. Therefore, the correction made in the amended description of 16 December 1987, i.e. "0.06% copper by weight based on magnesium oxide" was not appropriate. According to the Appellant the correct text would have read "0.025% copper by weight based on magnesium reagent". He requested correction in this way and introduction of the

terms "comparative examples" at line 13 in connection with examples 2 and 3. In support of this request he submitted calculations in order to show that the amounts of basic magnesium carbonate and cupric nitrate trihydrate used in example 1 would have led to a catalyst composition containing 0.025% copper by weight based on magnesium reagent which corresponded to 0.06% by weight based on magnesium oxide. The Appellant further argued that, as a consequence of the correction in example 1, the copper content of the catalysts of examples 2 and 3 was obviously 0.05 and 0.1% by weight based on magnesium reagent, i.e. respectively 0.12 and 0.24 wt% with respect to magnesium oxide. He concluded that in view of these values lying outside the range stated in the description and in the product claim, examples 2 and 3 had to be presented as comparative examples.

During the oral proceedings, the Board informed the Appellant that the request for correction of errors under Rule 88 was not allowable and thus the corrected values of the examples could not form a basis for a valid claim. At the end of the oral proceedings, the Appellant submitted a new set of five claims as main request. Claim 1 thereof is worded as follows:

"A method for alkylating at least one hydroxyaromatic compound by the catalytic reaction of the same with at least one primary or secondary alkanol, characterized in that it comprises carrying out said reaction at a temperature of up to 475°C in the presence of a catalyst composition which comprises magnesium oxide and up to 0.1% by weight, based on said magnesium oxide, of copper, said copper being deposited on said magnesium oxide in elemental or chemically combined form in a layer of submicroscopic thickness."

Dependent Claims 2 to 5 relate to preferred embodiments of this method.

- VI. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of Claims 1 to 5 submitted during oral proceedings.

Reasons for the Decision

1. The appeal is admissible.
2. There are no objections under Article 123(2) to the amended Claim 1 since it is supported by Claims 20 and 12 of the application as originally filed. Dependent Claims 2 to 5 are based upon original Claims 21 to 24 and, therefore, also meet the requirements of Article 123(2).
3. As pointed out by the Examining Division in its communication dated 10 June 1987, the term "submicroscopic thickness" is in itself vague. However, in the Board's opinion the skilled person can understand the meaning of the sentence "deposited on magnesium oxide in a layer of submicroscopic thickness" in the context of catalysis taking into account the method of preparation of the catalyst, the very low amount of copper deposited on MgO and the statement in the description that the layer is believed to be essentially monoatomic (cf. page 4, lines 27-32). Therefore, Claim 1 is considered to meet the requirements of clarity set out in Article 84 CBE.
4. After examination of the cited documents, the Board has come to the conclusion that none of them discloses a process for alkylation of hydroxyaromatic compounds with alkanols, having the combination of features recited in Claim 1.

Document (1) does not concern the alkylation of hydroxyaromatic compounds by reaction with an alkanol but the dehydrohalogenation of hydrocarbons and recovery of elemental halogen.

Document (2) relates to a process for the methylation of the ortho position of phenols by reacting methanol with a phenol in the presence of a magnesium oxide catalyst at a temperature in the range of 475°-600°C. The catalyst may contain 1 wt% copper in form of copper oxide (cf. Claim 1 and column 11, lines 23-32 and 41-70), i.e. a copper content which is much higher than the upper limit mentioned in the present Claim 1.

Document (3a) also concerns the orthomethylation of phenols by methanol. The reaction is carried out at a temperature higher than 400°C, preferably 500-600°C, in the presence of a catalyst consisting of magnesium oxide and 0.5 to 50 wt % of one or two metals selected from Cu, Zn, Ni, Mo, W, Be, Pt or Pd (wt% based on magnesium oxide). The catalysts of examples 1 and 5 to 8 contain 5 to 10 wt% copper (see Claim 1; page 3, lines 3-6; whole page 4; page 6, table 1). The claimed process differs from this prior art at least by the lower copper content of the catalyst. This is also true with respect to document (3) which is a summary of the corresponding Japanese patent application. Therefore, the process according to Claim 1 is novel.

5. In its first communication dated 10 June 1987 the Examining Division expressed a provisional opinion as to the lack of inventive step of the process claimed in original Claim 20 which essentially corresponds to the present Claim 1 (cf. point 11). However, it is not derivable from this communication which document was regarded as closest prior art and what technical problem was taken into consideration starting therefrom. Furthermore, the question whether or

not the method of alkylation involves an inventive step was not considered any longer in the decision under appeal, although a claim directed to this method (cf. Claim 14) was maintained in the amended set of claims. Moreover, document (3a) handed out at the oral proceedings discloses additional relevant information over document (3), which might have an influence upon the issue of inventive step and, in the Board's view, document (3a) represents the closest prior art. Under these circumstances, the Board finds it appropriate to remit the case to the Examining Division for further prosecution upon the basis of the claims submitted at the oral proceedings.

6. During the oral proceedings, it was decided upon the request for correction of errors, namely the request for replacing "0.25% copper by weight based on magnesium oxide" at page 5, line 12, by the correct version "0.025% copper by weight based on magnesium reagent" and introducing the terms "comparative examples" at page 5, line 13, after "examples 2-3" (cf. point V above). The Board concluded that the request for correction of errors under Rule 88 was not allowable for the reasons given hereafter.
 - 6.1 In order for correction under Rule 88 to be allowable, it must be established (i) that an error is present in the document as filed at the EPO and (ii) that the correction is obvious in the sense set out in Rule 88, i.e. "in the sense that it is immediately evident that nothing else would have been intended than what is offered as the correction".
 - 6.2 In the present case, all the examples of the application as originally filed are described as being illustrative of the invention except for the two "controls" of tables I and II. However, as pointed out by the Examining Division, the copper content of 0.25 wt% (cf. page 5, line 12) lies

outside the range of up to 0.1 wt% mentioned in the original product Claim 12. This value is also not in agreement with the statement in the original description that "in general, the solid catalyst compositions produced by the method of the invention comprise magnesium oxide and up to about 0.1% by weight, based on magnesium oxide, of copper ..." (see page 4, lines 27-31).

Therefore, in the Board's view, the skilled reader of the patent application would recognise in view of this inconsistency that an error has occurred with regard to the copper content of the catalyst, either at page 5, line 12 or in the range stated both in the product claim and at page 4 of the description.

In the Board's opinion, the skilled reader having noticed this error would check whether the amounts of starting products used in example 1 could actually lead to a final catalyst with a copper content of 0.25% by weight based on magnesium oxide, taking into account that no copper was left in the liquid phase (cf. page 4, line 2). It is credible that he would base his calculation upon the sole formula of basic magnesium carbonate given in the introduction of the description (see page 2a, line 16), i.e. $(\text{MgCO}_3)_4 \cdot \text{Mg}(\text{OH})_2 \cdot 5\text{H}_2\text{O}$, although another formula, namely $3\text{MgCO}_3 \cdot \text{Mg}(\text{OH})_2 \cdot 3\text{H}_2\text{O}$ is also well known for basic magnesium carbonate (cf. Handbook of Chemistry and Physics, 60th Edition 1979-1980, page B-93). From this calculation it is directly derivable that, under the operating conditions of example 1, the indicated amounts of basic magnesium carbonate and cupric nitrate trihydrate would normally lead to a final catalyst containing 0.06% copper by weight based on magnesium oxide instead of 0.25 wt%. If the calculated copper content is expressed on the basis of

the magnesium reagent this would in fact correspond to 0.025% by weight based on basic magnesium carbonate. Therefore, the skilled reader would conclude therefrom that an error has in any case occurred in example 1, either in the amounts of the starting products or in the copper content of the final catalyst which is in turn inconsistent with the range indicated at page 4, lines 27-31 and in the product claim.

6.3 It remains to consider whether the requested correction fulfils condition (ii).

6.3.1 Firstly it should be noted that the calculated copper content of 0.06 wt% based on magnesium oxide lies within the range of up to 0.1 wt% mentioned both in the description and in the product claim. Replacement of the value "0.25%" by "0.06%" at page 5, line 12, would, therefore, remove all the inconsistencies indicated above and would thus appear as a plausible correction to the skilled reader. Such a correction was, by the way, proposed by the Appellant himself in reply to the Examining Division's communication pointing out the inconsistency between example 1 and the product claim (see Applicant's letter of 16 December 1987 and page 5 of the amended description enclosed therewith).

6.3.2 The Appellant's request for correction is, however, different. The requested replacement of "0.25% copper by weight based on magnesium oxide" by "0.025% copper by weight based on magnesium reagent" corresponds in fact to the second alternative derivable from the calculations mentioned above (cf. point 6.2). However, this correction has an influence upon examples 2 and 3. According to the Appellant, substitution of "magnesium reagent" for "magnesium oxide" in example 1 implies that the copper

contents of 0.05 and 0.1% indicated in examples 2 and 3 are no longer based on the weight of magnesium oxide but on that of magnesium reagent, since the catalysts were prepared following the procedure of example 1. This would correspond to copper contents of respectively 0.12 and 0.24 wt% with respect to magnesium oxide, i.e. contents which would in turn be inconsistent with the range of up to 0.1 wt% stated at page 4 of the description and in the product claim. In order to resolve the new inconsistencies resulting from this correction, the Appellant further requests that examples 2 and 3 be designated as comparative examples.

Therefore, it appears from the preceding that there exists at least two ways in which the error in example 1 could have been corrected. Both alternatives envisaged above are indeed plausible but, in the Board's view, the skilled reader would not consider the requested correction as more straightforward or more plausible than the first one, since it removes all the inconsistencies only under the provision that two examples, which originally served to illustrate the invention, are transformed into comparative examples. Thus, the Board is convinced that the skilled reader would regard these two possibilities of correction at the most as equally plausible. Under this circumstance it comes to the conclusion that it is not immediately evident that nothing else would have been intended than the correction requested at the oral proceedings. Therefore, this correction is not obvious in the sense required by Rule 88 and hence not allowable.

- 6.4 The catalysts of examples 4 and 5 were also prepared by the procedure of example 1, except that polyphenylene oxide was incorporated therein. Therefore, their copper contents are also erroneous. With regard to the appropriate correction, the same reasoning applies as for example 1.

7. It results from the requested correction being not allowable that examples 1 to 5 of the application as originally filed, as well as the datas of tables I and II (except for the "Control" of these tables), cannot be used for proving advantages of the claimed subject-matter over the cited prior art or for establishing the presence of an inventive step. This should be taken into consideration for the further prosecution of the application upon the basis of the claims submitted at the oral proceedings.

Order

For these reasons, it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division for further prosecution on the basis of Claims 1 to 5 remitted during oral proceedings.

The Registrar:

The Chairman:

M. Beer

P. Lançon