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Datasheet for the decision of 24 June 2009

Case Number: T 0763/07 - 3.3.03

Application Number: 99948056.9

Publication Number: 1218435

C08G 63/82 IPC:

Language of the proceedings:

Title of invention:

Method for making polyesters employing acidic phosphoruscontaining compounds

Patentee:

EASTMAN CHEMICAL COMPANY

Opponent:

Zimmer Aktiengesellschaft INVISTA Resins & Fibers GmbH & Co. KG

Headword:

Relevant legal provisions:

EPC Art. 54, 56, 108

Keyword:

- "Novelty (yes)"
- "Inventive step (no)"
- "Appeal of appellant opponent 02 inadmissible"

Decisions cited:

T 0305/87, T 0332/87, T 0450/89, T 0246/91, T 0677/91, T 0164/92

Catchword:



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Boards of Appeal

Chambres de recours

Case Number: T 0763/07 - 3.3.03

DECISION
of the Technical Board of Appeal 3.3.03
of 24 June 2009

Appellant Opponent 01: Zimmer Aktiengesellschaft

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Decision under appeal: Interlocutory decision of the Opposition

Division of the European Patent Office dated 14 February 2007 and posted 5 March 2007 concerning maintenance of European patent

No. 1218435 in amended form.

Composition of the Board:

Chairman: R. Young
Members: W. Sieber

C. Vallet

- 1 - T 0763/07

Summary of Facts and Submissions

I. The mention of the grant of European patent
No. 1 218 435, in respect of European patent
application No. 99948056.9, based on International
application PCT/US99/19390, in the name of Eastman
Chemical Company, filed on 24 August 1999, was
published on 5 November 2003 (Bulletin 2003/45). The
granted patent contained 30 claims, whereby Claim 1
read as follows:

"A process for making polyester resin comprising:

- (a) esterifying at least one dicarboxylic acid component and at least one diol component; and
- (b) polymerizing the product of step (a) under conditions effective to provide a polyester resin, wherein:
 - (1) polymerization step (b) occurs in the presence of (i) an antimony-based polymerization catalyst and (ii) an acidic phosphorus-containing additive;
 - (2) the catalyst (i) is added prior to the additive (ii), and
 - (3) the acidic phosphorus containing additive (ii) is added in an amount to provide less than 15 ppm by weight of elemental phosphorus in the resulting polyester."

Claims 2-30 were dependent claims directed to elaborations of the process of Claim 1.

II. Notices of opposition were filed on 30 July 2004 by Zimmer AG (opponent 01) and on 3 August 2004 by Invista Resin & Fibers GmbH & Co. KG (opponent 02). The opponents requested revocation of the patent in its entirety on the ground that the claimed subject-matter lacked novelty and did not involve an inventive step (Article 100(a) EPC). Opponent 01 further invoked the ground pursuant to Article 100(c) EPC. The oppositions were supported inter alia by the following documents:

D1: EP 1 031 590 A2;

D2: DE 197 53 378 A1;

D3: DE 44 32 839 A1;

D4: DE 43 09 227 A1;

D6: US 5 608 031 A; and

D8: WO 97/47675 A.

III. At the oral proceedings before the opposition division on 14 February 2007, the proprietor filed an auxiliary request I containing 30 claims. Claim 1 of auxiliary request I corresponded to Claim 1 as granted except that the acidic phosphorus-containing additive (ii) was further specified at the end of condition (1):

"... selected such that the reaction rate of the polymerization step (b) increases with a decreasing amount of additive (ii)".

- 3 - T 0763/07

By an interlocutory decision which was announced orally on 14 February 2007 and issued in writing on 5 March 2007, the opposition division found that the patent could be maintained in amended form based on the proprietor's auxiliary request I.

- IV. Notices of appeal against the above decision were filed on 9 May 2007 by opponent 01 (appellant opponent 01) and on 10 May 2007 by opponent 02 (appellant opponent 02), the required fee being paid on the respective same day.
- V. On 16 July 2007, appellant opponent 01 filed the statement of grounds of appeal in which novelty and inventive step of Claim 1 according to auxiliary request I found allowable by the opposition division were challenged.

According to appellant opponent 01 D1, D2 and D3 anticipated the claimed subject-matter when looking to each of the documents as a whole. In this context, reference was made to T 164/92, T 450/89, T 677/91 and T 332/87. In connection with its novelty objection against D1 appellant opponent 01 submitted an Attachment 2 which showed some analytical data (including a phosphorous content below 15 ppm) in plants of Zimmer AG operated according to their own patented processes.

As regards inventive step, D3, and in particular Example 4 of D3, was considered to represent the closest prior art. The alleged invention differed from Example 4 of D3 only in the amount of phosphorus added during the reaction, namely less than 15 ppm versus

15 ppm. The examples in the patent in suit were not suitable to demonstrate any technical effect attributable to this difference. Therefore the technical problem had to be seen in the provision of an alternative to the process of Example 4 of D3. The solution to this problem was not based on an inventive step since such small amounts of phosphorus were known from D2 and further from D4, D6 and D8.

- VI. By a communication dated 10 August 2007 sent by registered letter with advice of delivery, the registry of the board informed appellant opponent 02 that no statement of grounds of appeal had been filed and that the appeal could be expected to be rejected as inadmissible. Appellant opponent 02 was invited to file observations within two months.
- VII. In its reply dated 19 February 2008 to the statement of grounds of appeal of appellant opponent 01, the proprietor (respondent) requested that the appeal be dismissed.

The respondent argued that the "selection criterion" in Claim 1 as maintained by the opposition division, ie that the acidic phosphorus-containing additive (ii) had to be "selected such that the reaction rate of the polymerization step (b) increases with a decreasing amount of additive (ii)", would be a limiting feature to the scope of the claim.

As regards the novelty objections, the respondent pointed out that appellant opponent 01 had picked various passages in each of the cited documents and combined them in a way which would require the

- 5 - T 0763/07

knowledge of the claimed invention. In fact, the skilled reader would have to make several educated choices before he could possibly arrive at the claimed process.

The respondent observed that none of the cited references explicitly or implicitly addressed the problems as elaborated in the patent specification, namely the finisher time and the haze level of the resulting polymers in relation to the mode of addition (early versus late) and the phosphorous concentration. Only D3 suggested that the "late" addition of phosphorus-containing stabilizers might have an impact on the haze value. However, D3 further observed that the phosphorous stabilizer had no measurable effect on the haze value if added "late". This document approached the problem of haze level on the basis of the catalyst. It was clearly shown in the examples of the patent specification that the combination of (a) the type of phosphorous compound employed, (b) using low amounts of phosphorous compound and (c) adding the additive late provided faster reaction times and lower haze values.

The assessment of appellant opponent 01 based on Example 4 of D3 as a promising spring board was based on hindsight. There was absolutely no recognition of any problem in relation to the concentration of the phosphorus-containing stabilizer in the prior art. D3 provided no guidance for a skilled person to arrive at the claimed process regardless of which problem was taken into account. The person skilled in the art starting from Example 4 of D3 would have to contemplate

several avenues before he would come up with a suggestion of the claimed process.

- VIII. In a letter dated 2 April 2009, appellant opponent 02 informed the board that it would not attend the oral proceedings scheduled for 24 June 2009.
- IX. On 24 June 2009 oral proceedings were held before the board where appellant opponent 02, as announced, was not represented. Since it had been duly summoned, however, the oral proceedings were continued in its absence in accordance with Rule 115(2) EPC and Article 15(3) RPBA (OJ EPO 2007, 536).

As regards the admissibility of the appeal of appellant opponent 02 the board indicated that this appeal appeared to be inadmissible (Article 108 EPC in conjunction with Rule 101(1) EPC). Neither appellant opponent 01 nor the respondent had any comment on this issue.

With regard to novelty, appellant opponent 01 and the respondent basically relied upon their written submissions. As regards the "selection criterion" in Claim 1 as maintained by the opposition division, the board indicated that this feature appeared to be not limiting to the scope of the claim because any acidic phosphorus-containing compound recognized in the art automatically fulfilled this requirement as was apparent from the patent in suit.

Concerning inventive step, appellant opponent 01 considered Example 4 of D3 as an appropriate starting point. No technical effect had been proven of this

- 7 - T 0763/07

closest prior art so that the technical problem had to be seen in the provision of a further process. The use of low amounts of phosphorus was, however, known from D2, D4, and D6. The same arguments applied when starting from Example 9 of D2 as the closest prior art.

The respondent argued that the examples in the patent in suit clearly established a trend with respect to finisher time and haze values when the phosphorus—containing additive is added late and in small amounts. Further, the claimed process required the use of an antimony—based polymerization catalyst which, according to the respondent, excluded the presence of further metal components in the catalyst such as germanium which was used in D3 in combination with antimony. This argument was rebutted by appellant opponent 01 according to whom the term "antimony—based" merely required the presence of antimony but did not exclude the presence of further catalyst components.

X. Appellant opponent 01 requested that the decision under appeal be set aside and the patent be revoked in its entirety.

The respondent requested that the appeal be dismissed.

- 8 - T 0763/07

Reasons for the Decision

- 1. Admissibility of the appeals
- 1.1 The appeal of appellant opponent 01 is admissible.
- Appellant opponent 02 has not filed a written statement setting out the grounds of appeal and the notice of appeal contained nothing that could be regarded as a statement of grounds of appeal pursuant to Article 108 EPC. Consequently, the appeal of appellant opponent 02 is rejected as inadmissible (Article 108 EPC in conjunction with Rule 101(1) EPC).

2. Interpretation of Claim 1

Claim 1 as found allowable by the opposition division requires that the acidic phosphorus-containing additive (ii) is "selected such that the reaction rate of the polymerization step (b) increases with a decreasing amount of additive (ii) ". In the board's view this "selection criterion" is not a limiting feature for the scope of the claim. It is apparent from the patent in suit and the application as filed, respectively, that this "selection criterion" provides no additional technical feature that is not already inherently present in every acidic phosphoruscontaining additive. Thus, it is stated in paragraph [0046] of the patent in suit (corresponding to the passage on page 12, lines 23-27 in the application as filed) that "The phosphorus-containing additive employed in the present invention can be any acidic phosphorus-containing compound recognized in the art" (emphasis added by the board). Furthermore, the

patent in suit and the application as filed disclose no measure or test that has to be taken in order to "select" an appropriate acidic phosphorus-containing additive from the class of known acidic phosphorus-containing compounds. Consequently, the board agrees with appellant opponent 01 that the "selection criterion" is automatically fulfilled by every acidic phosphorus-containing additive.

It might be true, as pointed out by the respondent, that the position of appellant opponent 01 with respect to the "selection criterion" contradicts its initial objection under Article 123(2) EPC, namely that the omission of the "selection criterion" in Claim 1 as granted would result in added subject-matter. However, this admittedly inconsistent argumentation cannot alter the facts as presented in the application as filed.

3. Novelty

Appellant opponent 01 cited three documents, namely D1 to D3, which allegedly anticipated the claimed subject-matter.

D1, a document which is state of the art pursuant to Article 54(3) EPC, discloses the production of linear polyesters by transesterification or esterification and subsequent polycondensation by means of a heterogeneous catalyst (paragraph [0001]). Catalytically active metal compounds that can be used with the carrier substance are metal compounds of titanium (Ti), antimony (Sb), germanium (Ge), tin (Sn) and aluminium (Al) which supply the polyester reaction mixture with Ti⁴⁺, Sb³⁺, Ge⁴⁺, Sn⁴⁺ and Al³⁺ ions, respectively, for reaction with

- 10 - T 0763/07

the OH and COOH end groups of the polyester reaction mixture (paragraph [0012]). In a further embodiment of the process according to D1, the time at which a stabilizer, such as phosphorous acid, phosphoric acid, phosphonic acid and carboxyphosphonic acid and their compounds (at a quantity of 1-50 ppm, preferably 1-10 ppm, relative to the polyester mass) is added is different from the time at which the catalyst is added and as far apart from this point as possible. Thus, for example, the catalyst is added to the monomer mixture in the esterification process at the beginning, and the phosphorus-containing stabilizer is added, at the earliest, after the supply of the total monomer mixture has been completed, corresponding to a degree of esterification of 69-98%. For a non-catalyzed esterification the phosphorus-containing stabilizer can be added at the beginning of the esterification and the catalyst at the end of the esterification (paragraph [0021]). As regards the examples of D1, none of the examples describes a process having all the features of the claimed process. For example, a Sb catalyst is used in Examples 3 and 5, but no phosphorus-containing additive. On the other hand, when an acidic phosphorus-containing additive is used as in Examples 10-15, the catalyst is a Ti compound.

Although all the elements of the claimed process can be found in D1, it is conspicuous to the board that several selections from the general disclosure of D1 would have to be made in order to arrive at a process meeting the requirements of Claim 1 as maintained by the opposition division. Firstly, it may be noted that the process of D1 either starts from the dicarboxylic acid or its ester, whereas the claimed process requires

- 11 - T 0763/07

the esterification of at least one dicarboxylic acid. Secondly, with regard to the catalyst, the skilled reader would have to select from a particular list of useful metallic compounds before suggesting the proper catalyst, namely Sb. Thirdly, as regards the acidic phosphorus-containing additive, the skilled reader would have to select the proper type of additive (derivatives of the explicitly mentioned acids may not be acidic any more) and the proper amount thereof in order to meet the respective requirements of the claimed process. Finally, another selection from the general disclosure of D1 would have to be made in relation to the time of addition of the phosphoruscontaining stabilizer. Although D1 specifically mentions that there should be a significant time difference between the addition of the catalyst and the phosphorus-containing additive, paragraph [0021] of D1 mentions also that for a non-catalyzed esterification the phosphorus-containing stabilizer can be added at the beginning of the esterification and the catalyst at the end of the esterification, ie just the reverse order of addition in comparison to the claimed process.

Hence, the combination of all the features required in the claimed process is not suggested by D1. Neither the general disclosure of D1 nor the examples of D1 contain a suggestion in this respect. Consequently, the subject-matter of Claim 1 is novel over D1.

Appellant opponent 01 has filed in connection with D1 an Attachment 2 which showed amongst other analytical data a phosphorous content of less than 15 ppm in plants of Zimmer AG operated according to their own patented processes. It is conspicuous to the board that

this document does not describe a process, and does not show the form of the phosphorus-containing compound (acidic or not), and when this compound is added. Further, there is, as pointed out by the respondent, not sufficient information to determine whether this document may belong to the prior art at all. Consequently, for these reasons alone Attachment 2 is disregarded, and any discussion as to whether or not this document might be relevant in the context of D1 is superfluous.

3.2 D2 discloses a method for producing linear polyesters by transesterification of at least one dicarboxylic acid dialkylester or esterification of at least one dicarboxylic acid with at least one diol and subsequent precondensation and polycondensation in the presence of conventional catalysts, wherein the polycondensation, and optionally the esterification, is carried out in the presence of a carbon-containing cocatalyst, preferably activated charcoal. The cocatalyst is used in addition to usual polycondensation catalysts, such as compounds of Sb, Ti, Pb, Ge, Zn, and/or Sn or a Zeolite, and, optionally, in addition to the usual esterification catalysts, such as compounds of Sb, Ti, Ge and/or Sn (page 2, lines 59-61). The addition of the cocatalyst and the usual catalysts required for the polycondensation and, optionally, for the esterification, take place separate from one another or together as a suspension (page 3, lines 7-11). Stabilizers such as phosphoric acid, phosphorous acid, phosphonic acid, carboxyphosphonic acid and their derivatives that are often employed for the production of polyester, in particular packaging, should not be added at the same time as the addition of the activated - 13 - T 0763/07

charcoal and, relative to the course of the polyester production, be as far apart from it as possible (page 3, lines 17-20). The phosphorus-containing stabilizer is added in an amount of 1-50 ppm, preferably 1-10 ppm (page 3, lines 21-22). As regards the examples of D2, it is conspicuous to the board that Examples 8-10 disclose all the features of the claimed process except the proper amount of the acidic phosphorus-containing additive. The amount of phosphorus is given as 15 ppm (Examples 8 and 9) and 17 ppm (Example 10), respectively, ie not less than 15 ppm as required in the claimed process.

It is apparent from the above analysis of D2 that Examples 8 and 9 come quite close to the claimed process, but neither the general disclosure nor the examples of D2 contain a clear and unambiguous disclosure with respect to the combination of all the features required in the claimed process. In fact, one would have to make a twofold selection from D2 in order to arrive at a process falling within the scope of Claim 1 as maintained by the opposition division. In particular, one would have to select the process conditions of Examples 8-10 and combine them with a low amount of the acidic phosphorus-containing additive. Although the general disclosure of D2 refers to an amount of 1-10 ppm, there is no suggestion in D2 that such an amount should be used in combination with the process conditions of Examples 8-10. Consequently, the subject-matter of Claim 1 is novel over D2.

3.3 D3 discloses a process for adjusting the haze value of ethylene terephthalate homopolymers and low-modified copolymers while they are being produced by direct esterification and polycondensation by adding a predetermined amount of Sb and optionally Ge catalyst before or at the start of the esterification process. After resupplying the catalyst, phosphorous stabilizers such as phosphoric acid and/or the esters thereof such as trimethyl phosphate, triethyl phosphate, tributyl phosphate and tris-ethylene glycol phosphate may be added to the polycondensation mixture in an amount corresponding approximately to 0-50 ppm phosphorus. When adding the Ge catalyst, phosphorous stabilizers must be added in an amount corresponding to about 5-50 ppm phosphorus, where the amount of phosphorus is greater, the higher the Ge concentration (page 3, lines 37-43). In Example 4 of D2, terephthalic acid is esterified with ethylene glycol in the presence of Sb and Ge catalysts. Phosphoric acid is added as a stabilizer to the first polycondensation step immediately after the second portion of the catalyst. In fact, Example 4 of D3 discloses all the features of the claimed process except the proper amount of phosphorus which is indicated to be 15 ppm, calculated on polyester (Table 1).

It is apparent from the above analysis that the situation of D3 is quite similar to the situation in D2. Example 4 comes quite close to the claimed process, but neither the general disclosure nor Example 4 contains a clear and unambiguous disclosure with respect to the combination of all features required in the claimed process. Again, one would have to combine a specific example with a low amount of phosphoric acid

- 15 - T 0763/07

resulting in a two fold selection from D3. This combination is certainly not suggested by D3. Consequently, the subject-matter of Claim 1 is novel over D3.

3.4 Basically, the novelty objections of appellant opponent 01 rested upon the argument that the whole content of a document should be taken into account for the assessment of novelty, because, as set out in T 164/92 (OJ EPO 1995, 305), the disclosure of a publication was determined by what knowledge and understanding could and might be expected of the average skilled person in the technical field in question. In this context, reference was also made to T 450/89 of 15 October 1991, T 677/91 of 3 November 1992 and T 332/87 of 23 November 1990 (none of these decisions published in OJ EPO).

However, this line of argumentation is not convincing for the following reasons.

As set out in T 305/87 (OJ EPO 1991, 429, point 5.3 of the reasons) when contesting the novelty of a claim, the content of a document must not be treated as something in the nature of a reservoir from which it would be permissible to draw features pertaining to separate embodiments in order to create artificially a particular embodiment which would destroy novelty, unless the document itself suggests such a combination of features. This is confirmed by eg T 450/89 where it is stated in paragraph 3.11 of the reasons that "a conclusion of lack of novelty ought not to be reached unless the prior art document contains a clear and unmistakable disclosure of the subject-matter of the

- 16 - T 0763/07

later invention" (in this context see also T 677/91, paragraph 1.2 of the reasons). In the present case, none of D1, D2 or D3 contains, as demonstrated above, a clear and unambiguous teaching as to the combination of all the features of Claim 1. No other conclusion on novelty can be reached when considering T 332/87 where it is stated in paragraph 2.2 of the reasons that "In general the technical teaching of examples may be combined with that disclosed elsewhere in the same document, eg in the description of a patent document, provided that the example concerned is indeed representative for the general teaching disclosed in the representative document". In the present case, there is no indication that the relevant examples, namely Examples 8 and 9 of D2 or Example 4 of D3, are representative for a general teaching concerning the time of addition of the phosphorus-containing compound. In D2, for example, it is clear from the outset that when the description of D2 refers to the time of addition of the phosphorus-containing compound there is no connection with respect to the time of the addition of the primary catalyst comprising a metal at all. Neither D2 nor D3 contain, explicitly or implicitly, a suggestion to combine certain process conditions of these examples with other parts of the general disclosure.

4. Inventive step

4.1 The claimed subject-matter relates to a process for producing polyester resins and in particular poly(ethylene)terephthalate (PET) containing low levels of phosphorus-containing additives that is suitable for use in a variety of applications (paragraph [0002] of

- 17 - T 0763/07

the patent in suit). Further, it is stated in paragraph [0015], that "The present invention is based, in part, on the surprising discovery that the choice of phosphorus-containing additive, when employed in connection with certain polymerization catalysts, can have a significant impact on reaction rate of the polymerization process as well as the clarity of the resulting polyester".

- As shown in point 3.3, above, Example 4 of D3 likewise discloses the production of PET in the presence of a Sb catalyst, whereby the only distinction over the claimed process is a slightly higher amount of phosphorus in the PET (originating from phosphoric acid), ie 15 ppm versus less than 15 ppm. Furthermore, it is apparent from Table 1 that the PET of Example 4 has a very good clarity (measured NTU value of only 1.5-1.9). Thus, D3, and in particular Example 4 of D3, discloses technical features and effects most similar to the claimed process. Consequently, the board considers Example 4 of D3, in line with the parties, to represent the closest prior art.
- 4.3 In the next step of the problem and solution approach the objective technical problem has to be formulated based on the technical effect(s) that the claimed subject-matter provides over the closest prior art.

In this connection, the respondent referred to an improved haze and reaction rate mentioned in paragraph [0015] of the patent in suit and allegedly being demonstrated by the examples and comparative examples in the patent in suit. However, it is conspicuous to the board that the comparison in the

- 18 - T 0763/07

patent in suit has not been done against the closest prior art. In fact, Example 4 of D3 lies much closer to the claimed subject-matter than the comparative examples in the patent in suit, in particular the relevant Comparative Examples 16, 17, 19 and 20 which use between 40 and 50 ppm phosphorus. Thus, an inquiry has to made as to which technical problem objectively existed over the closest prior art (in this context see T 246/91 of 14 September 1993, paragraph 4.4 of the reasons of the decision; not published in the OJ EPO).

Turning again to Example 4 of D3, there is no evidence on file which would show that a slightly lower amount of phosphorus in the PET would provide any advantage over this example (quite apart from the question as to whether or not it would ever be possible to show an effect in close vicinity to 15 ppm at all). Consequently, the objective technical problem can only be seen in the provision of an alternative to the process of the closest prior art.

The board has no doubts that this problem is in fact solved by the claimed process.

4.4 It remains to be decided if the suggested solution is inventive.

A person skilled in the art starting from the process of Example 4 of D3 as the closest prior art and faced with the problem of providing an alternative to this process, would immediately contemplate slight variations of the process of Example 4 of D3 within the limits generally disclosed in the description of D3. Changing the amount of phosphorus is in this context a

- 19 - T 0763/07

simple and straightforward option, and one that the person skilled in the art would have seriously contemplated and adopted without any difficulty for the following reasons. Firstly, D3 itself allows a variation of the amount of phosphorus (0 to 50 ppm). Secondly, it is known from D2, likewise a document dealing with the production of PET in the presence of a Sb catalyst and a phosphorus-containing additive, that the amount of phosphorus-containing additive should be 1-50 ppm, preferably 1-10 ppm (page 3, lines 20-22). Thus, there is a clear incentive both in the closest prior art itself and in D2 to decrease the amount of phosphorus below the 15 ppm used in Example 4 of D3. Consequently, the subject-matter of Claim 1 as maintained by the opposition division lacks an inventive step over D3 in combination with D2.

4.5 The respondent has argued that D3 was more remote from the claimed process than presumed by appellant opponent 01 because the claimed process required the use of an antimony-based catalyst containing only antimony whereas Example 4 of D3 used a Sb catalyst in combination with a Ge catalyst. This argument is, however, not convincing. As pointed out by appellant opponent 01 at the oral proceedings, in normal linguistic language the term "antimony-based" does not necessarily exclude the presence of other metal components. Furthermore, there is nothing in the application as filed which would support the respondent's interpretation in this context. Thus, D3 which uses a catalyst where the major component is antimony, namely a catalyst consisting of Sb or Sb in combination with Ge where Sb \geq 110 ppm and Ge = 0 to 50 ppm, is indeed the most relevant state of the art,

- 20 - T 0763/07

and Example 4 of D3 using a catalyst containing 170 ppm Sb and 35 ppm Ge is the appropriate starting point for the assessment of inventive step.

5. Claim 1 not meeting the requirements of Article 56 EPC and being part of the only claim set on file, the patent has to be revoked.

Order

For these reasons it is decided that:

- 1. The appeal of opponent 02 is rejected as inadmissible.
- 2. The decision under appeal is set aside.
- 3. The patent is revoked.

The Registrar: The Chairman:

E. Görgmaier R. Young