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D E C I S I O N
of 11 May 2005

Case Number: T 0982/02 - 3.3.3

Application Number: 93304520.5

Publication Number: 0574260

IPC: C08F 20/04

Language of the proceedings: EN

Title of invention:

Method for production of hydrophilic resin

Patentee:

NIPPON SHOKUBAI CO., LTD.

Opponent:

Stockhausen GmbH & Co.KG

Headword:

-

Relevant legal provisions:

EPC Art. 54, 114(1), 114(2)

EPC R. 55

Keyword:

"Late submitted material (not admitted)"

"Novelty - prior disclosure - implicit features (no)"

Decisions cited:

G 0009/91, G 0010/91, T 0205/83, T 0242/88, T 0585/92,
T 1002/92, T 0990/96, T 0728/98, T 0100/00, T 0112/00,
T 0786/00

Catchword:

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Case Number: T 0982/02 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 11 May 2005

Appellant: NIPPON SHOKUBAI CO., LTD.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office dated 12 July 2002 and
issued in writing on 25 July 2002 revoking
European patent No. 0574260 pursuant to
Article 102(1) EPC.

Composition of the Board:

Chairman: R. Young
Members: A. Däweritz
H. Preglau

Summary of Facts and Submissions

I. The grant of European patent No. 0 574 260 in respect of European patent application No. 93 304 520.5, filed on 10 June 1993 and claiming the priorities of 10 June 1992 and 12 October 1992 of two earlier applications in Japan (150425/92 and 272789/92), respectively, was announced on 3 March 1999 (Bulletin 1999/09). The patent contained 13 claims, independent Claim 1 reading as follows:

"A method for the production of a hydrophilic resin having a low residual monomer content which comprises polymerising a water-soluble unsaturated monomer containing 50 to 100 mol % of an acrylate having a ratio of neutralisation in the range of 30 to 100 mol % and not more than 1,000 ppm of the amount of beta-hydroxy propionic acid and salts thereof."

The remaining dependent claims 2 to 13 related to elaborations of the method as claimed in Claim 1, above.

The compound beta-hydroxy propionic acid (also referred to as hydracrylic acid) will be abbreviated herein below to " β -HPA", acrylic acid to "AA".

II. On 1 December 1999, a Notice of Opposition was filed in which revocation of the patent in its entirety was requested on the basis of the grounds according to Article 100(a) EPC, for non-compliance with the provisions of Articles 52 to 57 EPC. The Opponent initially relied on fourteen documents and provided copies of all these documents including

- D1: EP-A-0 372 706.
- D2: F.M. Wampler III, "Formation of Diacrylic Acid During Acrylic Acid Storage", Plant/Operations Progress, Vol. 7, No. 3, July 1988, pages 183 to 189
- D5: Ullmann's Encyclopedia of Industrial Chemistry, 5th Edition, Vol. A13, 1989, page 510
- D11: EP-A-0 509 708 (repeatedly referred to in the opposition proceedings as EP-A-0 509 709, which, however, concerns a "Molar distalizing appliance").

In the course of the opposition proceedings, the Patent Proprietor submitted a new Main Request and nine Auxiliary Requests, each of which contained a set of amended claims and which formed the basis for oral proceedings held on 12 July 2002. During these oral proceedings, four of the auxiliary requests were withdrawn.

- III. In the decision orally announced at the end of the above oral proceedings and issued in writing on 25 July 2002, the patent in suit was revoked.

More particularly, the Main Request as amended was found to contravene Article 123(2) EPC, and the subject-matter according to each of the remaining auxiliary requests was held not to be novel with regard either to D1 or to D11. Thus, D1 was deemed to anticipate the subject-matter of the first and the seventh Auxiliary Request, D11 to disclose the subject-matter according to the fourth, fifth and sixth Auxiliary Request, respectively.

This assessment was based on the disclosure of each of these two documents in conjunction with the finding that, according to a number of decisions (T 990/96: OJ EPO 1998, 489; T 205/83: OJ EPO 1985, 363; T 728/98, OJ EPO 2001, 319; and T 242/88 of 18 January 1990, not published in OJ EPO), a document disclosing a low molecular weight organic compound and its manufacture made it available to the public in all desired grades of purity, since, as a rule, conventional methods of purification of low molecular weight organic compounds were within the general knowledge of a person skilled in the art. As no proof had been provided that this rule was not applicable to this case, the limit of 1000 ppm of β -HPA was not deemed to constitute a valid feature distinguishing the claimed subject-matter from the disclosure of these prior art documents, although neither of D1 and D11 had explicitly mentioned the maximum level of 1000 ppm of β -HPA or its salts (the corresponding requirement as worded in Claim 1 will be referred to herein below as the "relevant feature", cf. section I, above).

According to the decision under appeal, it was common practice to purify a compound obtained in a particular chemical manufacturing process according to prevailing needs and requirements. Hence, AA fulfilling the relevant feature had been made available by D1 or D11. The Patent Proprietor had not made plausible that prior attempts had failed to reduce the content of β -HPA to the above range. Consequently, it was held that D1 made available to the public a method of utilising, in the polymerisation, AA in such a high grade of purity. Such a high grade existed when freshly distilled AA was polymerised within 24 h after its preparation.

Document D11, additionally, disclosed a drying step and a step to crosslink the surface region of the polymer derived from AA, having a neutralisation degree of 50 to 99 mol %, and a crosslinking agent.

IV. Against this decision, a Notice of Appeal was filed by the Appellant/Patent Proprietor on 24 September 2002, and the prescribed fee was paid on the same date.

In the Statement of Grounds of Appeal, received on 20 November 2002, the Appellant further pursued the subject-matter of patent in suit as granted (Main Request) and disputed the reasons for the revocation given in the decision under appeal. In the alternative, it requested that the patent in suit be maintained on the basis of new Auxiliary Requests 1 to 3.

Sets of claims for all four requests were filed therewith. Contrary to the statement, mentioned above, concerning the Main Request, the wording of dependent Claim 12 as submitted, however, referred to "polyhydric alcohols" instead of "polyhydric alcohols". This term was also maintained in all further versions of this claim submitted throughout these proceedings.

In further letters dated 15 April 2004 and 11 April 2005, the Appellant presented additional arguments and, in the second of these letters, replaced all previous sets of claims by a total of thirteen sets of claims to constitute the Main Request and Auxiliary Requests 1 to 12, respectively.

Apart from the deviation in Claim 12 mentioned in the penultimate paragraph, above, the wording of the claims of this Main Request was identical to that of the claims as granted (section I, above).

- V. The Respondent, in letters dated 19 and 20 November 2003 and 11 April 2005, supported the decision under appeal, disputed the arguments of the Appellant and requested that the appeal be dismissed. To this end, it relied, in these letters, not only on the documents mentioned in section II, above, but additionally provided "new facts and evidence" ("neue Tatsachen und Beweismittel") and asserted public prior use of the method. In its latest letter, mentioned above, the Respondent requested, that, in the alternative, the case be remitted to the Opposition Division if novelty of the claimed process was acknowledged by the Board.
- VI. On 11 May 2005, oral proceedings were held in the presence of both parties.
- VII. Apart from the documents initially referred to in the Notice of Opposition (section II, above), the following additional documents and evidence were on file. They had been cited and submitted, respectively,
by the Respondent,
in the letter dated 19 November 2003:
D14: US-A-5 599 335, admittedly published too late,
D15: US-A-4 709 985, a copy of US-A-4 708 985 had been provided at the same time,
D16: US-A-4 808 637,
D17: US-A-5 079 034,
D18a to D18d: internal orders for analyses ("Stockhausen Analysenauftrag für Rohstoffe"),

- D19: Affidavit (Eidesstattliche Erklärung) of
Prof. Dr. Günter Bub,
- D20: Affidavit of Dr. Hans-Peter Bohlmann,
- D21: DE-A-3 545 250,
- D22: DE-A-4 021 847,
- D23: DE-A-4 004 953;
in the letter of 20 November 2003:
- D24: EP-A-0 339 461;
in the letter dated 11 April 2005:
- D26: EP-A-0 441 975,
- D27: Affidavit of Dr. Franck Furno, containing an
experimental report,
- D28: JP-A-04-106 108 (published on 8 April 1992),
- D29: English translation of D28,
- D30: "Modern Superabsorbent Polymer Technology",
F.L. Buchholz et al. (Editors), Wiley-VCH, 1998,
pages 75 and 114,
- D31: Beyer-Walter, Lehrbuch der Organischen Chemie,
S.Hirzel Verlag, 21st edition, 1988, page 281;
by the Appellant,
in the letter dated 15 April 2004:
- D25: US-A-5 223 569 (published on 29 June 1993);
in the letter dated 11 April 2005:
- D25: again (numbered by the Appellant: D26);
- D32: US-A-4 914 170 (numbered: D27),
- D33: Organic Synthesis, page 321 and 322 (containing no
publication date, numbered: D28), and
*in the letter dated 9 August 2000 (during the
opposition proceedings):*
- D34: Partial translation with the title "Acrylic Acid
and Polymer thereof", pages 27 to 43, and the text
in Japanese (numbered in that letter: D15).

Having regard to the above additional documents filed by the Respondent, the Appellant requested that the documents and evidence D26 to D31 not be admitted to the proceedings, because it had not been possible for the Appellant, in view of the necessity of translating the latest submission of the Respondent into Japanese and because of the "Golden Week" in Japan, to provide fully-reasoned comments on the documents, let alone on the results in the experimental report.

In view of the comments of both parties in the oral proceedings on the issues (relevance for the decision and late-filing) of Article 114 EPC with regard to the above documents D14 *et seq.*, the parties were informed by the Board, after deliberation, that the following documents and evidence were excluded from further consideration: D14, D15, D16, D17, D24, D26, D27, D28, D29 and D33. Since it had, however, been agreed *expressis verbis* by the Appellant, that D18a to D18d, D30 and D31, and by the Respondent, that D25, D32 and D34 be taken into account, these latter documents were admitted to the proceedings. Likewise, D19, D20, D21, D22 and D23 were also admitted, all of which had been referred to in close relation with D18a to D18d.

VIII. The arguments of the parties concerning the issue of novelty can be summarised as follows:

(1) With respect to D1, one of the key documents in the decision under appeal, it was conceded by the Respondent that β -HPA was not explicitly disclosed to be a constituent in the AA used therein.

(2) However, the Respondent expressed the opinion that the "self-contamination" of AA (as mentioned in the Notice of Appeal, page 4, third paragraph) had been known in the art. Moreover, the use of the highly reactive AA in a very high grade of purity, ie as "soon as possible" (this term was used with reference to [0060] of the patent in suit) after its conventional purification (in the sense as used in the decisions mentioned in the decision under appeal, section III, above), eg by distillation by its producer or supplier, was, therefore, conventional, in particular in the manufacture of hygienic goods which had to fulfil particular purity demands. The purification methods applied by the Appellant were, according to the Respondent, also conventional. Consequently, the decision under appeal was correct in this respect when relying on the jurisprudence as mentioned in section III, above.

(3) The Respondent additionally argued, in view of the data on the analysis sheets D18a to D18d concerning the purity of commercially available AA and the affidavits D19 and D20 giving further details in this respect, that β -HPA had been detected neither by the staff of the producer of the AA before the shipping of the acid, nor by the staff of the Opponent directly before the AA was used in its own polymerisation process prior to the patent in suit. Since these analyses had been carried out by competent staff, these data showed, in its opinion, that the requirement in Claim 1 concerning the purity of the acid had been fulfilled.

(4) The Appellant, however, referred to the statement of the Respondent that it had not determined as a

routine measurement, until the grant of the patent in suit in 1999, the β -HPA content in the partially neutralised monomer solution, but had only started thereafter to conduct investigations, reaching far back into the past, concerning the β -HPA and dimer content in the starting material used ("eingesetzten Edukten") (Respondent's letter dated 19 November 2003, page 4, last paragraph of point 2.3).

(5) In view of further statements of the Respondent in the same letter (page 11, paragraph 3), according to which (i), at least by means of the gas-chromatographic method as used by the Respondent, β -HPA could not be detected ("... konnte hingegen durch das von Stockhausen angewendete gaschromatographische Verfahren nicht nachgewiesen werden") and (ii), with reference to D19 and D20, detectable amounts of β -HPA had not been contained in the AA as delivered to the Opponent/ Respondent, the parties were asked whether the detection of β -HPA by gas chromatography ("GC" as used eg in D18a to D18d) was, in principle, possible. The Appellant referred the patent in suit [0125], according to which liquid chromatography had been used by the Patentee. If GC could be used at all for this purpose, it would certainly have required specific conditions to be fulfilled. The Respondent answered that its experienced staff had certainly used the appropriate method for detecting all relevant impurities.

(6) With regard to the examples in D1 allegedly anticipating the claimed method, the Respondent pointed out that these examples had been carried out in the laboratory. Therefore, it had to be assumed that the monomers had been used, as was usual in laboratories,

in their highest possible purity, so that the examples could serve as models allowing to understand the mechanism of the reaction taking place and to find out the feasibility of the method chosen for the preparation of desired goods. Since this goal could only be achieved, when no impurities had been present in the reactants, the skilled person would start from pure compounds, despite all the time and effort necessary for their purification.

(7) The Appellant disputed that experimental work in laboratories would be carried out with starting compounds in their highest possible purity, because the skilled person would have no interest in obtaining results which could not be transferred to the industrial scale. Rather, the skilled person would try to find out the least possible purity of the starting material which still allowed to obtain a good product.

(8) Furthermore, with regard to the Respondent's argument that it had been conventional to carry out the preparation of the monomer as soon and quickly as possible, the Appellant argued that the skilled person would, then, also have carried out the neutralisation as quickly as possible by allowing higher temperatures in the exothermic reaction. As shown in the patent in suit (2100 ppm at 50 to 60°C in Control Production 11 vs. 230 ppm at 20 to 40°C in Production 8), such a procedure resulted, however, in high β -HPA contents and high contents of residual monomer in the resin. Nor would he or she have allowed the monomer to age in the course of the preparatory steps, as eg described in Production 1 of the patent in suit. Consequently, the

Appellant denied that the treatment of the AA in the claimed method was conventional.

(9) Additionally, the Appellant referred to Control 2 in D1 to disprove a further argument of the Respondent, according to which, the purity of the acrylate monomer used could be inferred from a given residual monomer content in the final resin. The procedure of this Control 2 had also been followed in Production 8 of the patent in suit, so that, according to the Respondent's argument, the acrylates obtained and the resins derived therefrom should have had, respectively, identical β -HPA and residual monomer contents. However, significantly less residual monomer was present in the resin of Example 11 of the patent in suit, derived from the product of its Production 8, than in the resin obtained in Control 7 of D1, wherein the acrylate according to Control 2 of D1 had been used.

(10) The Appellant argued furthermore, that it was essential for the success of the claimed method that the very low limit of 1000 ppm of β -HPA and its salts in the monomer had not been exceeded not only in the AA at some early stage, eg when delivered to the resin producer (cf. D19), but also, as required by Claim 1 (ie according to the relevant feature), after the partial neutralisation in the polymerisation. At this stage, however, it was impossible to remove β -HPA and its salts from the monomer due to the very similar properties of β -HPA and AA and their respective salts.

(11) In the discussion concerning the jurisprudence referred to in the decision under appeal and the question of whether the treatment of the monomer in the

patent in suit was conventional, the Respondent supported the findings in the decision under appeal, whilst the Appellant argued that, due to the reactivity of the AA, the present situation was completely different from the circumstances in the cases of the cited decisions. In the course of this discussion, the parties were given the opportunity to consider later decisions (T 786/00 of 19 December 2001, T 112/00 of 26 June 2002 and T 100/00 of 7 March 2003, none of which was published in OJ EPO). These decisions, like T 990/96 (above), dealt with the question of whether a document describing a chemical compound and its manufacture disclosed any grade of purity thereof. The Respondent stated that, in its opinion, all the decisions mentioned in the decision under appeal and cited by the Board were in line with one another.

(12) With regard to D11, both parties relied on the above arguments submitted with regard to D1.

(13) In respect of the alleged public prior use, on the basis of D18a to D23, the Appellant pointed out that production processes are, in general, kept secret. Nor were the production plants accessible for the public. Hence, neither had the procedures carried out in the plant been available to the public, nor had the Respondent proved that the relevant feature of Claim 1 had been fulfilled. Normally, starting materials were used only after clearance of the batch when the results of its analysis had been available. Before the clearance of a charge, it was usually kept in storage. In the case of D18a to D18d, this clearance had taken, however, up to 3 days. Moreover, none of these documents gave any hint as to the actual use of the

acid charges referred to therein. Nor were any chromatograms provided, but only their interpretations, referring to some organic impurities in the acid as received from the provider, impurities such as the dimer, acetic acid, propionic acid and HQME stabiliser. However, there was no hint to the presence or absence of β -HPA, for which compound, had not, presumably, been looked. A reason therefor might have been that, although being unavoidable, β -HPA was neither detrimental to the polymerisation reaction, nor did it cause concerns for health. Furthermore, it was even possible to add β -HPA to a polymerisation reaction mixture as a source for AA (as witnessed by D25).

(14) Nor were there, in the Appellant's view, clear links between, on the one hand, the charges referred to in D18a to D18d and, on the other hand, the affidavits D19 and D20 or the documents D21 to D23, which disclosed different polymerisation processes of the Opponent. The availability of the latter documents did not necessarily mean that their processes had ever been carried out before the filing of the patent in suit. Nor did these documents refer to β -HPA contents in the AA in the polymerisation. The residual monomer contents in the final resins could not, however, substitute these details of the process necessary to prove lack of novelty, for the reasons already referred to above.

(15) The Respondent pointed out that it was one of a few large producers of polyacrylic acid by radical polymerisation for the same purposes as described in the patent in suit, thereby dealing with the same technical problems such as residual monomer content of the products. Moreover, as shown by the analysis sheets

D18a to D18d, the high purity of commercial AA had been conventional, as were the polymerisation processes in which this starting material had been used. Such conventional processes were disclosed in D21 to D23.

(16) Then, the discussion about the question of novelty was closed.

IX. Having regard to the requests of the parties as submitted in writing (sections IV and V, above), the further procedure was discussed. Whilst, because of the short residual term of the patent in suit, the Appellant requested that the oral proceedings be continued in order to arrive at a final decision dealing with all the grounds for opposition raised by the Opponent, the Respondent maintained its request that the case be remitted to the Opposition Division, if novelty was acknowledged. In support of this request, the Respondent pointed out that (i) the appeal served mainly the purpose of reviewing the decision issued by the first instance, (ii) the patent in suit had been granted and (iii) it was, therefore, a valid patent in the designated Contracting States, on which the Patent Proprietor could rely in accordance with the national laws. Therefore, time should not be taken into consideration.

X. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the Main Request or, in the alternative, on the basis of one of the Auxiliary Requests 1 to 12, all filed with letter dated 11 April 2005.

The Respondent requested that the appeal be dismissed or, in the alternative, that the case be remitted to the Opposition Division.

Reasons for the Decision

1. The appeal is admissible.
2. *Late-filed documents*

As pointed out by the Enlarged Board of Appeal in G 9/91 and G 10/91 (OJ EPO 1993, 408 and 420, cf. Nos. 6, 16 and 18 of the reasons), the main purpose of appeal proceedings is to give the losing party the possibility of challenging the decision of the Opposition Division on its merits within the legal and factual framework as defined by the requirements (including the time limits) of Articles 99 and 100 and Rule 55 EPC.

- 2.1 Against this background, the piecemeal citation of numerous new documents in each letter submitted in the course of the appeal proceedings is considered by the Board as not in conformity with this purpose, in particular, when these documents, as can be seen from the arguments provided therewith, were clearly to serve the purpose of starting further attacks on the novelty of the subject-matter of the patent in suit. Therefore, this Board has, as announced in the oral proceedings, applied the principles set out in decision T 1002/92 (OJ EPO 1995, 605, Nos. 3 to 3.4 of the reasons) for the admission of late-filed evidence and late-filed documents with due consideration of Article 114(1) and

(2) EPC. Reference can thus be made to Headnote II of T 1002/92:

"In proceedings before the Boards of Appeal, new facts, evidence and related arguments, which go beyond the 'indication of facts, evidence and arguments' presented in the notice of opposition pursuant to Rule 55(c) EPC in support of the grounds of opposition on which the opposition is based, should only very exceptionally be admitted into the proceedings in the appropriate exercise of the Board's discretion, if such new material is prima facie highly relevant in the sense that it can reasonably be expected to change the eventual result and is thus highly likely to prejudice maintenance of the European patent; and having regard also to other relevant factors in the case, in particular whether the patentee objects to the admissibility of the new material and the reasons for any such objection, and the degree of procedural complication that its admission is likely to cause."

2.2 Thus, in consideration of the late publication date of D14 and of the fact that none of documents D15, D16, D17, D24, D26, D28 and D29 referred to a β -HPA content of the acrylate monomer as defined in Claim 1 and that D33 was not concerned with polymerisation, the Board came to the conclusion that the above requirements for the admission of these documents were not fulfilled and they were, therefore, not admitted in the proceedings (Article 114(2) EPC).

2.3 Moreover, as regards D27 submitted by the Respondent only on 11 April 2005, the Appellant was in any case not in a position to deal with the experimental data,

let alone to repeat the experiments, in time for the oral proceedings. In this connection, the Board accepts the arguments of the Appellant (section VII, above) referring to the necessity of a translation into Japanese and to the "Golden Week" (a sequence of national holidays in Japan in the period of 29 April to 5 May 2005), so that the Appellant had not been able to provide fully-reasoned comments on these data within the last month before these oral proceedings. Consequently, the Board has come in this respect to the same conclusion as above and decided to disregard the report.

- 2.4 However, in view of the fact that consent was given by the respective other party to take a number of late-filed documents into account (section VII, above), namely D18a to D18d, D25, D30, D31 and D34, the latter of which served only as witness documents to confirm assertions and to strengthen arguments provided in the discussion, the Board admitted these documents and reports in the proceedings. Moreover, since D18a to D18d had been cited in close relation with D21 to D23, those latter documents were also taken into account.

Main Request

3. *Novelty*

- 3.1 The patent in suit relates to a method for the production of a hydrophilic resin comprising the polymerisation of a water-soluble unsaturated monomer containing 50 to 100 mol % of an acrylate having a ratio of neutralisation in the range of 30 to 100 mol % (Claim 1). According to the description ([0008] to

[0010]), the hydrophilic resins are derived from partially or completely neutralised "acrylate" monomer, which term "refers to the total of acrylic acid and an acrylate" ([0044]), and should contain only low amounts of residual monomer, namely of AA and its salts.

In [0048] and [0049], further monomers are disclosed, which may be used in amounts of 0 to 50 mol % of the total monomers, including *inter alia* methacrylic acid, maleic acid, crotonic acid, itaconic acid and esters of acrylic and methacrylic acid, just to mention some out of the list of compounds in [0049], which might be looked upon as the most similar ones in comparison with the above "acrylate" component.

In the Board's view, this list of further monomers and the percentage range of 0 to 50 mol % in Claim 1 demonstrate that the term "acrylate" has not been used in the patent in suit in a generic way so as to include any α,β -alkenoic acids, but, instead, excludes the further compounds listed in [0048] and [0049].

- 3.2 It has not been in dispute between the parties that AA is a compound having particular chemical properties. If stored, its dimerisation to β -acryloxypropionic acid ("the dimer") and even its oligomerisation to higher molecular weight oligomers in a Michael-addition reaction cannot be prevented. The degree to which the Michael-addition takes place depends significantly on the length of storage, the storage conditions and impurities contained in the AA (as confirmed in D2: page 183, "Introduction"; pages 188/189, "Conclusions").

- 3.2.1 Moreover, β -HPA may form from the dimer, namely in the conditions of caustic neutralisation necessary for polymerisation (D2: page 183, right column and Fig. 3). On page 189, mention is made of 99.7 % and of a "common specification limit" of purity of 99.5 %, which values are equal to impurity contents of 3000 and 5000 ppm, respectively. Whilst, initially, these impurities in the AA used in D2 included less than 0.040 mass % (ie less than 400 ppm) of the dimer (D2: page 184, above Table 3), the dimer content grew upon storage, and the speed of this increase depended on the water content and the storage temperature (Table 4 and Fig. 4 to 9).
- 3.2.2 This means that, contrary to the normal behaviour of chemical compounds which, after their purification and in appropriate storage conditions, maintain the achieved degree of purity (as argued by the Appellant, Statement of Grounds of Appeal, page 8, last two complete paragraphs), AA as such forms a dynamic system inevitably changing its composition until its consumption in the polymerisation. In the patent in suit, this is confirmed by the comparison of the results of Production 1 and Control Productions 1 to 6. This comparison demonstrates the influence of the length of storage and the storage conditions on the β -HPA content, or that of the results of Production 8 and Control Production 11, showing the importance of the reaction conditions (namely the temperature) during the neutralisation reaction (section VIII, above, paragraph 8).
- 3.2.3 Consequently, the wording of Claim 1 ("... polymerising ... monomer containing ... acrylate having a ratio of neutralisation in the range of 30 to 100 mol % and not

more than 1,000 ppm of the amount of beta-hydroxy propionic acid and salts thereof") takes into account that due care has to be taken of the content of β -HPA and its salts in the monomer until the onset of the polymerisation. However, the above wording shows that the relevant feature does not relate to the purity of AA as delivered to the polymerisation plant or as fed in the neutralisation step.

- 3.3 Document D1, the main document on which the novelty objection was based, discloses a specific method for the production of an acrylate by neutralisation of AA with a basic substance. It also relates to a method of polymerisation on the basis of an acrylate-containing polymer prepared by the above specific method, and to the polymer so obtained.

The specific neutralisation method of D1 can be used in the patent in suit, as mentioned in [0021]. In fact, it was carried out in a number of examples of the patent, eg in Production 1, just to mention one of them, the product of which was then polymerised in Example 1.

However, a number of comparative examples in the patent, eg Control Productions 1 to 6 and Controls 1 to 9, show that the application of the disclosure of D1 is not sufficient for the achievement of the required properties of the resin product. Thus, the control examples of the patent in suit and the examples of D1 show residual monomer contents in the same range, which contents are significantly higher than those in the examples achieved according to the teaching in the patent in suit (patent: Tables 1 and 2; D1: Table 1).

- 3.3.1 Moreover, it was not disputed by the Respondent that D1 refers neither to the initial purity of the AA used as a starting material, in general, nor to the relevant feature.
- 3.3.2 Nevertheless, the Respondent argued, in particular with regard to D18a to D18d, D19 and D20, (i) that commercially available AA upon delivery from the supplier fulfilled the purity requirement anyway (sections V and VIII, paragraphs 3 and 13 to 15, above) and (ii) that it had been common general knowledge and conventional to use the AA "as soon as possible" after its purification by distillation (which, according to the Respondent, is normally carried out by the supplier of the AA before its delivery, cf. D19) without any intermediate storage before the polymerisation, ie immediately after receipt in order to avoid any need for its re-purification in the polymerisation plant (section VIII, paragraph 2, above). However, the Appellant raised doubts as to the immediate use of the delivered AA by raising the question of clearance of the AA charge after analysis (section VIII, paragraph 13, above).

Moreover, the term "as soon as possible" as used by the Respondent can only be found in the patent in suit (page 7, line 5, [0060]), whilst D1, undisputedly, is completely silent about either the use directly after delivery or the storage of the AA after delivery, about the purity of the AA fed to the neutralisation and also about the side reactions mentioned above (sections 3.2 to 3.2.3, *supra*).

3.3.3 With respect to the above point (i) it must be noted, that each of D18a to D18d referred only to one sample taken from a particular charge of AA received with the first lorry which had arrived on 3, 6, 8 and 13 April 1992, respectively. None of these analysis sheets clearly and unambiguously shows that AA, as received by the Opponent/Respondent on the dates given, had, in fact, been completely free of β -HPA or had contained less than 1000 ppm thereof, and even if it had been so, it was not evident that this would still have been the case when it was used in polymerisation after at least partial neutralisation. In view of the dates when these sheets had been finished (up to 3 days later; "Erledigt am"), it is not even unambiguously clear that the acid had been used or was generally used in the polymerisation on the date of receipt. The argument of the Respondent to this end on the basis of D20 (point 3: the AA was "analysed immediately before it was used ...") is not convincing in view of its own written statements, referred to by the Appellant, and of the further arguments of the Appellant to this issue, which were not refuted by the Respondent. D19 relates to an analysis carried out by the supplier before shipping the product. Therefore, it cannot provide any information in relation to the relevant feature (cf. section VIII, paragraphs 4, 5, 6, 11 and 14, above).

3.3.4 In particular, it has not been convincingly shown that β -HPA and its salts had been considered, at all, to be optional impurities of the AA, that their content had been known to be a critical feature in the polymerisation of AA, and that these compounds had been searched for in GC or were, in fact, detectable by this method as carried out. Nor are D19 and D20

unambiguously clear in this respect, as addressed above, in particular, when comparing the formulation in these documents with the statement of 19 November 2003, page 4, paragraph 2.

3.3.5 Hence, it must be concluded that neither D1 itself refers to the relevant feature, nor does D2 (section 3.2, above) or any other document in the proceedings, including D18a to D20, indicate its importance. On the contrary, D5, D34 and D25 indicate that AA may form from β -HPA (as confirmed in Respondent's letter dated 19 November 2003, item 3.2.9), and D25 even describes that AA may be made *in situ* from β -HPA, deliberately added to the polymerisation mixture (cf. its Example 1).

3.3.6 Therefore, the Board cannot concur with the Respondent's arguments about the automatic fulfilment of the relevant feature in D1. Rather, it must be concluded that the general description of D1 does not clearly and unambiguously disclose the relevant feature of Claim 1.

3.3.7 Turning from the general disclosure of D1 to its examples and the arguments of the parties concerning the purity of AA used in laboratory scale experiments, in general (section VIII, paragraphs 6 and 7, above), the Board takes the view that the preparation of hydrophilic resins on the basis of "acrylate" monomers had been a well established technique as documented in the patent in suit itself ([0004] to [0007]), in the numerous patent documents already cited in the Notice of Opposition and the state of the art referred to in these documents. Then, it had become important to improve the known products eg with respect to their

residual monomer content. One way of achieving this goal was by modification of the production methods as disclosed in D1, which, however, did not provide an entirely satisfactory solution therefor (section 3.3, above).

However in the Board's view, the further investigations to find a satisfactory solution did not require studies of the mechanism of the well-known polymerisation reaction, but, rather, experiments to find out with which grades of purity of the monomer used and in which reaction conditions, this goal could still be achieved. Therefore, the Board concurs with the Appellant in that the practitioner would have looked for the least demanding process requirements which still allowed to achieve this goal, rather than with the Respondent who argued that, in such experiments, the starting materials would be used in their highest possible purity.

- 3.3.8 As D1 was silent about the relevant feature and the analysis data provided were not considered to provide the necessary information in this respect, the Respondent asserted that this missing feature could be derived from the residual monomer content in the examples of D1. However, in view of the results of the examples and comparative examples in the patent in suit and the examples in D1 (section 3.3, above), the Board does not accept the assertion that the content of β -HPA and its salts in the polymerisation can unambiguously be derived by calculation from the residual monomer content of the product. On the contrary, the arguments brought forward by the Appellant (section VIII, paragraph 9, above) to show that there is no clear link

between the relevant feature and the residual monomer content in the polymer are convincing.

- 3.3.9 In summary, it has not been clearly and unambiguously shown that D1 discloses explicitly or implicitly the specific combination of all the features as defined in Claim 1 of the patent in suit, whether considered by itself or in conjunction with common general knowledge as contended by the Respondent, as would have been necessary for the establishment of lack of novelty.
- 3.4 Having regard to the fact that neither party provided further arguments to the question of novelty on the basis of D11, and that D11 refers to purity of the AA only once, ie in Example 1 with regard to the acid before neutralisation ("99 % pure acrylic acid"), the Board has no reason to consider this document in more detail. Rather, the finding in section 3.3.9, above, is also valid for this document.
- 3.5 In addition to D1 or D11 *per se*, the decision under appeal relied on a number of decisions of the Boards of Appeal. On the basis of these decisions (section III, above), the Opposition Division had come to the conclusion that each of the above documents despite their silence about any contents of β -HPA and their salts had disclosed the use of AA at all grades of purity. This finding has been disputed between the parties (section VIII, paragraph 11, above).

Therefore, the question has to be examined of whether the findings in the cited decisions are applicable in the present circumstances and, if so, of whether their application can lead to conclusions different from the

above assessment of novelty vis-à-vis D1 and D11, respectively.

- 3.5.1 In the oldest of the decisions mentioned, T 205/83 (above), the Board had denied novelty of a product because the alleged difference from the prior art lay in the residual monomer content, which was held not to be an inherent property or parameter of the polymer as claimed in the main request of that case (No. 3.2.3 of the reasons, paragraph 2). However, in No. 4 of the reasons (as worded in the translation published in the OJ EPO), the Board continued: "The same does not apply to the alternative request, which pursues only the granted process Claims 1 to 3."

Thus, in view of Claim 1 in the patent in suit, which relates to a method, this decision supports the position of the Appellant rather than the denial of novelty as worded in the decision under appeal.

- 3.5.2 The decision, on which the decision under appeal primarily relied, was T 990/96 (above). This was the decision, on the basis of which the Respondent based its arguments, that it had been conventional to use the monomer in a very high grade of purity and that the measures for accomplishing this had also been conventional, eg by distillation of the monomer only shortly before its use in the polymerisation.

However, this decision, similar to the main request in the case of T 205/83 (above), concerned a product claim.

Moreover, in T 990/96, the purification was considered conventional, because the prior art had already

provided a method therefor, which could be used in the case at issue in that decision. Nor had the Appellant/Applicant in that case discharged the burden of proof, which had lain on it, to show that an exceptional situation had been given in that case, because eg conventional purification processes had failed (Nos. 7 to 9.1 of the reasons).

3.5.3 The above findings in T 990/96 and in T 205/83 were also confirmed in T 728/98 (above; cf. its Headnote 2 and No. 6.2 of the reasons), as far as those decisions also dealt with the question of novelty of a chemical compound which was claimed in substantially pure form.

3.5.4 In decision T 786/00 (above), however, the Board explained, why it did not follow T 990/96 with regard to a process claim wherein a certain impurity was not to exceed a certain maximum value in a molten reaction mixture. Apart from the different categories of the claims in these decisions and the fact that in T 990/96 an ultimate degree of purity of the final product was to be achieved, the Board saw a further difference in that the concern of the skilled person must be presumed to be the use of the most impure starting materials possible consistent with the aim of obtaining a sufficient yield of product. Therefore, the general statements in T 990/96 were found not to be applicable directly to the starting materials or, hence, to the case underlying that decision (No. 3.8.2 of the reasons).

3.5.5 The findings in T 786/00, above, were confirmed in T 112/00 (above, No. 2.6.2 of the reasons).

- 3.5.6 The above observations concerning the jurisprudence up to now, in particular T 205/83, T 786/00 and T 112/00 (above), show, in the Board's view, that decisions concerning the novelty of a claimed product (physical entity) are not necessarily pertinent to a case relating to a physical activity (method or process).
- 3.5.7 In Decision T 242/88 (above), however, the Board was of the opinion that the definition of a minimal grade of purity of the starting material was not a feature which distinguished the claimed process from the prior art, because the skilled person understood that a chemical compound defined in terms of its chemical name, which did not provide particular details relating to its purity, was practically completely pure, unless exceptional circumstances prevail. Such an exceptional situation was, however, not acknowledged there, since it had not been disputed that a 99 % purity of the starting material had been usual prior to the filing of that case and that the purification steps used had already been described (Nos. 3.2 to 3.4 of the reasons).
- 3.5.8 As pointed out in sections 3.2 to 3.2.2, above, AA is, however, a compound having, in comparison to the normal behaviour of chemical compounds as considered in those decisions, abnormal properties, so that "conventional" purification thereof, eg by distillation at the end of its production, is not sufficient for the achievement of the goal underlying the patent in suit (section 3.3, above).
- 3.5.9 In relation to such a "conventional purification process" (as eg used in T 990/96, above), it was found in decision T 100/00 (above), that "the qualification

'conventional' can only mean 'conventional in view of the concrete technical context concerned'. A purification technique may be conventional in one technical area but non-conventional in others." (No. 4.15 of the reasons).

3.5.10 In the present case, it has been found, for the first time and irrespective of the method of purification of the AA by the supplier, that the content of β -HPA and its salts must not exceed a specified limit in the polymerisation of the monomer. The purity of the starting material as delivered to the production plant (as conventionally understood and as discussed in the above decisions) is, however, different from the relevant feature in Claim 1 (section I, above).

3.5.11 Therefore, the Board is of the opinion that, in view of the particular chemical behaviour of AA (section 3.5.8, above), the conditions and circumstances with which the skilled person is confronted in the polymerisation of AA are particular and cannot directly and simply be compared, let alone identified with those conditions and circumstances considered by the Boards in the cases dealt with in the above decisions. The Board is therefore satisfied, in particular for the reasons given in sections 3.2 to 3.2.3, above (in view of the inevitable side reactions of AA), that the situation in this case is exceptional in the sense as used in T 242/88 (above).

Consequently, the Board does not, under these particular circumstances, concur with the finding in the decision under appeal that D1 or D11 had implicitly

disclosed the purity of the "acrylate" monomer as required by the wording of Claim 1.

3.5.12 It follows that neither D1 nor D11 anticipate the subject-matter of Claim 1, even when taking the jurisprudence, mentioned above, into account.

3.6 The further objection of lack of novelty on the basis of an alleged public prior use was raised with regard to documents D18a to D23. In this context again, one of the decisive questions is whether it has been clearly and unambiguously shown by the Respondent, on whom the onus of proof lay, that, in one of the documents presented as proof for the allegation, all the requirements of Claim 1 had already been disclosed in clear and unambiguous combination without leaving room for any doubt ("proof up to the hilt").

3.6.1 As pointed out by the Appellant, the claims in the patent in suit do not relate to a product which can be analysed by the customer or the public, as eg to determine the residual monomer in a polymer, but to a method, which is normally not made public (section VIII, paragraph 13, above). Nor was the argument of the Appellant convincingly refuted by the Respondent that polymerisation plants, in general, have not been accessible for the public, and that this was also true for the Respondent's plant.

The Board does not see any reason not to accept these arguments of the Appellant.

3.6.2 Amongst the documents referred to by the Respondent with regard to the asserted public prior use, a process

for the preparation of resins on the basis of AA is only disclosed in each of D21, D22 and D23. However, since none of these documents mentions the presence or absence of β -HPA in the water-soluble unsaturated monomer, the above findings (sections 3.3.1 to 3.3.9, above) are also valid for each of these documents.

- 3.6.3 In particular, as shown in section 3.3.8, above, direct conclusions cannot be drawn from the residual monomer contents of the final product, optionally after conventional purification, as to the β -HPA content in the AA used as a starting material, let alone the β -HPA content in the polymerisation reaction according to any one of the processes in D21, D22 or D23.

Moreover, for the reasons already set out in sections 3.3.2 to 3.3.4, above, none of the analysis sheets D18a to D18d nor of the affidavits D19 and D20, can strengthen the novelty objection of alleged public prior use either.

Thus, the argument that the AA used in the processes of D21 to D23 corresponded to the analysis results of D18a to D18d cannot explain the residual monomer contents given in D21, ranging in the examples from 0.07 wt.% (700 ppm) to 0.25 wt.% (2500 ppm), and in D22, ranging in the examples from 220 to 490 ppm (whilst D23 is silent in this respect). Rather, this finding is incompatible with the Respondent's above argument, that no β -HPA had been present in the AA used by the Opponent/Respondent at that time (as allegedly shown in any one of D18a to D18d).

This objection is, therefore, rejected.

4. According to decision T 585/92 of 9 February 1995 (OJ EPO 1996, 129, No. 3.2 of the reasons), the burden of proof is shifted from the opponent to the patent proprietor, once the patent in suit has been revoked. In view of the above considerations and conclusions, however, the Board is satisfied that the Appellant has discharged its burden of showing that the decision under appeal was wrong on its merits. Consequently, this objection of the Respondent is of no effect.

5. It follows that the subject-matter as claimed in Claim 1 of the Main Request fulfils the novelty requirement according to Articles 52(1) and 54 EPC.

Consequently, the decision under appeal, which came to the opposite result, cannot be upheld. Rather, it must be set aside.

6. Moreover, there is, therefore, no need to consider the auxiliary requests of the Appellant.

7. Since (i) the decision under appeal dealt only with the question of novelty, and (ii) the only statement of the Opposition Division dealing with the question of inventive step was contained in the annex to the summons dated 18 July 2001, informing the parties that "the opposition ground of lack of inventive step will be discussed when the question of novelty is clarified" (item 6 of the annex), and in view of the respective request of the Respondent in this respect (section IX, above), the Board has decided to make use of its powers under Article 111(1) EPC to remit the case for completion of its examination in respect of the other

ground for opposition raised and substantiated in the Notice of Opposition.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Opposition Division for further prosecution on the basis of the Main Request submitted with letter of 11 April 2005.

The Registrar:

The Chairman:

E. Görgmaier

R. Young