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D E C I S I O N
of 1 December 2003

Case Number: T 0295/02 - 3.3.3

Application Number: 94105079.1

Publication Number: 0618249

IPC: C08G 63/81

Language of the proceedings: EN

Title of invention:

Aliphatic polyester and preparation process thereof

Applicant:

MITSUI CHEMICALS, INC.

Opponent:

-

Headword:

-

Relevant legal provisions:

EPC Art. 54, 84

Keyword:

"Claims - clarity - functional features"
"Novelty (yes)"

Decisions cited:

T 0068/85

Catchword:

-



Case Number: T 0295/02 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 1 December 2003

Appellant:

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Representative:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office of 22 March 2001 posted
6 June 2001 refusing European application
No. 94105079.1 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: R. Young
Members: P. Kitzmantel
H. Preglau

Summary of Facts and Submissions

- I. This appeal, which was filed on 9 August 2001 lies against the decision of the Examining Division of 22 March 2001 issued in writing on 6 June 2001, refusing European patent application No. 94 105 079.1 filed on 30 March 1994 in the name of MITSUI TOATSU CHEMICALS, Inc. (now MITSUI CHEMICALS, Inc.), published under No. 0 618 249, and claiming four JP priorities of 2 April, 15 June, 17 June and 21 December 1993.
- II. The appeal fee was paid together with the Notice of Appeal and the Statement of Grounds of Appeal was filed on 16 October 2001.
- III. The decision under appeal was based on Claims 1 to 12 filed with a submission dated 17 November 1999.

Claim 1 reads:

"A process for preparing an aliphatic polyester having a weight average molecular weight of 15,000 or more, which comprises subjecting a monomer composition, selected from

(i) a mixture of one or more aliphatic polyhydric alcohol(s) and one or more aliphatic polybasic acid(s) and

(ii) a mixture of one or more aliphatic polyhydric alcohol(s), one or more aliphatic polybasic acid(s) and one or more hydroxycarboxylic acid(s),

to a polycondensation reaction in an organic solvent, wherein a portion of the organic solvent containing water and the monomer(s) is distilled off the reaction mixture and an additional organic solvent is charged to

the reaction mixture, said additional solvent containing an amount of water and the monomer that is less than the amount of water and the monomer dissolved in the distilled organic solvent."

Claims 2 to 12 were dependent on Claim 1.

IV. The decision under appeal refused the application because, in its opinion, Claim 1 contravened Article 84 EPC and was directed to subject-matter that was anticipated by D1: US-A-4 554 343.

(a) With respect to Article 84 EPC it was held that Claim 1 lacked clarity in view of an alleged inconsistency of its feature "said additional solvent containing an amount of water and the monomer that is less than the amount of water and the monomer dissolved in the distilled organic solvent" (emphasis added) with two statements in the description; one on page 4, last paragraph, specifying that the additional solvent must contain less water or monomers and the other on page 12, last paragraph, setting out that the additional solvent must contain "the same or less amount of water and the monomer as compared with the distilled organic solvent".

(b) A further Article 84 EPC objection of the decision under appeal relates to the functional character of the afore-mentioned feature. It was held that that this characterisation, which failed to specify the steps to be taken in order to obtain the desired lesser water and monomer content, contravened the requirement that functional

features could only be accepted if it was not possible to define the process in another way.

- (c) The Examining Division's objection of lack of novelty relied on the contention that the process of D1, i.e. the preparation of high molecular weight polyesters from alicyclic or aromatic dicarboxylic acid components and from 1,3- or 1,4-cyclohexanedimethanol in a solvent, which comprised the azeotropic removal of water and the returning of condensed solvent vapour, involved reaction conditions which were identical to those according to present Claim 1, therefore inevitably including that the removal of water was accompanied by the removal of monomer(s).

- (d) This conclusion was not invalidated, in the Examining Division's view, by the statement in D1 (column 1, lines 48 to 50) that "with our process ..., no phthalic anhydride [i.e. monomer] is lost ...".

- (e) Furthermore, the restriction of the application-in-suit to the preparation of polyesters from aliphatic components would not be able to distinguish its subject-matter from the disclosure of D1 because, in the light of the information on page 11, line 2 of the application-in-suit, 1,4-cyclohexanedimethanol was considered as aliphatic alcohol and because aliphatic acids were among the acids contemplated in D1, column 3, first paragraph.

V. The Appellant's arguments brought forward in the Statement of Grounds can be summarized as follows:

- (a) Since the statement in Claim 1 "said additional solvent containing an amount of water and the monomer that is less than the amount of water and the monomer dissolved in the distilled organic solvent" was clear in itself, there was no need for its interpretation in the light of the description.
- (b) The Examining Division's objection to the functional character of this feature was also unfounded because it met the requirements emphasised in T 68/85 and confirmed in various other decisions, namely (i) that this feature could not otherwise be defined more precisely without restricting the scope of the invention, and (ii) that it provided instructions which were sufficiently clear for the expert to reduce them to practice without undue burden.
- (c) Furthermore the subject-matter of Claim 1 was also novel over D1 because this document did not disclose a polycondensation process where water and monomer was distilled off with the solvent and where solvent was returned comprising a smaller amount of water and monomer.
- (d) Contrastingly, D1 emphasised that, contrary to prior art processes, phthalic anhydride was not lost during the azeotropic removal of the reaction water, i.e. did not disclose that monomer was distilled off.

- (e) The importance of the claimed feature that the additional solvent which was charged to the reaction mixture contained less than the amount of water and monomer dissolved in the distilled organic solvent was demonstrated by Comparative Example 1 of the description.
- (f) The claimed subject-matter also involved an inventive step because there was no suggestion in D1 of this solution of the problem underlying the present application, namely the provision of aliphatic polyesters having enhanced molecular weight.

VI. The Appellant requested that the decision under appeal be set aside and a patent be granted.

Reasons for the Decision

- 1. The appeal is admissible.
- 2. *Article 84 EPC*
 - 2.1 It was held in the decision under appeal that Claim 1 lacked clarity because of an alleged inconsistency of its feature "said additional solvent containing an amount of water and the monomer that is less than the amount of water and the monomer dissolved in the distilled organic solvent" (emphasis added) with two statements in the description; one on page 4, last paragraph, specifying that the additional solvent must contain less water or monomers and the other on page 12,

last paragraph, setting out that the additional solvent must contain "the same or less amount of water and the monomer as compared with the distilled organic solvent".

2.2 While it is true that these statements in the description are inconsistent with the cited passage of Claim 1, this inconsistency results from an amendment of the word "or" to "and" (via intermediate amendment to "and/or") in the wording of original Claim 2 (then already transferred into Claim 1): "organic solvent containing water or the monomer(s) is removed" (emphasis added) which amendment was carried out by the Applicant with its letter of 12 November 1997 in response to a respective suggestion in the Examining Division's communication of 11 July 1997.

2.3 Furthermore it can be concluded from the minutes of the oral proceedings held on 22 March 2001 before the Examining Division (section 2.1, third paragraph) that the Applicant was indeed prepared to adapt the description to "conform to a definite allowable set of claims".

2.4 It is therefore apparent that the text of the description as it was before the Examining Division was a provisional text not intended by the Applicant to form the agreed basis of any decision, especially of a decision concerning its consistency with the amended claims, in the sense of Article 113(2) EPC.

2.5 The inconsistency between operative Claim 1 and the provisional description is therefore not a valid reason for refusal of the application.

- 2.6 The same conclusion applies to the further Article 84 EPC objection of the decision under appeal, namely the one concerning the functional character of the feature of Claim 1 requiring that the "additional organic solvent" contains "an amount of water and the monomer that is less than the amount of water and the monomer dissolved in the distilled organic solvent."
- 2.7 The Board accepts the position of the Appellant, i.e. that this feature is not objectionable because it meets the requirements of the EPC as emphasised in T 68/85 (OJ EPO 1987, 228) and confirmed in various other decisions, namely (i) that this characteristic of the claimed invention could not otherwise be defined more precisely without restricting its scope, and (ii) that it provided instructions which are sufficiently clear for the expert to reduce them to practice without undue burden.
- 2.8 Requirement (i) is satisfied because of the apparent existence of more than one way for achieving reduced amounts of water and monomer(s) in the "additional organic solvent", and requirement (ii) is met because the steps to be taken in order to realise this functional characterisation is within the common general knowledge of the skilled person.
- 2.9 That functional features which meet these two requirements fulfil the conditions of Article 84 EPC is set out, with particular reference to T 68/85, in the Guidelines for Examination (part C, chapter III, 4.7).

3. *Novelty*

3.1 Document D1

Claim 1 of this document relates to a process for the preparation of high molecular weight polyesters comprising reacting substantially equimolar amounts of an acid component comprising at least 50 mole % of at least one alicyclic or aromatic dicarboxylic anhydride or corresponding dicarboxylic acid having 6 to 30 carbon atoms with 1,3-cyclohexanedimethanol, 1,4-cyclohexanedimethanol or mixtures thereof, at a temperature between about 110°C and about 180°C in a solvent comprising benzene having 1 to 2 chlorine or alkyl substituents having 1 to 4 carbon atoms, azeotropically removing water from the reaction mixture while condensing solvent vapour and returning it to the reaction mixture, and recovering the polyester after an inherent viscosity of at least 0.4 has been attained.

3.2 The lack of novelty conclusion of the decision under appeal *inter alia* relied on the assumption that the aliphatic character of the claimed polyesters could not distinguish them from the polyesters according to D1 because this document also contemplated the use of aliphatic dicarboxylic acids/anhydrides, and because 1,4-cyclohexanedimethanol was listed among the (aliphatic) polyhydric alcohols to be used according to the claimed invention.

3.2.1 However, in the Board's judgment, this assumption is ill-founded because the statement in column 3, first paragraph, on which the decision under appeal relied with regard to the possible use of aliphatic

dicarboxylic acids/anhydrides, does not encompass polyesters whose acid units are derived solely from aliphatic dicarboxylic acids/anhydrides. Rather that statement reads: "The acid component may contain up to 50 mole% of an aliphatic dicarboxylic acid or anhydride having from 3 to 12 carbon atoms, ...".

3.2.2 Since Claim 1 of D1 requires that the acid component comprises at least 50 mole% of an alicyclic or aromatic dicarboxylic acid/anhydride, aliphatic acid units can only be present in the resulting polyester in a maximum amount of 50 mol%.

3.2.3 However, present Claim 1 is directed to a process for preparing an aliphatic polyester by polycondensation of a monomer composition comprising aliphatic polyhydric alcohol(s) and aliphatic polybasic acid(s) (and possibly hydroxycarboxylic acid(s)) and does not therefore allow for the presence of non-aliphatic components, non-aliphatic dicarboxylic acids/anhydrides inclusive.

3.2.4 It is noted in this context that the term "aliphatic" as it is used in the present application includes compounds whose functional groups, carboxyl or hydroxyl, are bound to an "aliphatic" carbon atom, as is the case for the compounds 1,4-cyclohexanedimethanol, 1,4-benzenedimethanol, phenylsuccinic acid and 1,4-phenylenediacetic acid exemplified on page 11, lines 2, 3 and 8 of the original application. A compound whose functional group is located on an "aliphatic" carbon atom having alicyclic substituents (eg 1,4-cyclohexanedimethanol) is therefore to be distinguished from a proper alicyclic compound whose

functional group is directly bound to a cycloaliphatic ring (eg 1,2-cyclohexanedicarboxylic anhydride used according to D1, Example 7).

- 3.3 It follows that the disclosure of D1 is not novelty destroying for the subject-matter of present Claim 1.
4. The reasons given in the decision under appeal do not therefore justify the refusal of the application.
5. Since the decision under appeal only relied on the issues of clarity and novelty, it appears appropriate, in accordance with Article 111(1) EPC, to remit the case to the first instance for further prosecution of the application.
6. In this respect the Board makes the following remarks concerning the technical effects to be achieved by the claimed invention:
- According to Comparative Example 1 of the present application, whose procedure - with respect to the use of a Dean Stark trap - is similar to that according to D1, the polycondensation reaction is carried out in the absence of a solvent although the presence of a solvent is an essential feature of the process of D1.
 - Example 4 is the only "inventive" example which, as Comparative Example 1, performs the first oligomerisation step of a reaction mixture ethylene glycol/succinic acid/metallic tin in a vessel having mounted thereon a Dean Stark trap, and which does not comprise a condensation step

having a molecular sieve packed tube mounted on the vessel.

- The higher molecular weight obtained according to Example 4 therefore merely seems to reflect the use of diphenyl ether as solvent.

- The Appellant's reliance in the Statement of Grounds of Appeal (page 7, second paragraph) on Comparative Example 1 as evidence for the effect to be achieved by returning "additional" solvent containing less water and monomers than was contained in the distilled solvent therefore appears doubtful.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance for further prosecution.

The Registrar:

The Chairman:

E. Görgmaier

R. Young