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Datasheet for the decision of 22 July 2008

Case Number: T 0534/04 - 3.3.05

Application Number: 97122407.6

Publication Number: 0850895

IPC: C04B 24/26

Language of the proceedings: EN

Title of invention:
Cement dispersant, method for producing polycarboxylic acid for cement dispersant and cement composition

Patentee:
NIPPON SHOKUBAI CO., LTD.

Opponent:
BASF SE

Headword:
Method for producing polycarboxylic acid for cement dispersant/NIPPON SHOKUBAI

Relevant legal provisions:
EPC Art. 123(2)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Amendments containing subject-matter extending beyond the content of the application as filed (yes) - combination as originally disclosed cannot be dismantled (see reasons 1.4)"

Decisions cited:
-
Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0534/04 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 22 July 2008

Appellant II: (Opponent)
BASF SE
D-67056 Ludwigshafen (DE)

Representative:
Riedl, Peter
Patentanwälte
Reitstötter, Kinzebach & Partner
Postfach 86 06 49
D-81633 München (DE)

Appellant I: (Patent Proprietor)
NIPPON SHOKUBAI CO., LTD.
1-1, Koraibashi 4-chome
Chuo-ku
Osaka-shi
Osaka-fu 541 (JP)

Representative:
Glawe, Delfs, Moll
Patentanwälte
Postfach 26 01 62
D-80058 München (DE)

Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 23 February 2004 concerning maintenance of European patent No. 0850895 in amended form.**

Composition of the Board:

Chairman: G. Raths
Members: E. Waeckerlin
S. Hoffmann

Summary of Facts and Submissions

I. The present appeals were lodged against the interlocutory decision of the opposition division maintaining the patent in amended form on the basis of the third auxiliary request as filed during the oral proceedings before the opposition division on 20 January 2004.

II. During the opposition proceedings, the parties referred *inter alia* to the following documents:

D2 JP-A-08165156;

D3 DE-A-195 13 126;

D6 Kosswig, K.; Stache, H.: Die Tenside. München : Carl Hanser Verlag, 1993, p. 148 - 149, 174, 202;

D7 Schönfeldt, N.: Grenzflächenaktive Äthylenoxid-Addukte. Stuttgart : Wissenschaftliche Verlags-gesellschaft, 1976, p. 17, 83, 84.

III. In the decision under appeal, the opposition division held that the main request could not be granted because the subject-matter of claim 3 was not novel in view of the disclosure of D2.

The first and second of the auxiliary requests were open to objection, because the method according to claim 1 of these requests did not involve an inventive

step having regard to the combination of documents D3 and D7.

With regard to the third auxiliary request, the opposition division acknowledged that the claims as amended were in conformity with Article 123(2) and (3) EPC. Moreover it was held that the claimed method was novel and inventive in view of document D2, taken in combination with either D6 or D7.

IV. Both the proprietor of the patent (appellant I) and the opponent (appellant II) appealed against the interlocutory decision of the opposition division on 23 April 2004 and 30 April 2004, respectively.

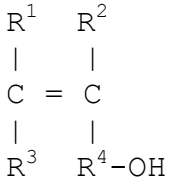
V. In the grounds of appeal appellant I argued that the refusal of claim 1 of the first and second auxiliary requests was unfounded. In support of the argumentation, appellant I referred to further documents. He submitted a set of amended claims marked "Main Request (Appeal)". Claim 1 was a combination of claims 1 and 2 of the previous auxiliary request 2, which had been refused by the opposition division.

Under cover of a letter dated 27 May 2008 appellant I submitted four sets of further amended claims as a main request and auxiliary requests 1 to 3, respectively, replacing the previous set of claims.

Claim 1 of the main request reads as follows:

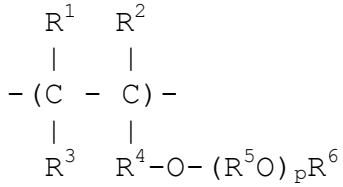
"1. A method for producing a polycarboxylic acid for a cement dispersant said polycarboxylic acid being a copolymer and containing a polyalkylene glycol ether

type unit having a polyalkylene glycol at a side chain, wherein the end portion of the polyalkylene glycol is a hydroxyl group, and the polyalkylene glycol is obtained by adding alkylene oxide in the range of 80 to 155 °C, wherein a polyalkylene glycol ether type monomer, which is obtained by an addition reaction of alkylene oxide having 2 to 4 carbon atoms in the range of 80 to 155 °C in the presence of a base catalyst with an unsaturated alcohol (B-1) represented by the general formula (3) below:



formula (3)

where R^1 to R^3 each independently represent hydrogen or a methyl group; and R^4 represents $-CH_2-$, $-(CH_2)_2-$ or $-C(CH_3)_2-$, is used as a polyalkylene glycol ether type monomer giving the repeating unit, represented by the general formula (1) below:



formula (1)

where R^1 to R^3 each independently represent hydrogen or a methyl group; R^5O represents one kind or a mixture of two or more kinds of oxyalkylene group having 2 to 4 carbon atoms, in the case of two or more kinds, those may be added in a block state or a random state; R^6 represents hydrogen; R^4 represents $-CH_2-$, $-(CH_2)_2-$ or $-C(CH_3)_2-$; and p represents an integer of 1 to 300."

Independent claim 2 of the main request reads as follows:

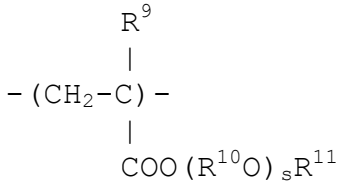
"2. A method for producing a polycarboxylic acid for a cement dispersant said polycarboxylic acid being a copolymer and containing a polyalkylene glycol ester type unit having a polyalkylene glycol at a side chain, wherein the polyalkylene glycol is obtained by adding alkylene oxide in the range of 80 to 155 °C, wherein a polyalkylene glycol (6), which is obtained by addition reaction of alkylene oxide having 2 to 4 carbon atoms in the range of 80 to 155 °C with an alcohol (B-2) represented by the general formula (7) below, is used in producing a polyalkylene glycol ester type monomer giving the repeating unit (III) by esterification between a polyalkylene glycol (6) represented by the general formula (6) below and (meth)acrylic acid or ester interchange between the polyalkylene glycol (6) and alkyl(meth)acrylates, with the alkyl group in the alkyl(meth)acrylates having 1 to 22 carbon atoms;

$$H\text{-}(R^{10}O)_s\text{-}R^{11} \qquad \textit{formula (6)}$$

where $R^{10}O$ represents one kind or a mixture of two or more kinds of oxylkylene [sic] *group having 2 to 4 carbon atoms, in the case of two or more, those may be added in a block state or a random state, R^{11} represents an alkyl group having 1 to 22 carbon atoms, a phenyl group, or an alkylphenyl group, with the alkyl group in the alkylphenyl group having 1 to 22 carbon atoms; and s is an integer of 1 to 300;*

$$HO\text{-}R^{11} \qquad \textit{formula (7)}$$

where R^{11} represents an alkyl group having 1 to 22 carbon atoms, a phenyl group, or an alkylphenyl group having 1 to 22 carbon atoms, said repeating polyalkylene glycol ester type unit (III) being represented by the general formula (4) below:



formula (4)

where R^{9} represents hydrogen or a methyl group: $R^{10}O$ represents one kind or a mixture of two or more kinds of oxyalkylene group having 2 to 4 carbon atoms, in the case of two or more kinds those may be added in a block state or a random state; R^{11} represents an alkyl group having 1 to 22 carbon atoms, a phenyl group, or a alkylphenyl group, with the alkyl group in the alkylphenyl group having 1 to 22 carbon atoms; and s is an integer of 1 to 300."
(Note by the board: Formula (6) of claim 2 contains an obvious error. It should correctly read $HO-(R^{10}O)_s-R^{11}$. Moreover in the definition of the group R^{11} the mistaken term *"oxylkylene"* has to be corrected to read *"oxyalkylene"*.)

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that the lower limit of the temperature range of the addition reaction is changed from 80°C to 100°C. Independent claim 3 of auxiliary request 1 corresponds to claim 2 of the main request.

Claim 1 of auxiliary request 2 corresponds to claim 1 of auxiliary request 1, except that the unsaturated alcohol is specified to be 3-methyl-3-butene-1-ol.

Auxiliary request 3 contains a single independent claim, i.e. claim 1, corresponding to claim 2 of the main request.

VI. Appellant I argued essentially that the choice of the method for obtaining the polyalkylene glycol ether type monomer according to claim 1 of the main request, namely the addition of alkylene oxide to an unsaturated alcohol having the formula (3), was not obvious in view of various alternative methods which were available in the prior art. Furthermore the reaction temperature was critical, and the selection of 155°C as the upper limit resulted in an unexpected effect, namely that a given flow value of the cement could be obtained with a reduced amount of polymer dispersant.

VII. Appellant II submitted that the method according to claim 1 of the set of claims submitted by appellant I together with the grounds of appeal lacked novelty in respect of each of documents D16 and D24:

D16 US 5 296 627 A, WO 89/12618;

D24 EP 0 056 627 A.

Furthermore various objections of lack of inventive step were raised against said claim 1.

In a letter dated 12 December 2007, appellant II raised a further objection against claim 1 as submitted by appellant I together with the grounds of appeal, alleging that the claim was not in conformity with Article 123(2) EPC. Claim 1 related to a method for

producing a polycarboxylic acid containing a monomer unit represented by formula (1). There was no statement in claim 1, however, that the product contained also a dicarboxylic acid type unit represented by formula (2), as disclosed in the description and in claim 4 of the application as filed. Therefore the subject-matter of claim 1 extended beyond the content of the application as originally filed.

VIII. In reply, appellant I refuted the arguments presented by appellant II by letter dated 27 May 2008.

IX. Oral proceedings were held on 22 July 2008 in the presence of both appellants I and II.

X. The arguments of the parties in respect of Article 123(2) EPC can be summarised as follows:

According to appellant I, claim 1 of the main request is based on claim 3 of the application as originally filed. Further features have been added in order to limit the production process and the polyalkylene glycol. These features are based on the description and claim 4 of the application as filed, in particular on the detailed description of the production of the monomer giving the repeating unit of formula (1). Since this detailed description also discloses the temperature range of 80 to 155°C, it was clear to a skilled person that additional details relating to the polyalkylene glycol may be inserted into original claim 3 without the necessity also to include features relating to the dicarboxylic acid type unit of formula (2). The detailed description of the production of the monomer giving the repeating unit of formula (1) has no

relation to the dicarboxylic acid type unit of formula (2), so that the objection raised by appellant II under Article 123(2) EPC is unfounded.

At the oral proceedings appellant I explained that the same considerations apply also to claim 2 of the main request. In the application as originally filed the method for producing the product is described in detail. It was clear to the skilled person that the specific features of the method, which are described one after the other in the description, may be combined with each other, but that there exists no need to do so. Therefore it was not necessary to indicate in claim 2 any repeating unit other than the unit having formula (4). According to appellant I, it is the polyalkylene glycol side chain, which is mainly responsible for the properties of the product.

XI. Appellant II maintained its objection under Article 123(2) EPC against claim 1 of the main request. Neither the number nor the structure of the monomer unit(s) contained in the product were specified in claim 3 as originally filed. Such details could only be found in claim 4 as originally filed, but this claim related to a copolymeric product where the monomer units of formula (1) and (2), respectively, were disclosed in combination. This coincided with the corresponding passages of the description as filed.

At the oral proceedings appellant II stressed that the same objection under Article 123(2) EPC applied also to claim 2 of the main request. Claim 2 referred to a polyalkylene glycol ester type unit represented by the general formula (4), without mentioning that a

monocarboxylic acid type unit represented by the general formula (5) had also to be present. In the application as originally filed these two monomer units were disclosed only in combination with each other. Therefore the inclusion of the monomer unit of formula (4) in claim 2 contravened Article 123(2) EPC.

As regards the three auxiliary requests, both parties to the proceedings repeated *mutatis mutandis* their previous arguments under Article 123(2) EPC as presented in connection with the main request.

XII. Appellant I requested that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the main request or auxiliary requests 1 to 3, all of them submitted by letter dated 27 May 2008.

Appellant II requested that the decision under appeal be set aside and that the European patent No. 0 850 895 be revoked.

Reasons for the Decision

Allowability of the amendments under Article 123(2) EPC

1. Claim 1 of the main request

1.1 As pointed out by appellant I, claim 1 as amended is based on claim 3 of the application as originally filed. Said claim 3 reads as follows:

"3. A method for producing a polycarboxylic acid for a cement dispersant having a polyalkylene glycol at a side chain, characterized in that alkylene oxide is added to an active hydrogen-containing compound in a range of 80 to 155 °C."

To this, a number of further characteristics have been added, so that the amended claim 1 (see above, point V) contains the following specific features:

(i) The polycarboxylic acid is a copolymer.

(ii) The polyalkylene glycol side chain contains what is called *"a polyalkylene glycol ether type unit"*.

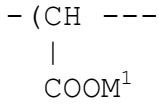
(iii) The end portion of the *"polyalkylene glycol side chain"* is a hydroxyl group.

(iv) The *"polyalkylene glycol ether type monomer"* is obtained by the addition of alkylene oxide having 2 to 4 carbon atoms to an unsaturated alcohol represented by the general formula (3), thus leading to the *"repeating unit"* of formula (1).

(v) The addition reaction is carried out in the presence of a base catalyst.

Having regard to Article 123(2) EPC, the question arises whether the combination of all these specific additional features is disclosed in the application as originally filed.

1.2 According to the first feature (i) the product of the method, i.e. the polycarboxylic acid for a cement dispersant, is a copolymer. This means that the product is a polymer derived from two or more distinct monomeric species, as opposed to a homopolymer where only one monomer is used. The board notes that the application as originally filed does not contain a general disclosure, according to which the product may be in the form of a copolymer. There is a specific disclosure, however, of a method for producing a copolymeric product derived from the combination of two structurally specified monomer units, optionally complemented by a third specific monomer (see page 7, lines 13 - 14; page 9, lines 19 - 20; page 16, lines 2 - 6). In fact the preparation of a polycarboxylic acid is described in detail, whereby the copolymer contains, as the first *"repeating unit"*, a polyalkylene glycol ether type unit of formula (1) and, as the second *"repeating unit"* a dicarboxylic acid type unit *"represented by the general formula (2)*



formula (2)

where M^1 and M^2 each independently represent hydrogen, monovalent metal, divalent metal, ammonium or organic amine, X represents $-OM^2$, or $-Y-(R^7O)_rR^8$, Y represents -O-, or -NH-, R^7O represents one kind or a mixture of two or more kinds of oxyalkylene group having 2 to 4 carbon atoms, in the case of two or more kinds, those may be added in a block state or a random state, R^8 represents hydrogen, alkyl group having 1 to 22 carbon atoms, phenyl group, aminoalkyl group, alkyl phenyl group, or hydroxyalkyl group (each alkyl group in he

aminoalkyl, alkyl phenyl and hydroxyalkyl groups having 1 to 22 carbon atoms), r is an integer of 0 to 300, and an acid anhydride group (-CO-O-CO-) may be formed in place of the -COOM[1] and -COX groups between carbon atoms to which the -COOM[1] and -COX groups should be bonded respectively" (see page 3, line 6 to page 4, line 26; examples 4 and 5; claim 4).

1.3 In claim 1 as amended the presence of the *"repeating unit"* of formula (1) has been included as a mandatory feature (see added feature (iv) above). On the other hand the dicarboxylic acid type unit of formula (2) is missing in claim 1. In other words the structure of the second and any further monomer is left open in claim 1 as amended. Since claim 1 as amended does not contain the combination of a polyalkylene glycol ether type unit of formula (1) as the first *"repeating unit"*, and a dicarboxylic acid type unit of formula (2) as the second *"repeating unit"*, the claim extends in this respect beyond the disclosure of the application as originally filed.

1.4 The appellant I has argued that the description of the production of the monomer giving the *"repeating unit"* of formula (1) has no relation to the dicarboxylic acid type unit of formula (2). Therefore he concludes that the *"repeating unit"* of formula (1) may be included as a feature in claim 1 without the necessity of including also the feature of the *"repeating unit"* of formula (2). The board is not convinced by this argumentation. According to the established case law of the boards of appeal, if a claim is restricted to a specific embodiment, it is normally not allowable under Article 123(2) EPC to extract isolated features from a

set of features which have originally been disclosed in combination for that embodiment (see Case Law of the Boards of Appeal of the European Patent Office, fifth edition, 2006, pages 238 to 241). Such an amendment could possibly be justified in the absence of any clearly recognisable functional or structural relationship among said features. In the case at issue, however, both a structural and a functional relationship exist. In fact the structure of the copolymeric product is determined by the combination of the two *"repeating units"* of formula (1) and (2), respectively. As far as the relevant properties of the product are concerned, it is evident that these are given by the structure of the copolymer as a whole, not just the structure of some part of it. The combination as originally disclosed cannot be dismantled.

1.5 Appellant I argued that the polyalkylene glycol side chain, which forms part of the *"repeating unit"* of formula (1), is mainly responsible for the properties of the product. Appellant I thus implies that the structure of the second and any further *"repeating units"* of the copolymeric product is relatively unimportant. There is no evidence in support of such an allegation on file.

The arguments of appellant I are at variance with the experimental evidence contained in the application as filed. In fact, the copolymeric products exhibit either the *"repeating units"* of formula (1) and (2) in combination (see pages 23 to 24, examples 4 and 5; pages 26 to 29, examples 7 and 8; page 28, table 1), or, alternatively, the *"repeating units"* of formula (4)

and (5) in combination (see pages 25 to 26, example 6; pages 26 to 27, example 9; page 29, table 2).

1.6 Further appellant I argued that the production of the monomer giving the *"repeating unit"* of formula (1) has no relation to the dicarboxylic acid type unit of formula (2). In the board's view the argument is beside the point. It is immaterial whether there exists a relationship between the production of the two monomers giving rise to the *"repeating units"* of formula (1) and (2), or not. What matter is that, irrespective of their manner of production, the two *"repeating units"* of formula (1) and (2), respectively, have been disclosed in combination as mandatory structural elements of the copolymeric product. Thus, the two *"repeating units"* have to be regarded as a whole, not as separate independent units.

1.7 For these reasons the board concludes that claim 1 as amended is not allowable under Article 123(2) EPC.

2. *Claim 2 of the main request*

2.1 Claim 2 as amended is also based on claim 3 of the application as originally filed. To this, a number of further characteristics have been added, so that the amended claim 2 contains the following specific features:

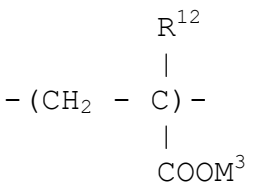
(i) The polycarboxylic acid is a copolymer.

(ii) The polyalkylene glycol side chain contains what is called *"a polyalkylene glycol ester type unit"*.

(iii) The *"polyalkylene glycol (6)"* is obtained by the addition of alkylene oxide having 2 to 4 carbon atoms to an alcohol (B-2) represented by the general formula (7).

(iv) The *"polyalkylene glycol (6)"* is esterified with (meth)acrylic acid, or an ester interchange is effected with alkyl(meth)acrylates having 1 to 22 carbon atoms in the alkyl group, thus leading to the *"repeating unit"* of formula (4).

2.2 Again according to the first feature (i) the product of the method, i.e. the polycarboxylic acid for a cement dispersant, is a copolymer. As explained above (see point 1.2), the application as originally filed does not disclose in a general manner that the product may be in the form of a copolymer. There is a specific disclosure, however, of a method for producing a polycarboxylic acid comprising, as *"repeating units"*, a polyalkylene glycol ester type unit of formula (4) and a monocarboxylic acid type unit *"represented by the general formula (5)*



formula (5)

where R^{12} represents hydrogen or a methyl group, and M^3 represents hydrogen, monovalent metal, divalent metal, ammonium, or organic amine" (see page 4, line 28 to page 6, line 19; example 6; claim 5).

2.3 The considerations set out above in the context of the method for producing a product containing the *"repeating units"* of formula (1) and (2) in combination, also apply *mutatis mutandis* to claim 2 as amended. Since the application as originally filed discloses the *"repeating unit"* of formula (4) only in combination with the *"monocarboxylic acid type unit"* of formula (5), the omission of the latter amounts to an extension of the subject-matter beyond the contents of the application as filed.

2.4 The board concludes, therefore, that claim 2 as amended is also not allowable under Article 123(2) EPC.

3. *Auxiliary requests 1 to 3*

3.1 The independent claims of the auxiliary requests 1 to 3 contain identical definitions of the *"repeating units"* of the product as the corresponding independent claims 1 and 2 of the main request. Consequently the objection under Article 123(2) EPC against claims 1 and 2 of the main request apply likewise to claim 1 of auxiliary requests 1 and 2, respectively, as well as to claim 3 of auxiliary requests 1 and 2, respectively, and to claim 1 of auxiliary request 3.

3.2 Consequently none of the auxiliary requests is in conformity with Article 123(2) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar The Chairman

C. Vodz G. Raths