

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen
(D) No distribution

**Datasheet for the decision
of 21 January 2011**

Case Number: T 2213/08 - 3.3.09

Application Number: 96922234.8

Publication Number: 0780424

IPC: C08J 7/12

Language of the proceedings: EN

Title of invention:

Water absorbent powder and process for the production thereof

Patentee:

NIPPON SHOKUBAI CO., LTD.

Opponent:

BASF SE

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 83, 123

Keyword:

"Main request, Auxiliary Requests 1 and 2 - added subject-matter - yes"

"Auxiliary Request 3 - inventive step - no"

"Auxiliary Request 4 - added subject-matter - no; sufficiency - yes; novelty - yes, inventive step - yes"

Decisions cited:

T 1008/02, T 1018/05, T 0297/90

Catchword:

-



Case Number: T 2213/08 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 21 January 2011

Appellant 01: NIPPON SHOKUBAI CO., LTD.
(Patent Proprietor) 1-1, Koraibashi 4-chome
Chuo-ku
Osaka-shi, Osaka-fu 541 (JP)

Representative: HOFFMANN EITLE
Patent- und Rechtsanwälte
Arabellastraße 4
D-81925 München (DE)

Appellant 02: BASF SE
(Opponent) D-67056 Ludwigshafen (DE)

Representative: -

Decision under appeal: Interlocutory decision of the Opposition
Division of the European Patent Office
announced orally on 4 September 2008 and posted
6 October 2008 concerning maintenance of
European patent No. 0780424 in amended form.

Composition of the Board:

Chairman: W. Sieber
Members: J. Jardón Álvarez
R. Menapace

Summary of Facts and Submissions

I. European patent No. 0 780 424 was granted in respect of European patent application No. 96922234.8, which was filed in the name of NIPPON SHOKUBAI CO., LTD. on 5 July 1996 as international application PCT/JP1996/001863 (WO 1997/003114). The mention of grant was published on 26 May 2004 in Bulletin 2004/22. The patent was granted with 45 claims, independent Claims 1, 33 and 40 reading as follows:

"1. A manufacturing method of water-absorbent agent powders from water-absorbent resin powders having a carboxyl group in which surface regions are crosslinked by a crosslinking agent having an epoxy group, a residue of the crosslinking agent being present in the water absorbent resin powders, **characterized by** comprising the step of: adding a nucleophilic reagent to the heated water absorbent resin powders in powder form."

"33. Water-absorbent agent powders, **characterized by** comprising:

at least partially porous water-absorbent resin powders having a carboxyl group, wherein:

said water-absorbent agent powders are crosslinked by a crosslinking agent having an epoxy group, an amount of a residue of the crosslinking agent is not more than 2 ppm, and an absorbency under load of 50 g/cm² with respect to a physiologic saline solution is not less than [*sic*] 20 g/g."

"40. Water-absorbent agent powders containing a carboxyl group and having surface regions crosslinked by a crosslinking agent having an epoxy group, **characterized by** comprising:

100 parts by weight of dried water-absorbent resin powders having a carboxyl group; and
1 to 30 parts by weight of liquid nucleophilic reagent other than organic acids, inorganic acids, and polyasparagine, wherein:

absorbency under high pressure based on a physiologic saline solution under load of 50 g/cm² is not less than 20 g/g; and
a residual amount of the crosslinking agent having an epoxy group is not more than 2 ppm."

Claims 2 to 32, 34 to 39 and 41 to 45 were dependent claims.

II. A notice of opposition was filed by BASF AG (now BASF SE) on 23 February 2005. The opponent requested revocation of the patent in its entirety on the grounds that the claimed subject-matter lacked novelty and did not involve an inventive step (Article 100(a) EPC), and that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC).

By letter dated 9 June 2006 the opponent argued that the disclaimer in granted Claim 40 ("... other than organic acids, inorganic acids, and polyasparagine ...") extended beyond the content of the application as filed

and requested the introduction of this new ground of opposition (Article 100(c) EPC) into the proceedings.

During the opposition proceedings *inter alia* the following documents were cited:

D1.1: English translation of JP 03-195705 A (D1);

D4: EP 0 668 080 A2;

D6: WO 96/17884 A1;

D6.1: EP 0 744 435 A1, published on 27.11.1996, filed as English translation of D6; and

D11: Repetition of Referential Example 4 of D4 by Mr. M. Weismantel dated 13 May 2008.

III. Taking account of the amendments made by the proprietor during the opposition proceedings, the opposition division found that the subject-matter of Claims 1 to 32 of the third auxiliary request filed on 4 September 2008 during the oral proceedings met the requirements of the EPC. The interlocutory decision was issued in writing on 6 October 2008.

The opposition division introduced the ground of opposition under Article 100(c) EPC into the proceedings and rejected the main, the first and the second auxiliary requests because the claimed subject-matter extended beyond the content of the application as originally filed.

The opposition division held that the subject-matter of the claims of the third auxiliary request met the requirements of the EPC. The claims maintained by the opposition division included two independent claims, namely Claim 26, a claim identical to Claim 33 as granted (see above point I) and Claim 1 reading as follows:

"1. A manufacturing method of water-absorbent agent powders from water-absorbent resin powders having a carboxyl group in which surface regions are crosslinked by a crosslinking agent having an epoxy group, a residue of the crosslinking agent being present in the water absorbent resin powders, **characterized in that** the water-absorbent resin powders have a water content of < 10 % by weight and in that the water-absorbent resin powders are post-processed by adding water as a nucleophilic reagent to the said heated water absorbent resin powders in powder form under an applied heat."

- IV. On 14 November 2008 the patent proprietor (Appellant 01) lodged an appeal against the interlocutory decision of the opposition division and paid the prescribed fee on the same day. A statement setting out the grounds of appeal was filed on 16 February 2009, including a main request and sets of claims for six auxiliary requests.
- V. On 12 December 2008 the opponent (Appellant 02) also lodged an appeal against the interlocutory decision of the opposition division and paid the prescribed fee on the same day. With the statement setting out the grounds of appeal filed on 12 February 2009, Appellant 02 requested that the decision under appeal be set aside and the patent be revoked in its entirety.

Appellant 02 also filed the following further documents:

D12: WO - 94/20547 A1;

D13: Methoden der organischen Chemie (Houben-Weyl);
4. Auflage; Band VI/3; Georg Thieme Verlag; 1965;
pages 447-448;

D14: Repetition of Example 4 of D4 by Mr. T. Pfeiffer
dated 29 January 2009; and

D15: Repetition similar to Example 4 of D4 (without
addition of succinic acid) by Mr. T. Pfeiffer
dated 25 February 2009.

VI. Appellant 01 filed its reply to the grounds of appeal
of Appellant 02 on 2 July 2009 and further submissions
on 25 February 2010. With these letters Appellant 01
also filed several requests and the following
experimental evidence:

D16: Repetition of Example 4 of D4 by Mr. K. Ishizaki,
not dated.

VII. The reply of Appellant 02 to the grounds of appeal of
Appellant 01 was filed on 26 June 2009.

VIII. On 6 October 2010 the board dispatched a summons to
attend oral proceedings scheduled for 21 January 2011.
In the attached communication the board expressed its
preliminary opinion that the main request included an
unallowable disclaimer and drew the attention of the

parties to the points to be discussed during the oral proceedings.

IX. With letter dated 15 December 2010 Appellant 02 filed further arguments in support of its objection of lack of sufficient disclosure and a copy of decision T 1008/02.

X. With letter dated 24 December 2010, Appellant 01 filed sets of claims for a main request and eight auxiliary requests to replace all the previous requests on file.

XI. On 21 January 2011 oral proceedings were held before the board. During the oral proceedings, Appellant 01 filed a new set of claims for an amended Auxiliary Request 4 and maintained all its previous requests filed with letter dated 24 December 2010.

(a) The main request includes three independent claims, Claim 1 being directed to a method of manufacturing a water-absorbent agent and Claims 27 and 34 directed to water-absorbent agent powders. Claim 34 of the main request reads as follows:

"34. Water-absorbent agent powders containing a carboxyl group and having surface regions crosslinked by a crosslinking agent having an epoxy group, **characterized by** comprising:
100 parts by weight of dried water-absorbent resin powders having a carboxyl group; and
1 to 30 parts by weight of water,

wherein the absorbency under high pressure based on a physiologic saline solution under load of 50 g/cm² is not less than 20 g/g; and a residual amount of the crosslinking agent having an epoxy group is not more than 2 ppm."

- (b) The sets of claims for Auxiliary Requests 1 and 2 include Claim 34 of the main request but renumbered as Claim 33 (Auxiliary Request 1) and Claim 32 (Auxiliary Request 2), respectively.
- (c) Independent Claims 1 and 26 of Auxiliary Request 3 read as follows:

"1. A manufacturing method of water-absorbent agent powders from water-absorbent resin powders having a carboxyl group in which surface regions are crosslinked by a crosslinking agent having an epoxy group, a residue of the crosslinking agent being present in the water absorbent resin powders, **characterized in that** the water-absorbent resin powders are post-processed by adding water as a nucleophilic reagent to the said heated water-absorbent resin powders in powder form, wherein said heated water-absorbent resin powders have a temperature of not less than 35°C."

"26. Water-absorbent agent powders, **characterized by** comprising at least partially porous water-absorbent resin powders having a carboxyl group, wherein said water-absorbent agent powders are crosslinked by a crosslinking agent having an epoxy group, an amount of a residue of the crosslinking agent is not more than 2 ppm, and an

absorbency under load of 50 g/cm² with respect to a physiologic saline solution is not less than 20 g/g, and wherein said water-absorbent agent powders are obtainable by a manufacturing method as set forth in any of the preceding claims."

- (d) Independent Claims 1 and 23 of Auxiliary Request 4 read as follows:

"1. A manufacturing method of water-absorbent agent powders from water-absorbent resin powders having a carboxyl group in which surface regions are crosslinked by a crosslinking agent having an epoxy group, a residue of the crosslinking agent being present in the water absorbent resin powders, **characterized in that** the water-absorbent resin powders have a water content of <10% by weight and in that the water-absorbent resin powders are post-processed by adding water as a nucleophilic reagent to the heated water-absorbent resin powders in powder form, wherein the nucleophilic reagent is used in an amount of from 1 to 30 parts by weight based on 100 parts by weight of the water-absorbent resin powders."

"23. Water-absorbent agent powders, **characterized by** comprising at least partially porous water-absorbent resin powders having a carboxyl group, wherein said water-absorbent agent powders are crosslinked by a crosslinking agent having an epoxy group, an amount of a residue of the crosslinking agent is not more than 2 ppm, and an absorbency under load of 50 g/cm² with respect to a physiologic saline solution is not less than

25 g/g, and wherein said water-absorbent agent powders are obtainable by a manufacturing method as said [*sic*] forth in any of the preceding claims."

The claims of Auxiliary Request 4 filed during oral proceedings before the board differed from the claims of the previous Auxiliary Request 4 only in that the word "said" had been deleted in the expression "the said heated water absorbent resin powders" in Claim 1. This amendment was carried out to overcome a clarity objection of Appellant 02. Since the amendment merely restored the granted claim wording, no objections were raised by Appellant 02 against the amendment or the introduction of this request into the proceedings.

XII. The arguments presented by Appellant 01 in its written submissions and at the oral proceedings insofar as they are relevant for the present decision may be summarized as follows:

- The patent in suit included several examples showing that the requirements of Article 83 EPC were met. Appellant 02, which had the burden of proof, did not provide any experimental evidence showing that an embodiment covered by the claims could not be worked out.
- The amendments made to the claims were supported by the original disclosure. The application as filed clearly indicated that the water-absorbent resin powders were heated beforehand, thus supporting the

amendment of Claim 1. Concerning Claim 34 it argued that the word "dried", although not explicitly disclosed in the application as filed, had only been introduced for clarity, and therefore did not introduce any added subject-matter.

- None of the documents cited by Appellant 02 anticipated the claimed subject-matter. The claimed method, wherein the heated water absorbent resin powders were treated with water was not described in any of the prior art documents. Moreover, the claimed water-absorbent agent powders had a higher absorbency under load than those disclosed in D4 as demonstrated by D16, i.e. the reworking of Example 4 of D4.

- The claimed subject-matter also involved an inventive step. Starting from the disclosure of D4 as closest prior art, the claimed invention provided new absorbent agent powders exhibiting improved absorbency under high load, reduced amount of residue of the epoxy crosslinking agent and improved absorbing rate. None of the documents in the proceedings suggested that this object could be solved by the claimed method and therefore the claimed subject-matter involved an inventive step. The same argumentation applied to the claimed products.

XIII. The arguments of Appellant 02 may be summarized as follows:

- Appellant 02 objected to the use of open-ended expressions such as "is not less than 20 g/g" in the

claims to define the absorbency under load as they included embodiments for which the patent gave no information of how they could be obtained.

- The subject-matter of Claim 1 of all the requests extended beyond the content of the application as filed essentially because the process as disclosed in the application as originally filed required that it was carried out "under an applied heat". Additionally, the water-absorbent powders of Claim 34 of the main request were also not derivable from the original disclosure because of the addition of the term "dried" to qualify the water-absorbent resin powders and the lack of disclosure of the amount of water used.

- The disclosure of document D1.1 was novelty destroying for the subject-matter of the process claims and the disclosure of D4 for the subject-matter of the product claims. In the context of the latter, it relied on its reworking of Example 4 of D4, which showed that the product of D4 fulfilled the requirements of absorbency under load now claimed (D14).

- Concerning inventive step, Appellant 02 started from the disclosure of D4 as closest prior art and argued that the claimed subject-matter lacked inventive step having regard to the combined teaching of D4 and D6.1.

XIV. Appellant 01 requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or one of Auxiliary

Requests 1-3 and 5-8, all filed on 24 December 2010, or Auxiliary request 4, filed during the oral proceedings.

Appellant 02 requested that the decision under appeal be set aside and that European patent No. 0 780 424 be revoked.

Reasons for the Decision

1. The appeals are admissible.

MAIN REQUEST AND AUXILIARY REQUESTS 1 AND 2

2. Amendments (Article 100(c) EPC/123 EPC)
 - 2.1 Claim 34 of the main request is directed to water-absorbent agent powders characterized by their absorbency under high pressure, the residual amount of epoxy group and by comprising:
 - (a) 100 parts by weight of dried water-absorbent resin powders having a carboxyl group; and
 - (b) 1 to 30 parts by weight of water.
 - 2.2 These two features (a) and (b) were objected to by Appellant 02 as not being supported by the application as filed, essentially because (i) the term "dried" did not appear in the application as filed in association with the water-absorbent resin powders and (ii) the amount of water was disclosed only in connection with the water to be reacted with the water-absorbent resin powders, i.e. the starting materials, but not with the amount present in the final water-absorbent agent powders.

2.3 Appellant 01 admitted that the term "dried" was not disclosed in the application as originally filed but argued that it was necessary to include it as a reference point in order to define clearly the claimed subject-matter, the skilled person reading it implicitly in the application as filed. Concerning the amount of water, Appellant 01 referred to page 47, lines 3 to 9 wherein the amount of water used as nucleophilic reagent was defined.

The board is not convinced by these arguments of Appellant 01. There is no explicit basis in the application as filed for water-absorbent agent powders comprising 100 parts by weight of **dried** water-absorbent resin powders having a carboxyl group and 1 to 30 parts by weight of water. The only disclosure of 1 to 30 parts by weight of nucleophilic reagent (and therefore water) can be found in Claim 11 as filed which relates, however, to a manufacturing method characterized by adding 1 to 30 parts by weight of nucleophilic reagent to water-absorbent resin powders, the starting material, but not to a final product. As pointed out by Appellant 02 during the oral proceedings, water reacts with the residue of crosslinking agent and its amount in the final product is reduced. The amount of water would be further reduced due to evaporation under the process conditions.

Furthermore, Claim 11 as filed does not refer to the addition of 1 to 30 parts by weight of nucleophilic reagent to **dried** water-absorbent resin powders.

Moreover, contrary to the assertion of Appellant 01, the term "dried" does not make the subject-matter of the claim clear. In fact, the term is used in the application as filed in the reference examples in connection with the preparation of resin precursors still containing 6 percent by weight of water (see reference Examples 1 to 4). It is therefore not possible to know whether or not the "dried" water-absorbent powders still contain water and in which amount.

2.4 In summary, the amendments made to Claim 34 are not derivable from the application as originally filed and, for this reason alone, the main request is not allowable.

2.5 Claim 33 of Auxiliary Request 01 and Claim 32 of Auxiliary Request 2 are identical to Claim 34 of the main request with the consequence that Auxiliary Requests 1 and 2 are not allowable for the same reasons as the main request.

AUXILIARY REQUEST 3

3. *Novelty*

3.1 Claim 1 of Auxiliary Request 3 is directed to a method of manufacturing water-absorbent agent powders from water-absorbent resins powders wherein the water-absorbent resin powders are

- post-processed by
- adding water as a nucleophilic reagent to
- the heated water-absorbent resin powders, the resin powders having a temperature of not less than 35°C.

3.1.1 The novelty of this claim was contested by Appellant 02 having regard to the disclosure of D1.1. D1.1 discloses a method for the production of highly water-absorbent resins, wherein water is added during the crosslinking reaction (see Claim 1 and Examples 1 to 5).

3.1.2 The subject-matter of Claim 1 differs from the disclosure of D1.1 by the fact that water is added in a post-processing step to the heated water-absorbent resin powders. In the process of D1.1 water is added in the midst of the crosslinking reaction to obtain actually the water-absorbent resin powders used as starting materials in the process of Claim 1 of the patent in suit.

3.1.3 For these reasons the subject-matter of claim 1 is novel.

3.2 Claim 26 of Auxiliary Request 3 is directed to water absorbent agent powders, essentially characterized by comprising

- at least partially porous water-absorbent resin powders,
- having an amount of residue of not more than 2 ppm, and
- an absorbency under load of not less than 20 g/g.

3.2.1 The novelty of this claim was contested by Appellant 02 in view of the disclosure of Example 4 of D4.

3.2.2 Example 4 of D4 discloses a water-absorbent agent wherein the amount of residue of crosslinking agent is not detectable (see Table 1). However this example is

silent about the structure of the water-absorbent agent (porous or not) and about the absorbency under load of 50 g/cm².

In order to show that D4 was novelty destroying Appellant 02 reworked Example 4 of D4 (see D14) and obtained an absorbency value of 21,5 g/g, that is to say within the range claimed.

On the other hand Appellant 01 also reproduced the same example and obtained a water-absorbent agent with an absorbency of 18,1 g/g, therefore questioning the results of Appellant 02.

- 3.2.3 There is however no need to investigate in detail this contradictory experimental evidence because Appellant 02 has failed to show that the water-absorbent agents of D4 are "at least partially porous".

According to Appellant 01 the products obtained in D4 are not porous because the starting materials used for its preparation are referred to as "irregular broken" water-absorbent resins (see page 6, lines 32 to 45; see also page 15, lines 30 to 33 wherein the preparation of the water-absorbent resin (A) used in Example 4 is described).

Appellant 02 argued that it could be expected that the products of D4 were porous because, in principle, all super-absorbents are porous.

This argument is not sound. In paragraph [0068] of the patent in suit, "at least partially porous particle is defined such that existence and absence of pores in a

plurality of particles is observable in a from 30 to 100 times enlarged electron micrograph". In order to show that the disclosure of D4 was novelty destroying it would have been necessary for Appellant 02 to provide experimental evidence that the water-absorbent agents obtained according to Example 4 of D4 fulfilled this requirement. In the absence of such evidence the argument that super-absorbents are generally porous is not convincing. To the contrary, in reference Example 1 of the patent in suit a resin precursor (A) is prepared by a process very similar to the one described in Referential Example 1 of D4 and the product is described as being non-porous.

3.2.4 The subject-matter of Claim 26 is therefore novel.

4. *Inventive step (Article 56 EPC)*

4.1 Closest prior art

4.1.1 The board considers, in agreement with both appellants, that the closest prior art is represented by D4.

4.1.2 Claim 1 of D4 discloses a method for the production of a water-absorbent agent characterized by mixing a water-absorbent resin containing a carboxyl group with an additive soluble in the aqueous solution of at least one member selected from inorganic acids, organic acids and polyamine, and a cross-linking agent capable of reacting with the carboxyl group. In Examples 6 and 7 of D4 water-absorbent agents were obtained by mixing a water-absorbent resin, which is surface-crosslinked *inter alia* with ethylene glycol diglycidyl ether, with an aqueous solution of 5 parts of aspartic acid and an

aqueous solution of 1 part of polyglutamine as an additive and drying the resultant mixture at 120°C.

Thus, in the process of Examples 6 and 7 of D4, like in the claimed process, surface-crosslinked water-absorbent resin powders are post-processed by adding water.

4.1.3 The distinguishing feature of the claimed method lies in the addition of water to heated (not less than 35°C) water-absorbent resin powders.

4.2 Problem to be solved and its solution

4.2.1 According to Appellant 01 this distinguishing feature results in water-absorbent agent powders having improved properties, namely a high absorbency under load and a very low amount of residue of the crosslinking agent in the final product. The patent in suit aims to solve this problem.

4.2.2 This problem is said to be solved by the claimed method wherein water as nucleophilic is added to the heated water-absorbent resin powders.

4.2.3 The results of the examples in the specification show that an increased absorbency under load and a decrease of the residual crosslinking agent can be achieved when heated water-absorbent resins are used. Thus, in Example 6, in which the water-absorbent resin powders are heated to 60°C, an absorbency under load of 25 g/g is achieved with only 1 ppm residual crosslinking agent, while in Comparative Example 6, in which the

temperature is 20°C, the absorbency under pressure is 21 g/g and the amount of crosslinking agent is 15 ppm.

- 4.2.4 It is however conspicuous to the board that in Comparative Example 7 heated (40°C) water-absorbent resin powders are treated with water as nucleophilic agent and a water-absorbent agent powder with a bad absorbency under load of only 10 g/g is obtained, raising serious doubts whether the problem as defined above is actually solved by the taken measure.

Appellant 01 argued that this example was not covered by the claims because the amount of water added was so high that the resin powder was in the form of a gel rather than in powder form.

However, it is noted that this example falls indeed within the claimed subject-matter as the claim does not limit the amount of water and in fact does not exclude processing in a gel form.

- 4.2.5 The board thus concludes that an improvement of the absorbency under load together with a decrease of the amount of residual crosslinking agent due to the distinguishing feature of the invention as claimed in Claim 1 of Auxiliary Request 3 is not derivable from the evidence on file.

4.3 Reformulation of the problem and its solution

- 4.3.1 As a consequence, the problem has to be reformulated in a less ambitious manner, not involving an improvement as to absorbency under load and the residual amount of crosslinking agent, and thus as the provision of an

alternative method of manufacturing water-absorbent powders.

4.3.2 The examples in the patent in suit show that this less ambitious problem has been solved by the claimed method.

4.4 Obviousness

In the absence of any improvement in the properties of the water-absorbent agent powders obtained by the claimed process, the process in question has to be considered an obvious alternative to the known process. Taking account that the process of D4 is usually carried out under heat treatment (see Claim 2), the skilled person would use heated resin powders when trying to find an alternative method for the preparation of water-absorbent agent powders. Thus, the skilled person would arrive at the claimed process.

4.5 As, therefore, the subject-matter of Claim 1 of Auxiliary Request 3 lacks inventive step, there was no need to go into further detail as to whether or not the subject-matter set out in Auxiliary Request 3 met the requirements of Articles 83 and 123(2) EPC.

AUXILIARY REQUEST 4

5. *Amendments (Article 100(c) EPC/123 EPC)*

5.1 Claim 1 of Auxiliary Request 4 is directed to a method of manufacturing water-absorbent agent powders from water-absorbent resins powders wherein

- the heated resin powders
- having a water content of <10% by weight,

- are post-processed by
- adding water as a nucleophilic reagent in an amount of from 1 to 30 parts by weight.

5.2 This method is disclosed as Method 1) in the paragraph bridging pages 39-40 of the application as originally filed and disclosed in detail on page 40, line 7 to page 56, line 22. The specific features of the process are supported as follows:

- the characterization of the process as a "post-process" to be carried out on the water absorbent resin powders is disclosed on page 40, line 1;
- the use of water as nucleophilic reagent and the amount used is disclosed, *inter alia*, on page 47, lines 4 to 7;
- the heating of the water-absorbent resin powders is disclosed on the paragraph starting on page 42, line 18 which indicates that "the water-absorbent resin powders are heated beforehand, i.e., an essential condition of the present invention, by externally applying heat to the water-absorbent resin powders to a predetermined temperature before the nucleophilic reagent is added..."; and
- finally, the water content of the water-absorbent resin powders is disclosed on page 16, lines 14 to 16.

5.3 Appellant 02 objected to the amended process of Claim 1 of Auxiliary Request 4 because in its opinion (i) the application as originally filed required that the

process was carried out "under an applied heat" and (ii) the water content of the resin powders was only disclosed for specific resin powders having a large specific surface area.

- 5.3.1 Appellant 02 based the first objection on the wording of page 39, lines 21 to 23 of the application as filed wherein Method 1) is defined as "adding a nucleophilic reagent to water-absorbent resin powders in a form of powder under an applied heat".

Although this passage could be interpreted as meaning that the heating of the powders has to be continued during the addition of water, the content of the whole application as filed indicates without any doubt that "applied heat" relates to the heating of the water-absorbent resin powders, whereas a (further) heat treatment of the mixture water/water-absorbent resin powder is only a preferred embodiment of the invention (see page, 53, lines 16 to 18, wherein it is stated that "it is **preferable** to apply a heat treatment in the presence of a nucleophilic reagent" - emphasis by the board -; see also the paragraph bridging pages 54 and 55).

- 5.3.2 Concerning the objection that the water content of the resin powders was disclosed only in combination with other features, it is noted that the claimed feature is disclosed on page 16, lines 14 to 16 in a new sentence and therefore independently of other features described in the same paragraph. There is neither an explicit nor an implicit link between the individually disclosed features in that paragraph.

5.4 The remaining claims are based on granted claims for which no objections were raised by Appellant 02. Independent Claim 23 is a combination of granted Claims 33 and 34 (see Claims 40, 41 and page 67, line 6 of the application as filed) further specifying that the agent powders are obtainable by the method of manufacturing of the preceding claims.

5.5 The amendments also undisputedly restrict the scope of the granted claims.

5.6 Consequently, the subject-matter of the claims fulfils the requirements of Articles 123(2) and (3) EPC.

6. *Sufficiency of disclosure (Article 100(b) EPC)*

6.1 The objection raised by Appellant 02 concerning sufficiency of the Auxiliary Request 4 relates to the use of the wording "not less than 25 g/g" when defining the absorbency under load of the water-absorbent agent powders of Claim 23. In its opinion this open-ended range was unduly broad so that it would embrace values of absorbency under load such as 50 g/g, which are not known. The patent specification did not disclose how these values could be obtained and therefore did not enable the full scope of the invention to be carried out. In this context, Appellant 02 referred to decision T 1008/02, wherein it is stated that a single value cannot be considered to provide sufficient support for a claim to a range of absorbency under load having no upper limit.

6.2 This objection of Appellant 02 is based on an erroneous interpretation of the subject-matter covered by the

claims. It is clear for a skilled reader that a claim such as present Claim 23 including an open-ended range is limited in practice. In fact, values of the parameter not obtainable in practice would not be regarded by the skilled reader as being covered by the claim and thus could not justify an objection of insufficiency of disclosure (see Case Law of the Boards of Appeal of the EPO, 6th edition 2010, Section II.A. 6.1; see also point 2.3 of T 1018/05 and point 2.2 of T 297/90, both cited therein).

6.3 In the present case the patent specification includes a detailed description of the claimed method and specific examples resulting in water-absorbent powders having the desired properties, including values of absorbency under load up to 26 g/g. Moreover Appellant 01 has amended the claim by incorporating the feature "obtainable by a manufacturing method as said [*sic*] forth in any of the preceding claims". The skilled reader would immediately understand the practical implication of this limitation, namely that the method of producing the water-absorbent agent powders sets the actual limits of the absorption under load.

6.4 Appellant 02 neither questioned the examples in the patent in suit nor submitted experimental evidence showing that the invention could not be performed. Consequently, the board is satisfied that the requirement of sufficiency of disclosure is met.

6.5 In reaching this conclusion the board also considered decision T 1008/02 cited by Appellant 02. In that decision the board concluded that the auxiliary request under consideration did not fulfil the requirements of

sufficiency because none of the examples showed the claimed properties, in particular an absorbency under load of "at least 27 ml/g", and no evidence had been produced that superabsorbent having the required properties were available to the skilled person (see points 3.3 and 3.4 of the reasons). Thus, the situation in that case differs from the present one where the patent provides four examples with values of absorbency of not less than 25 g/g.

Insofar as Appellant 02 relied on the "*obiter dictum*" in the last paragraph of point 3.5 of T 1008/02 ("However, this single value cannot be considered to provide sufficient support for a claim to a range for the AUL value starting at 24 ml/g, but having no upper limit."), it is pointed out that also such a situation is different from the present case, where the claim is drafted in the form of a product-by-process and the specification includes two examples fulfilling the requirements of the claim. As set out above, the method of producing the water-absorbent agent powder implies the practical limits of the parameter having no upper limit. It is also noted that sufficiency of disclosure was not the reason for the rejection of the request discussed in point 3.5 of T 1008/02.

7. *Novelty*

7.1 The reasons given for the novelty of Claims 1 and 26 of Auxiliary request 3 in view of D1.1 (Claim 1; see point 3.1, above) and D4 (Claim 26; see point 3.2, above) apply equally to the subject-matter of Claims 1 and 23 of Auxiliary Request 4. Additionally, Claim 23 has been further limited to absorbency values of not less than

25 g/g which is clearly above the absorbency value of 21.5 g/g measured by Appellant 02 for the water-absorbent resin of Example 4 of D4.

7.2 The subject-matter of the claims is therefore novel.

8. *Inventive step*

8.1 The subject-matter of Claim 1 of Auxiliary Request 4 includes now the amount of water that has to be added to the heated water-absorbent resin powders ("in an amount of from 1 to 30 parts by weight based on 100 parts by weight of the water-absorbent resins powders"). By this limitation the disclosure of Comparative Example 7 of the patent is no longer covered by the claims. The objections raised above under point 4.2.4 and 4.2.5 in the context of defining the objective technical problem for the subject-matter of Claim 1 of Auxiliary Request 3 no longer apply to the present request.

8.2 The board is therefore satisfied that, when assessing inventive step of the subject-matter of Claim 1 of Auxiliary Request 4, the objective technical problem has to be seen in the provision of a method of manufacturing water-absorbent agent powders with improved properties. As demonstrated by the examples in the patent in suit, this problem has been credibly solved by the process of Claim 1 of Auxiliary Request 4.

8.3 Obviousness

8.3.1 It remains to be decided whether, in view of the available prior art documents, it would have been

obvious for the skilled person to modify the process of the closest prior art D4 in order to arrive at water-absorbent agent powders with improved properties.

8.3.2 There is no hint to this solution in the available prior art.

D4 itself proposes for the preparation of water-absorbents having high absorption under load the reaction with an additive soluble in aqueous solution of at least one member selected from inorganic acids, organic acids and polyamino acids (see Claim 1), but it does not provide any suggestion that improved water-absorbent agents could be obtained by preheating the water-absorbent resins.

There is also no hint in D6.1 that water-absorbent resins having good absorption properties (page 3, lines 48 to 52) could be obtained by dispersing a solid blowing agent in the form of particles having an average particle diameter within a range from 1 to 100 μm in an aqueous monomer solution containing an unsaturated monomer and a crosslinking agent, and polymerizing said unsaturated monomer (see Claim 1).

8.3.3 Finally, the argument of Appellant 02 that the claimed subject-matter would be obvious over a combination of D4 with D6.1 is not convincing. As Appellant 02 correctly indicated, D6.1 describes porous super absorbents but no modification of the process of D4 in order to obtain absorbents with improved absorbency and low amount of epoxy residue.

8.3.4 For these reasons the subject-matter of Claim 1 of Auxiliary Request 4 and, by the same token, the subject-matter of dependent Claims 2 to 22 involve an inventive step.

The subject-matter of Claims 23 to 28 is directed to water-absorbent agent powders comprising at least partially porous water-absorbent resin powders having an absorbency under load of not less than 25 g/g and being obtainable by the process of Claim 1. These water-absorbent agent powders exhibit the improved properties discussed with respect to the process of Claim 1. Thus, for the same reasons as given for the process of Claim 1, the subject-matter of Claims 23 to 28 involves an inventive step.

9. As Auxiliary Request 4 of Appellant 01 is allowable, there is no need for the board to deal with the further requests.

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 with the order to maintain the patent with Claims 1-28, filed as auxiliary request 4 during the oral proceedings before the board, after any necessary consequential adaptation of the description and the figures.

The Registrar

The Chairman

C. Rodríguez Rodríguez

W. Sieber