Internal distribution code:

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

Datasheet for the decision of 29 January 2025

Case Number: T 0188/23 - 3.3.09

Application Number: 17883766.2

Publication Number: 3424988

IPC: C08J3/24, C08J3/12, C08J3/075, C08K5/11, C08L33/06, C08K5/101, C08F2/44

Language of the proceedings: EN

Title of invention:
SUPERABSORBENT POLYMER AND METHOD FOR PREPARING SAME

Patent Proprietor:
LG Chem, Ltd.

Opponent:
Nippon Shokubai Co., Ltd.

Headword:
Superabsorbent/LG CHEM

Relevant legal provisions:
EPC Art. 112(3), 123(2), 123(3)
RPBA 2020 Art. 13(2)

Keyword:
Amendments - main request and auxiliary requests 2-8 - added subject-matter (yes)
Late-filed auxiliary request - auxiliary request 1 - admitted (no)
Stay of proceedings in view of G 1/24 (no)
Extent of protection - auxiliary request 9 - extension of protection conferred (yes)

Decisions cited:
T 0439/22

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0

Case Number: T 0188/23 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 29 January 2025

Appellant: (Patent Proprietor)	LG Chem, Ltd. 128 Yeoui-daero Yeongdeungpo-gu Seoul 07336 (KR)
Representative:	Plasseraud IP 104 Rue de Richelieu CS92104 75080 Paris Cedex 02 (FR)
Respondent: (Opponent)	Nippon Shokubai Co., Ltd. Kogin Bldg., 4-1-1 Koraibashi Chuo-ku Osaka 541-0043 (JP)
Representative:	Herzog IP Patentanwalts GmbH Steinstraße 16-18 40212 Düsseldorf (DE)
Decision under appeal:	**Decision of the opposition division of the European Patent Office posted on 7 December 2022 revoking European patent No. 3424988 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	A. Haderlein
Members:	A. Jimenez
	M. Ansorge

Summary of Facts and Submissions

I. The appeal was filed by the patent proprietor (appellant) against the decision of the opposition division to revoke the European patent.

II. With its notice of opposition, the opponent requested revocation of the patent in its entirety on the grounds for opposition under Article 100(a), (b) and (c) EPC.

III. In its decision, the opposition division found that claim 1 of the main request and of auxiliary requests 1 to 8 did not comply with the requirements of Article 123(2) EPC. Claim 1 of auxiliary request 8 was found in addition not to comply with the requirement of Article 123(3) EPC.

IV. With its statement of grounds of appeal, the appellant pursued the same requests as those underlying the decision under appeal.

V. In its communication pursuant to Article 15(1) RPBA, the board preliminarily concluded that the appeal was likely to be dismissed.

VI. By letter of 19 November 2024, the appellant filed a new auxiliary request 1 and renumbered auxiliary requests 1 to 8 as auxiliary requests 2 to 9.

VII. Claim 1 of the main request reads as follows (labelling by the board):

(1) A super absorbent polymer comprising:

(1.1) a base polymer powder including a first crosslinked polymer of a water-soluble ethylenically unsaturated monomer having at least partially neutralized acidic groups; and

(1.2) a surface crosslinked layer formed on the base polymer powder and including a second crosslinked polymer in which the first crosslinked polymer is further crosslinked via a surface crosslinking agent,

(1.2.0) wherein the surface crosslinking agent is contained in an amount of 0.01 to 4 parts by weight based on 100 parts by weight of the base polymer powder,

(1.2.1) wherein the surface crosslinking agent includes at least two compounds having a solubility parameter value (σ) of 12.5 $(cal/cm^3)^{1/2}$ or more,

(1.2.2) wherein at least one of the surface crosslinking agents is an alkylene carbonate-based compound, and the remainder is a polyhydric alcohol-based compound,

(1.2.3) wherein at least one surface crosslinking agent being the alkylene carbonate-based compound and the remainder are included in a weight ratio of 5:1 to 1:5,

(1.2.4) wherein the surface crosslinking agent further includes polycarboxylic acid-based polymer in an amount of 0.01 to 0.5

parts by weight, based on 100 parts by weight of the base polymer powder, and

(1.3) wherein the permeability measured and calculated by the method of the following Equation 1 is 10 to 35 seconds:

[Equation 1]

Permeability (sec) = $T_S - T_0$

wherein:

T_S (unit: sec) means the time required for allowing a 0.9% saline (NaCl) solution to permeate a saline-absorbed super absorbent polymer under a load of 0.3 psi, wherein the saline-absorbed super absorbent polymer is prepared by swelling 0.2 g of super absorbent polymer with the 0.9% saline solution for 30 minutes, and

T_0 (unit: sec) means the time required for allowing the 0.9% saline solution to permeate under the load of 0.3 psi in the absence of the saline-absorbed super absorbent polymer.

VIII. Features 1 to 1.2.4 mentioned above are also present in claim 1 of auxiliary requests 2 to 8.

IX. Claim 1 of auxiliary request 9 reads as follows (labelling by the board):

(1) A method for producing a super absorbent polymer, comprising the steps of:

(1.1) performing crosslinking polymerization of a water-soluble ethylenically unsaturated monomer having at least partially neutralized acidic groups in the presence of an internal crosslinking agent to form a hydrogel polymer containing a first crosslinked polymer;

(1.2) drying, pulverizing and classifying the hydrogel polymer to form a base polymer power; and

(1.3) heat-treating and surface-crosslinking the base polymer powder in the presence of a surface crosslinking agent to form a super absorbent polymer particle,

(1.3.0) wherein the surface crosslinking agent is contained in the surface crosslinking solution in an amount of 0.01 to 4 parts by weight based on 100 parts by weight of the base polymer powder,

(1.3.1) wherein the surface crosslinking agent includes at least two compounds having a solubility parameter value (σ) of 12.5 $(cal/cm^3)^{1/2}$ or more,

(1.3.2) wherein at least one of the surface crosslinking agents is an alkylene carbonate based compound, and the remainder is a polyhydric alcohol-based compound,

(1.3.2') wherein the polyhydric alcohol-based compound includes propylene glycol or glycerol

(1.3.3) wherein at least one surface crosslinking agent being the alkylene carbonate-based compound and the remainder are included in a weight ratio of 5:1 to 1:5,

(1.3.4) wherein the surface crosslinking agent further includes polycarboxylic acid-based polymer in an amount of 0.01 to 0.5 parts by weight, based on 100 parts by weight of the base polymer powder,

(1.3.5) wherein the surface-crosslinking step includes a first reaction step in which the reaction is performed at a maximum reaction temperature of 170°C to 190°C for 3 to 10 minutes

(1.3.6) and a second reaction step in which the reaction is performed at a maximum reaction temperature of 190°C to 220°C for 20 to 40 minutes, and

(1.3.7) wherein before the first and second reaction steps, the temperature raising step for reaching the maximum reaction temperature is further included,

(1.3.8) the temperature raising step before the first reaction step is performed at a temperature raising rate of 1.5°C/min to 3.0°C/min, and

(1.3.9) the temperature rising step before the second reaction step is performed at a

temperature raising rate of 1.2°C/min to 2.3°C/min,

(1.4) wherein the permeability of the super absorbent polymer measured and calculated by the method of the following Equation 1 is 10 to 35 seconds:

[Equation 1]

Permeability (sec) = $T_S - T_0$

wherein:

T_S (unit: sec) means the time required for allowing a 0.9% saline (NaCl) solution to permeate a saline-absorbed super absorbent polymer under a load of 0.3 psi, wherein the saline-absorbed super absorbent polymer is prepared by swelling 0.2 g of super absorbent polymer with the 0.9% saline solution for 30 minutes, and

T_0 (unit: sec) means the time required for allowing the 0.9% saline solution to permeate under the load of 0.3 psi in the absence of the saline-absorbed super absorbent polymer.

X. The appellant requested that the decision under appeal be set aside and that the case be remitted to the opposition division for further prosecution on the basis of the main request underlying the impugned decision, auxiliary request 1 filed on 19 November 2024 or one of auxiliary requests 2 to 9 (corresponding to auxiliary requests 1 to 8 underlying the impugned

decision) or that the patent be maintained on the basis of the same claim requests. It also requested that the appeal proceedings be stayed in view of G 1/24 if auxiliary request 1 was not admitted into the proceedings.

The opponent (respondent) requested that the appeal be dismissed.

XI. The appellant's arguments relevant for the decision can be summarised as follows.

- Claim 1 of the main request complies with the requirement of Article 123(2) EPC. Feature 1.2.3 concerning the weight ratio of two crosslinking agents should be interpreted in a product-by-process fashion and is unambiguously disclosed in paragraph [80] of the application as filed. This interpretation is the only reasonable one from a technical point of view. It is consistent with the common practice in the field and with the description of the patent application. The same applies to the interpretation of feature 1.2.0 concerning the total quantity of the surface-crosslinking agents.

- (New) auxiliary request 1 should be admitted into the appeal proceedings as a reaction to the board's communication.

- If auxiliary request 1 is not admitted into the proceedings, the proceedings should be stayed in view of G 1/24.

- Claim 1 of auxiliary requests 2 to 9 complies with Article 123(2) EPC for the same reason as the main request.

- Claim 1 of auxiliary request 9 also meets the requirements of Article 123(3) EPC.

XII. The respondent's arguments relevant for the decision can be summarised as follows.

- The argument of the appellant that feature 1.2.3 of claim 1 of the main request has to be read in a product-by-process fashion is new and should not be admitted into the appeal proceedings.

- Even if this argument is admitted, there is no reason to interpret the wording of feature 1.2.3 in a product-by-process manner. The weight ratio in feature 1.2.3 concerns the ratio in the final product and is not directly and unambiguously disclosed in paragraph [80] of the application as filed, which concerns the ratio in the surface-crosslinking solution.

- Feature 1.2.0 concerning the total quantity of the surface-crosslinking agents adds subject-matter for the same reason.

- Auxiliary request 1 should not be admitted into the proceedings. There is no reason to stay the proceedings.

- The objections under Article 123(2) EPC apply for each of the auxiliary requests 2 to 9.

- Auxiliary request 9 violates Article 123(3) EPC due to the deletion of the back-reference to claim 1.

Reasons for the Decision

1. Main request - Article 123(2) EPC

1.1 In the decision under appeal, the opposition division concluded that the weight ratio of 5:1 to 1:5 for the alkylene carbonate-based compound and the remainder (feature 1.2.3) contravened Article 123(2) EPC. This was because the ratio, as defined in paragraph [80] of the application as filed (in its published version), applied specifically to the surface-crosslinking solution used before surface crosslinking rather than to the final product of claim 1 having a surface-crosslinked layer formed on the base polymer powder. Additionally, the appellant failed to demonstrate that this ratio would remain unchanged after the crosslinking reaction.

1.2 In the appeal proceedings, the appellant contends that the ratio in feature 1.2.3 would be understood by a skilled person in a product-by-process manner - specifically, as the ratio of the two components before the surface-crosslinking step, rather than as a ratio present in the final product.

1.3 The respondent objects to the admittance of the allegedly new argument that the weight ratio of feature 1.2.3 relates to the relative amount of the two components before crosslinking and maintains that the weight ratio in claim 1 concerns the ratio in the surface-crosslinked layer (the final product). The term "is further crosslinked" in feature 1.2 defines a condition not an action.

1.4 The board shares the view of the respondent that the interpretation of feature 1.2.3 of claim 1 was introduced by the appellant for the first time in the statement of grounds of appeal. Indeed, throughout the opposition proceedings, the patent proprietor did not contest that the weight ratio pertained to the end product. It argued that the relative amount of the two surface-crosslinking agents in the end product did not significantly deviate from the weight ratio in the surface-crosslinking solution (see proprietor's reply to the notice of opposition of 22 September 2021, point a; proprietor's submission dated 25 August 2022, point a; minutes of the oral proceedings before the opposition division, point 3.2 i). Accordingly, the new interpretation of feature 1.2.3 amounts to an amendment to the appellant's case, and its admittance is to be decided under Article 12(4) and (6) RPBA. In the current case, the board exercises its discretion to admit this argument into the appeal proceedings. The board considers that interpreting the claim is always a prerequisite for assessing the substance of a case, particularly when the interpretation is contested and crucial for the decision. Here, determining whether the weight ratio in feature 1.2.3 relates to the end product or to the initial amount of the surface-crosslinking agents included before performing the surface-crosslinking step is crucial for deciding on the objection raised by the opponent under Article 123(2) EPC. The appellant's new interpretation of the claim is therefore, in principle, suitable to address the issue that led to the decision under appeal. It was introduced at the outset of the appeal, is not complex and does not run counter the need for procedural economy.

1.5 However, the board is not convinced by the appellant's argument that feature 1.2.3 of claim 1 should be interpreted in a product-by-process manner.

1.5.1 According to the appellant, since the crosslinking agents react with the base polymer powder to form a surface-crosslinked layer, it is impossible to determine the relative concentrations of compounds that have already reacted and are no longer present as such in the final product. Thus, claim 1 lacks clarity and therefore requires interpretation. The only technically sound interpretation of feature 1.2.3 - and of other features specifying amounts or ratios, such as feature 1.2.0 ("wherein the surface crosslinking agent is contained in an amount of 0.01 to 4 parts by weight based on 100 parts by weight of the base polymer powder") — is a product-by-process interpretation.

1.5.2 Further according to the appellant, by definition, a crosslinking agent is an agent used in a crosslinking step. A skilled person would also interpret claim 1 in light of method claim 6, which explicitly describes how the crosslinking steps are carried out. Furthermore, the appellant contends that the product-by-process interpretation is supported by paragraphs [79] to [81] of the description and is consistent with the examples in the patent.

1.5.3 Still according to the appellant, it is common practice in the field to define a polymer by the amount of monomers and crosslinking agents before polymerisation and crosslinking. This approach is evident in documents D3, D4, D5, D9, D12 and D16. Given this established practice, the skilled person would understand the weight ratio of 5:1 to 1:5 as referring to the ratio of the two components before the surface-crosslinking

step, rather than as a ratio present in the final product.

1.5.4 The board is not convinced by the appellant's arguments. The alleged impossibility to determine the relative concentrations of compounds that have already reacted and are no longer present as such in the final product is not sufficient reason to construe the weight ratio of 5:1 to 1:5 as referring to the ratio of the two components before the surface-crosslinking step. Indeed, claim 1 defines a superabsorbent polymer, hence the end product, comprising a base polymer powder (feature 1.1) and a surface-crosslinked layer formed on the base polymer powder (feature 1.2). Features 1.2.0 to 1.2.4 and 1.3 further specify characteristics of the surface-crosslinking agent, via which the first crosslinked polymer is further crosslinked. Claim 1 does not refer to the surface-crosslinking solution or any surface-crosslinking process required to form the surface-crosslinked layer of the end product. As a result, the skilled person would logically interpret the features of claim 1 as referring to the superabsorbent polymer itself, rather than to any intermediate processing step. This interpretation is reinforced by the claim's wording, particularly in feature 1.2.3 ("the alkylene carbonate-based compound and the remainder are included") and feature 1.2.0 ("the surface crosslinking agent is contained"). The board acknowledges that measuring the precise quantity of crosslinking agents in the final polymer may be technically challenging or even impossible. However, this difficulty does not override the unambiguous wording of the claim features, which, in a product claim, unambiguously define the superabsorbent polymer as an end product.

1.5.5 The board further holds that this interpretation aligns with the description. Paragraph [80] defines the total amount of the surface-crosslinking agent contained in the surface-crosslinking solution and specifies the weight ratios for the alkylene carbonate-based compound and the remainder that are mixed in that solution. In contrast, claim 1 refers to the amount and ratio of these components in the final product, without any mention of a surface-crosslinking solution.

1.5.6 As a result, the quantities and ratios described in paragraph [80] and those defined in features 1.2.0 and 1.2.3 of claim 1 are not contradictory as they pertain to different contexts. The same applies to the examples of the patent, which all describe the use of a surface-crosslinking solution for the preparation of the superabsorbent polymer.

1.5.7 The appellant's argument that defining a polymer based on the amounts of monomers and crosslinking agents before polymerisation and crosslinking is common practice in the art is unpersuasive. None of the cited documents contain wording comparable to that of claim 1, where the specified amounts and ratios explicitly apply to the crosslinking agents that are "contained" or "included" in the final polymer.

1.5.8 Accordingly, the board has no doubt that the interpretation endorsed in the decision under appeal, and affirmed by both parties during the opposition proceedings, is the accurate one.

1.6 The board therefore agrees with the decision under appeal that claim 1 of the main request extends beyond the content of the application because the quantity and ratio of the surface-crosslinking agents, as defined in

paragraph [80] of the application as filed, apply only to the surface-crosslinking solution used before surface crosslinking, rather than to the final product claimed in current claim 1.

2. Admittance of auxiliary request 1

2.1 Auxiliary request 1 was filed by the appellant with the letter dated 19 November 2024 after the notification of the communication under Article 15(1) RPBA. Its admittance must therefore be assessed under Article 13(2) RPBA, which stipulates that amendments to a party's case shall, in principle, not be taken into account unless there are exceptional circumstances justified with cogent reasons.

2.2 In auxiliary request 1, the reference to a surface-crosslinking solution is inserted in features 1.2.0, 1.2.3 and 1.2.4 of claim 1. The appellant asserts that this new claim request was filed as an immediate response to point 3.3 of the board's communication, citing a "misunderstanding between the parties, the opposition division, and the board's interpretation of the opposition division's finding" (see letter of 19 November 2024, page 9). During oral proceedings, the appellant also emphasised that the board's communication was the first instance in which it was confronted with the opinion that the features of claim 1 could not be interpreted in a product-by-process manner.

2.3 The board finds no exceptional circumstances that justified admitting auxiliary request 1 into the appeal proceedings. Specifically, it does not recognise any discrepancy between the parties' and the board's interpretation of the finding in the contested

decision. Point 3.3 of the communication merely noted that the appellant's sole argument on appeal concerned the product-by-process interpretation of feature 1.2.3. The communication did not introduce any new objection that justified filing a new request. The objection - that the ratio in feature 1.2.3 was disclosed in the original application for the crosslinking solution - had been raised in the notice of opposition, and the board's preliminary conclusion aligns with the finding in the contested decision that claim 1 of the main request did not satisfy the requirement of Article 123(2) EPC. In addition, the appellant was confronted with the board's opinion on the unsuitability of the product-by-process interpretation of claim 1 for the first time only because this argument was introduced by the appellant in its statement of grounds for appeal. Under no circumstances may a party assume that introducing a new argument on appeal entitles them to file a new auxiliary request after receiving the board's communication. Accordingly, the board decided not to admit auxiliary request 1 into the appeal proceedings.

3. Request to stay the proceedings

3.1 At the oral proceedings, the appellant requested that the board stay the proceedings in view of the pending referral G 1/24 if auxiliary request 1 was not admitted into the appeal proceedings.

3.2 The appellant argued that the outcome of the pending referral is crucial to the case at hand as it hinges on whether the description should be considered when interpreting claim 1 of the main request.

3.3 It follows from Article 112(3) EPC that only the proceedings before the referring board must be stayed until the Enlarged Board gives its decision. Proceedings before other boards may also be stayed when the decision in appeal proceedings depends entirely on the outcome of the referral. The decision whether to stay the proceedings in such cases is a discretionary one.

3.4 For the following reasons, the board saw no reason to stay the proceedings.

3.4.1 The following questions have been referred to the Enlarged Board of Appeal by Board 3201 in case T 439/22.

1. Is Article 69 (1), second sentence EPC and Article 1 of the Protocol on the Interpretation of Article 69 EPC to be applied to the interpretation of patent claims when assessing the patentability of an invention under Articles 52 to 57 EPC?

2. May the description and figures be consulted when interpreting the claims to assess patentability and, if so, may this be done generally or only if the person skilled in the art finds a claim to be unclear or ambiguous when read in isolation?

3. May a definition or similar information on a term used in the claims which is explicitly given in the description be disregarded when interpreting the claims to assess patentability and, if so, under what conditions?

3.4.2 The board first notes that the questions referred to the Enlarged Board in G 1/24 pertain to the

interpretation of patent claims when assessing the patentability of an invention under Articles 52 to 57 EPC, rather than when evaluating compliance with Article 123(2) EPC. Regardless, none of the referred questions appear to be decisive for resolving the current case.

3.4.3 As stated in point 1.5 above, the relevant passages of the description and the features of the claims do not contradict each other. Moreover, the description does not provide a definition or similar information on any term used in claim 1 of the main request that could alter its interpretation. While paragraph [80] of the description provides information on the composition of the surface-crosslinking solution before the surface-crosslinking step is performed, the contested features in claim 1 of the main request specify the details of the surface-crosslinking agents present in the final polymer. Hence, the ratios and quantities mentioned in paragraph [80] of the description pertain to a different subject-matter than those in features 1.2.0 and 1.2.4 of claim 1 of the main request. As a result, even when considering the description, the skilled person would not alter their interpretation of claim 1.

3.4.4 In view of the above, the board saw no reason to stay the proceedings.

4. Auxiliary requests 2 to 8 - Article 123(2) EPC

4.1 Auxiliary requests 2 to 8 correspond to auxiliary requests 1 to 7 underlying the contested decision.

4.2 Features 1.2.3 and 1.2.0 are also present in claim 1 of each of auxiliary requests 2 to 8. Accordingly, the board concurs with the decision under appeal that these requests contain subject-matter extending beyond the content of the application as originally filed for the same reason as the main request.

5. Auxiliary request 9 - Article 123(3) EPC

5.1 In auxiliary request 9, the product claims have been deleted.

5.2 Claim 1 of this request is based on granted claim 6 directed to a method for producing a superabsorbent polymer according to claim 1. As noted in the decision under appeal, this reference to claim 1 implies that the process has to lead to a product with the characteristics of granted claim 1. In particular, in the product of granted claim 1, the surface-crosslinking agents are included in a weight ratio of 5:1 to 1:5. The board disagrees with the appellant's assertion that the process of claim 1 of auxiliary request 9 would inevitably result in a product falling within the scope of claim 1 as granted. Indeed, in the context of process claim 1 of auxiliary request 9, the skilled person would interpret feature 1.3.3 as referring to the surface-crosslinking agents to be applied to the base polymer powder before surface crosslinking (see feature 1.3 and 1.3.0), i.e. to the surface-crosslinking agent contained in the surface-

crosslinking solution, and not to the surface-crosslinking agent in the final product. Accordingly, the board agrees with the opponent and with the opposition division that claim 1 of auxiliary request 9 does not comply with Article 123(3) EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

L. Stridde A. Haderlein

Decision electronically authenticated