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**Datasheet for the decision
of 21 May 2021**

Case Number: T 1660/19 - 3.3.05

Application Number: 10766731.3

Publication Number: 2421799

IPC: C02F5/00, C02F1/72, C02F1/50

Language of the proceedings: EN

Title of invention:
CATALYTIC WATER TREATMENT METHOD AND APPARATUS

Applicant:
Ecolab USA Inc.

Headword:
Catalytic water treatment/Ecolab

Relevant legal provisions:
EPC Art. 54, 56
RPBA 2020 Art. 13(2)

Keyword:
Novelty - main request (no)
Inventive step - auxiliary request (no)
Amendment after summons - exceptional circumstances (no)

Decisions cited:

T 0197/86, T 0939/92, T 0995/18

Catchword:



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Case Number: T 1660/19 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 21 May 2021

Appellant: Ecolab USA Inc.
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Representative: Godemeyer Blum Lenze Patentanwälte
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 22 November
2018 refusing European patent application No.
10766731.3 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairwoman S. Besselmann
Members: G. Glod
S. Fernández de Córdoba

Summary of Facts and Submissions

I. The applicant's (appellant's) appeal lies from the examining division's decision to refuse European patent application No. 10 766 731.3 for lack of novelty.

II. The following document is of relevance here:

D9: WO 2008/065099 A1

III. In its communication under Article 15(1) RPBA 2020, the board dealt with the main request (underlying the impugned decision) and the auxiliary request filed with the notice of appeal. It was of the preliminary opinion that the appeal was to be dismissed.

IV. On 19 March 2021 the appellant submitted second and third auxiliary requests.

V. Oral proceedings took place by videoconference on 21 May 2021.

VI. Claim 1 of the main request is as follows:

"A method of treating a water source comprising: contacting the water source with a catalyst, the catalyst comprising a water treatment agent bound to a supporting material, wherein the water treatment agent is a source of magnesium ions, such that the water is treated, wherein the supporting material is a weak acid cation resin, and wherein the water treatment agent is bound to the supporting material by first converting the weak acid cation resin having a H⁺ ion attached to the active sites to a sodium form by soaking the resin in an excess of sodium hydroxide for 4 to 12 hours and

then rinsing with water, and then converting the sodium form to a magnesium form by using $MgCl_2$ as soluble magnesium salt."

Claim 1 of the first auxiliary request is as follows:

"A method of treating a water source with a catalyst comprising a water treatment agent bound to a supporting material, wherein the water treatment agent is a source of magnesium ions and wherein the supporting material is a weak acid cation resin, the method comprising:

- a) preparing the catalyst by first converting the weak acid cation resin having a H^+ ion attached to the active sites to a sodium form by soaking the resin in an excess of sodium hydroxide for 4 to 12 hours and then rinsing with water, and then converting the sodium form to a magnesium form by using $MgCl_2$ as soluble magnesium salt, thereby binding the water treatment agent to the supporting material; and*
- b) contacting the water source with the catalyst such that the water is treated."*

Claim 1 of the second auxiliary request is as follows:

"A method of treating a water source with a catalyst comprising:

- a) preparing the catalyst by binding a water treatment agent, which is a source of magnesium ions, to a supporting material which is a weak acid cation resin by first converting the weak acid cation resin having a H^+ ion attached to the active sites to a sodium form by soaking the resin in an excess of sodium hydroxide for 4 to 12 hours and then rinsing with water, and then converting the sodium form to a magnesium form by using $MgCl_2$ as soluble magnesium salt, and thereby*

binding the water treatment agent to the supporting material; and b) contacting the water source with the catalyst to precipitate CaCO₃ out of the water source in the form of aragonite."

Claim 1 of the third auxiliary request is as follows:

"A use of a catalyst comprising a water treatment agent bound to a supporting material to precipitate calcium carbonate out of a water source in the form of aragonite, wherein the water treatment agent is a source of magnesium ions and wherein the supporting material is a weak acid cation resin, the use comprising:

a) preparing the catalyst by first converting the weak acid cation resin having a H⁺ ion attached to the active sites to a sodium form by soaking the resin in an excess of sodium hydroxide for 4 to 12 hours and then rinsing with water, and then converting the sodium form to a magnesium form by using MgCl₂ as soluble magnesium salt, thereby binding the water treatment agent to the supporting material; and
b) contacting the water source with the catalyst such that the water is treated."

VII. The appellant's arguments, where relevant to the present decision, can be summarised as follows:

Main request

The distinguishing feature between D9 and claim 1 was the different catalyst prepared by the two-step process. In D9, a one-step process was used. The comparison of the data from D9 (Tables 1 and 2) with the patent application in this case (e.g. Example 4) showed that the catalyst used in the process in claim 1

was not exhausted as fast as the catalyst in D9. This differing activity of both catalysts showed that the catalyst in D9 had to be physically different from the catalyst used in claim 1. The difference lay in the nature of the binding of the magnesium ions to the resin. Although the resins in D9 and the patent application in this case were different, the significant difference in performance made it credible that the two-step process resulted in a structurally different catalyst than the one-step process. For the same reasons, it was credible that this difference was obtained across the entire scope of the claim.

The application mentioned different preparation methods but did not contain any information indicating that they resulted in the same catalyst.

Therefore novelty had to be acknowledged.

First auxiliary request

The difference between claim 1 and D9 was the two-step process. This led to improved scale inhibition, as evidenced by the examples in the application.

Even if the problem were only to provide an alternative, it would not be obvious since none of the prior-art documents disclosed a two-step process. The skilled person was not motivated to execute an additional step for the preparation of the catalyst. Page 4 of D9 did not teach such a process and did not give the skilled person any incentive to first use sodium hydroxide and then magnesium chloride. Such an objection was based on an *ex post facto* analysis.

Second and third auxiliary requests

These requests were provided in response to the board's communication under Article 15(1) RPBA 2020. They further specified that the object of the invention was scale removal. They *prima facie* addressed the outstanding objections, did not lead to new objections or a new case and therefore did not add any complexity to the case.

- VIII. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request underlying the decision under appeal or on the basis of the auxiliary request filed with the notice of appeal, or on the basis of the second or third auxiliary requests filed on 19 March 2021. Furthermore, the reimbursement of the appeal fee was requested.

Reasons for the Decision

Main request

1. Claim construction

Claim 1 relates to a method of treating a water source comprising, as the only method steps, "contacting the water source with a catalyst [...] such that the water is treated". The catalyst is defined as "comprising a water treatment agent bound to a supporting material, wherein the water treatment agent is a source of magnesium ions".

The further definition of the catalyst corresponds to a product-by-process feature and merely means that the catalyst is to be obtainable by the indicated process

features. Therefore, the actual steps for preparing the catalyst, including binding the water treatment agent to the weak acid cation resin, are not part of the overall water treatment method claimed.

Details on the loading of the weak acid cation resin are not provided; it is only defined by the way it is prepared. Consequently many different resins with different degrees of loading of magnesium are encompassed by the definition of the weak acid cation resin.

2. Article 54 EPC

In view of the claim construction given above, which is in line with the examining division's interpretation of claim 1, the board sees no reason to deviate from the examining division's decision.

D9 discloses the preparation of the magnesium form of a weak acid cation resin in a "one-step process" with a suspension of magnesium oxide (page 9, lines 19 to 22). This resin is used for treating water in its broadest sense, since it removes calcium ions and releases magnesium ions (Tables 1 and 2).

The arguments relating to the intention of the claimed method ("scale prevention") are not convincing because this is not reflected by the wording of the claim, which only relates to the treatment of water in general.

The appellant's position that the "one-step process" for the preparation of the resin disclosed in D9 would result in a structurally different catalyst than the "two-step process" is not corroborated by evidence as

indicated in the impugned decision (point 1.4 of the Reasons). The catalyst used in Examples 3 and 4 of the patent application was prepared according to a process described in Example 1 of the application. This process is not in line with the catalyst preparation in claim 1 of the request in this case. According to claim 1 the weak acid cation resin is converted to a sodium form by soaking the resin in an excess of sodium hydroxide for 4 to 12 hours. In Example 1, by contrast, the weak acid cation resin is soaked for 24 hours in sodium hydroxide.

Even if the examples in the patent application are nevertheless considered, their comparison with D9 does not allow a conclusion with respect to the "one-step process" vs. the "two-step-process". In Example 1 of the patent application the weak acid cation resin was Lewatit S 8528, while in D9 Lewatit S 8227 (page 10, line 30) was used. In D9 approximately 60% of the exchange capacity was in the magnesium form, while the remaining 40% was in the proton form (page 10, line 28 to page 11, line 2), other possible ratios being also mentioned (page 7, lines 25 to 28 and page 8, line 29 to page 9, line 13). No information in that respect is available for the resin in the patent application in this case. Claim 1 allows for any degree of loading with magnesium. The degree of loading depends on the specific weak acid cation exchange resin used and the chosen conditions of the preparation steps, which are only very broadly defined in the claim.

There are no examples of identical resins available that differ only in terms of the preparation steps to show that the different processes result in different structural resins, if any. There is no proof of the alleged different nature of the binding. Since such

data is missing, there is no reason to deviate from the impugned decision. In particular, it is to be concluded that the resin disclosed in D9 is also obtainable by a "two-step process" as indicated in claim 1 of the request in this case. Therefore, there is no distinguishing feature with respect to D9.

This conclusion is also in line with the disclosure on page 20 of the application, wherein the two processes are presented as alternatives (page 20, lines 3, 4, 14 and 22). Although it is not explicitly stated in the text that these alternative methods result in the same catalyst, there is also no information to the contrary. The two processes are presented as alternative ways for preparing the water treatment agent, which is normally understood as meaning that the different processes result in the same agent. Both processes have the same aim of converting a weak acid cation exchange resin to a magnesium form. This is also the case in Example 2, which is explicitly described as an alternative. No water treatment results are provided for Example 2; however, this does not show that they would be inferior.

To conclude, there is no data that would make it possible to deviate from the examining division's conclusion. Claim 1 is considered to lack novelty with respect to D9 and the main request is not allowable.

First auxiliary request

3. Article 56 EPC
- 3.1 D9 is considered to be the closest prior art since it also relates to the treatment of water (enriching water with magnesium). It discloses a one-step process for

binding magnesium to the resin by soaking the resin with an aqueous suspension of MgO (page 11, lines 4 to 9). When magnesium is released to water, calcium is removed from the water (page 11, lines 20 to 25 and Tables 1 and 2), and therefore scale prevention also occurs since calcium is mainly responsible for scale formation.

- 3.2 The problem to be solved with regard to D9 is allegedly an improved method for scale prevention.
- 3.3 The problem is intended to be solved by a method according to claim 1, characterised in that the weak acid cation resin having a H⁺ ion attached to the active sites is first converted to a sodium form by soaking the resin in an excess of sodium hydroxide for 4 to 12 hours and then rinsed with water, and then the sodium form is converted to a magnesium form by using MgCl₂ as soluble magnesium salt.
- 3.4 In line with the conclusion under point 2 above, there is no data that would show that the process of preparing the resin has an impact on the scale removal. It is established case law that, where comparative tests are chosen to demonstrate an inventive step with an improved effect over a claimed scope, the nature of the comparison with the closest prior art must be such that the effect is convincingly shown to have its origin in the distinguishing feature of the invention (T 197/86, point 6.1.3 of the Reasons). Since such comparative tests are not on file, it cannot be accepted that the distinguishing feature would lead to an improved process.

3.5 The problem needs to be redefined in a less ambitious way and can be considered that of providing an alternative method for binding magnesium to the resin.

3.6 The proposed solution is obvious for the following reasons:

It is known from D9 that weak acid cation resins in the proton form can be conditioned with sodium or potassium hydroxide (page 4, lines 25 to 29). These resins can then be used for removing metal ions from water (page 5, lines 1 to 5). It is evident to the skilled person that magnesium is one of the ions encompassed by said teaching, as can be taken from D9 itself (page 1, second paragraph). This means that the skilled person knows that a magnesium-loaded resin can be obtained from a sodium-loaded or potassium-loaded resin.

Although magnesium chloride is not explicitly mentioned in D9 for this purpose, it is one of the most commonly used magnesium salts. It is certainly within the skilled person's knowledge that it can be used when looking for alternative ways of preparing magnesium-loaded weak acid cation resins. A $MgCl_2$ solution is described in D9 for regenerating a strong acid cation exchange resin (page 3, line 25 to page 4, line 5). In the case of a strong acid cation exchange resin, it is possible to directly convert the calcium form to the magnesium form. The teaching that this regeneration is not applicable to a weak acid cation exchange resin (page 3, lines 7-14) concerns the direct exchange of calcium with magnesium. The skilled person would, however, contemplate using a $MgCl_2$ solution for the step at issue here, in which sodium ions are to be exchanged with magnesium ions.

In other words, there are many possible ways, including one-step or two-step processes, of preparing a magnesium-loaded weak acid cation resin. A mere arbitrary choice from the possible solutions cannot involve an inventive step (T 939/92, point 2.5.3 of the Reasons).

- 3.7 Therefore, the subject-matter of claim 1 does not involve an inventive step and the first auxiliary request is not allowable either.

Auxiliary requests 2 and 3

4. Article 13(2) RPBA 2020

These requests were only submitted after the communication pursuant to Article 15(1) RPBA 2020.

The communication does not represent an invitation or opportunity to file further written submissions (Case Law of the Boards of Appeal of the EPO, 9th edition, 2019, III.C.6.4.1 and T 995/18, point 1.4 of the Reasons).

The goal of these requests is to further specify the object of the water treatment process; however, the problem relating to the broad wording of the claim and its objective, namely water treatment, was already known at the search stage (see European search opinion, page 3, first paragraph) and has been re-emphasised during examination (see communication of 3 April 2018, point 5.1). Therefore, there are no cogent reasons to present claims dealing with that objection at such a late stage of the proceedings.

In addition, the formation of aragonite has never been part of any claim previously submitted and would therefore shift the case to a new debate.

In particular, claim 1 of the second auxiliary request would require a new discussion of at least Article 84 EPC because features making it possible to obtain the desired result "to precipitate CaCO_3 out of the water source in the form of aragonite" are not found in the claim.

Claim 1 of the third auxiliary request is formulated as a use claim, which has never been part of the proceedings. It would also require a discussion of at least Article 84 EPC because claim 1 is formulated as a combined use and process claim.

Consequently these requests cannot be considered to be clearly allowable.

To conclude, the board is not taking these auxiliary requests into account since it cannot recognise any exceptional circumstances which would justify this.

5. Reimbursement of the appeal fee

The appellant alleges that a substantial procedural violation has occurred since claim interpretation and Article 54 EPC were not discussed during the oral proceedings (statement of grounds of appeal, page 6, sixth paragraph).

It is evident from the minutes of the oral proceedings before the examining division that D9 was discussed as the closest prior art (page 1, penultimate paragraph and page 2, first paragraph, last sentence), which

implies that the subject of the discussion was inventive step (Article 56 EPC). After a break the chairman informed the applicant that claim 1 was considered to lack novelty and gave reasons why, which also implies that during deliberation the examining division could not identify any distinguishing feature with respect to D9. Thereafter, "The applicant was asked whether or not he had any further submissions to make, which he denied" (penultimate paragraph of the minutes), so the board cannot agree that the applicant was not given the opportunity to respond to the examining division's position.

Furthermore, the appellant submits that the chairman should have indicated during the oral proceedings how to overcome the novelty objection (statement of grounds of appeal, page 6, fourth and fifth paragraphs). It is the board's understanding that it is not the examining division's duty to propose ways to overcome objections.

In addition, the appellant alludes to an alleged procedural violation when summarising the course of the oral proceedings (page 3, first paragraph of the statement of grounds of appeal); however, the contentious sentence "furthermore he (i.e. the Chairman) had said that even if claim 1 were to be amended as a process claim instead of an apparatus claim, the claims would not involve an inventive step over the closest prior art D9" relates to the apparatus claim of 24 September 2018, and more specifically to the feature "wherein the pH of the water source prior to treatment is greater than 8". The indicated sentence is irrelevant to this case because the claims of 24 September 2018 were withdrawn during the oral proceedings before the examining division. In these oral proceedings, the appellant filed a new set of

method claims which did not contain any feature defining the pH of the water source. These claims were even admitted by the examining division and are the claims underlying the impugned decision.

Therefore, the board cannot recognise that the examining division committed a procedural violation, let alone a substantial one.

Since the requirement pursuant to Rule 103(1) (a) EPC that the appeal is allowable is not met, the request for reimbursement of the appeal fee is rejected.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairwoman:



C. Vodz

S. Besselmann

Decision electronically authenticated