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D E C I S I O N
of 21 November 2001

Case Number: T 0529/98 - 3.3.5

Application Number: 93902010.3

Publication Number: 0623095

IPC: C01B 15/029

Language of the proceedings: En

Title of invention:
Production of hydrogen Peroxide

Applicant:
Eka Chemicals AB

Opponent:
-

Headword:
Catalyst/EKA

Relevant legal provisions:
EPC Art. 84

Keyword:
"Clarity (no)"

Decisions cited:
-

Catchword:
-



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Boards of Appeal

Chambres de recours

Case Number: T 0529/98 - 3.3.5

D E C I S I O N
of the Technical Board of Appeal 3.3.5
of 21 November 2001

Appellant: Eka Chemicals AB
S-445 80 Bohus (SE)

Representative: Jönsson, Christer
Eka Chemicals AB
Patent Department
Box 11556
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 23 January 1998
refusing European patent application
No. 93 902 010.3 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: R. K. Spangenberg
Members: M. M. Eberhard
M. B. Guenzel

Summary of Facts and Submissions

I. European patent application No. 93 902 010.3 was refused by a decision of the examining division posted on 23 January 1998. The decision was based on claims 1 to 19 filed with the letter of 13 June 1997. Claims 1 and 8 thereof read as follows:

"1. A process for producing hydrogen peroxide by direct oxidation of hydrogen with oxygen in an acidic aqueous medium, comprising:

(a) contacting said hydrogen and oxygen acidic aqueous medium with a catalyst consisting of at least one Group VIII metal on a partially hydrophobic, partially hydrophilic support in a pressure vessel, wherein the catalyst support is a fluorinated carbon with a level of fluorination such that it is partially hydrophobic to allow the gaseous reactants to contact the catalyst, while being partially hydrophilic to diffuse the formed hydrogen peroxide from the catalyst to the aqueous medium, and the level of fluorination is in the range of about 10 to 65% F;

(b) providing a source of sodium and chloride ions to the acidic aqueous medium either at the outset of the reaction or once there is a decline in catalytic activity;

(c) maintaining the pressure in the vessel in the range of 3.5MPa-20MPa, with a hydrogen partial pressure below the explosive limit; and

(d) maintaining the temperature in the range of

the freezing point of the aqueous medium to about 60°C."

"8. A catalyst for use in the production of hydrogen peroxide, comprising:

(a) a partially hydrophobic, partially hydrophilic support, wherein the catalyst support is fluorinated carbon with a level of fluorination of about 10 to 65% F;

(b) a Group VIII metal; and

(c) a source of sodium and chloride ions."

II. The grounds for the refusal were that the subject-matter of the claims did not meet the requirement of clarity set out in Article 84 EPC and did not involve an inventive step insofar as the unclear features could not be taken into account for assessing inventive step. The examining division held that the partial hydrophobicity and partial hydrophilicity of the catalyst support as well as its level of fluorination of about 10 to 65% F were essential features on which, according to the appellant, the assessment of inventive step should be based. The first feature was purely descriptive and qualitative. The second feature was unclear because it was not indicated whether the level of fluorination of about 10 to 65% was expressed in atom% or weight%. The appellant's argument that the skilled person would immediately and unambiguously recognize from the description that the level of fluorination was expressed in % by weight, was not accepted as being an unsupported assertion.

III. The appellant lodged an appeal against this decision.

He submitted a new set of claims as the sole request with the grounds of appeal on 11 May 1998 as well as a declaration of Dr D.E. Grove. This set of claims differs from that on which the appealed decision is based only in that claim 18 was deleted and claim 19 renumbered. In a communication, the board informed the appellant of its provisional opinion in particular about the clarity of claims 1, 8 and 11.

IV. Concerning the issue of clarity the appellant argued in the grounds of appeal that it was universal practice to express the quantity of the components exclusively in percent by weight when characterising solid materials since this was what actually could be measured. Thus, if nothing else was stated a person skilled in the art immediately recognised all percentages as percent by weight. This was also supported by the declaration of Dr Grove who was an expert in catalyst preparations. Therefore, the skilled person reading the present application and particularly Example 1 would immediately and unambiguously recognise that "10 to 65%F" referred to % by weight. In reply to the board's communication, the appellant further argued that in the field of fluorinated carbon which, for example, could be used as catalyst support material, it was common practice to use % by weight. Moreover, the fluorine bound to the carbon, as fluoride, in various relations (CF_x) was not reacting chemically itself but only acting as a modifier for the hydrophobicity of the carbon. Therefore, there was no reason at all to use the more scientific unit mole % when characterising the amount of fluorine present.

V. The appellant requested that the appealed decision be set aside and that a patent be granted on the basis of

the claims filed on 11 May 1998.

Reasons for the Decision

1. The appeal is admissible.

2. According to claims 1 and 8, the catalyst used in the production of hydrogen peroxide comprises a partially hydrophobic, partially hydrophilic support, the catalyst support being a fluorinated carbon with a level of fluorination of about 10 to 65% F. The level of fluorination affects the hydrophobic/hydrophilic nature of the catalysts (see description page 7, lines 20 to 21). The appellant has argued both during the examining proceedings and at the appeal stage that the proper balance between hydrophobicity and hydrophilicity which is achieved if the catalyst support is a fluorinated carbon with a level of fluorination of about 10 to 65% F represented an essential feature of the invention. The level of fluorination being an essential feature of the invention, it has to be clearly and unambiguously defined. However, it is not clear whether the "level of fluorination of about 10 to 65% F" indicated in claims 1 and 8 is expressed in weight % or in atom % of fluorine (whatever the reference for the % may be, ie the carbon or the fluorinated carbon). The description contains no additional explanation in this respect. It does not give any information as to how this catalyst support was prepared and how the level of fluorination was measured. The description also does not indicate the name of a commercial product from which it might possibly have been derived whether the level of fluorination in the fluorinated carbon is expressed in weight% or atom %. In Example 1, which the appellant

referred to, the support is said to be a "fluorinated carbon (fluorine content 28%, median particle size less than one micrometer, surface area 130 m²/g)". This wording covers both possibilities, ie a level of fluorination of 28 atom % or 28 weight %. The expression "fluorine content" does not provide further information as to whether the amount of fluorine in the fluorinated carbon is expressed in weight % or in atom %. Therefore, there is no information in the description from which it might be unambiguously derived that the range stated in the claims and in the description is expressed in weight % rather than in atom %.

The appellant argued that "when characterising solid material it is universal practice to express the quantity of the components exclusively in percent by weight since this is what actually can be measured". This argument, which seems to be supported by the declaration of Dr Grove, is not convincing. Although, for example in the case of glass compositions, ie **solid materials**, the compositions are very often, and even usually, expressed in % by weight in the patent literature, in some patents they are, however, defined in mole %. In the declaration of Dr Grove it is further stated that the fluorine is not in the form of gaseous elemental fluorine (F₂) since the support would not be stable; it is in the form of a solid fluorinated carbon. However, this does not imply that the level of fluorination can only be expressed in weight % since the composition of solid materials can also be expressed in mole %. The appellant further argued that the fluorine bound to the carbon was not reacting chemically itself but only acting as a modifier for the hydrophobicity of the carbon. Likewise it cannot

unambiguously be derived therefrom that the level of fluorination is expressed in weight % rather than in atom % in the present patent application. The fact that the unit atom % might be more scientific than the unit weight% when characterising the amount of fluorine present also does not allow any conclusion as to whether the level of fluorination indicated in the claims and in the description is expressed in weight % or atom %. Scientific definitions may also be used in patents. As both definitions are possible, it is necessary to indicate in the patent application and in particular in the claims which of them was selected in order for the claims to meet the requirement of clarity. The appellant's affirmation that in the field of fluorinated carbon which, for example, can be used as support material, it is common practice to express the level of fluorination in % by weight was not supported by any evidence and, therefore, cannot be accepted by the board.

For the preceding reasons, the essential feature of claims 1 and 8 that the catalyst support is fluorinated carbon with a level of fluorination of about 10 to 65% is considered not to meet the requirement of clarity set out in Article 84 EPC. As claims 1 and 8 contravene Article 84 EPC, the appellant's request cannot be granted. It also follows from the above that the application as filed does not contain any information which would permit the deficiency in the claims to be overcome by amendment.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

U. Bultmann

R. Spangenberg