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D E C I S I O N
of 22 June 1994

Case Number: T 1046/92 - 3.3.1

Application Number: 89303433.0

Publication Number: 0352878

IPC: C07C 2/86

Language of the proceedings: EN

Title of invention:
Catalysts comprising metal compounds supported on a clay or hydrous silicate and their use

Applicant:
Contract Chemicals (Knowsley) Limited

Opponent:
-

Headword:
Catalyst/CONTRACT CHEMICALS

Relevant legal norms:
EPC Art. 84, 54(1), 54(2), 111(1)

Keyword:
"Clarity (yes, after amendment)"
"Novelty (yes, after amendment)"
"Remittal to the Examining Division"

Decisions cited:
-

Catchword:

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 1046/92 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 22 June 1994

Appellant: Contract Chemicals (Knowsley) Limited
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Decision under appeal: Decision of the Examining Division of the European Patent Office dated 14 July 1992 refusing European patent application No. 89 303 433.0 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: A. Jahn
Members: J. M. Jonk
J. A. Stephens-Ofner

57

Summary of Facts and Submissions

I. European patent application No. 89 303 433.0, filed on 7 April 1989 (publication No. 0 352 878), was refused by a decision of the Examining Division dated 14 July 1992. The decision was based on Claims 1 to 15 filed on 31 January 1992, Claim 1 reading as follows:

"A catalyst which comprises a compound of a metal which is zinc, nickel, aluminium, copper, cadmium, cobalt, or magnesium, supported on a clay or a hydrous silicate, the catalyst being one which gives a minimum rate of conversion of 20% per hour at room temperature and atmospheric pressure of benzylchloride to diphenylmethane in a reaction mixture comprising benzene (140 ml), benzylchloride (10 ml), catalyst (8 g at 1 m mol metal ion per gramme of catalyst)."

Independent Claim 6 related to a method for the preparation of the present catalyst, and independent Claim 13 concerned a method for the production of an organic compound in the presence of a catalyst according to any of the Claims 1 to 5 or as produced by a method according to any of Claims 6 to 12.

II. The grounds for the refusal were that the subject-matter of Claim 1 lacked clarity in the sense of Article 84 EPC and also lacked novelty in the light of documents

(1) EP-A-0 144 219,
(3) Helv. Chim. Acta, Vol. 70, 577 to 586, and
(4) Egypt. J. Chem. 28, No 2, 93 to 98 (1985).

The Examining Division considered that the subject-matter of Claim 1 indicated the performance of the claimed catalyst, namely, that it gave a minimum rate of

conversion of 20% per hour at the specified reaction conditions, without defining the concrete product features necessary for achieving the desired performance. It was further considered that a functional wording of the claim would be allowable if the invention could only be defined in such terms and if the result could be directly and positively verified by tests or procedures adequately specified in the description and involving nothing more than trial and error. The Examining Division held, however, that in the present case the claimed catalyst could be clearly defined by concrete product features which appeared to be essential to achieve the catalytic performance as indicated in the claim.

III. An appeal was lodged against this decision on 11 September 1992, and the appeal fee was paid on the same date.

A Statement of Grounds of Appeal was submitted on 10 November 1992.

IV. During oral proceedings held on 22 June 1994 the Board objected to the main claim as it then stood on the basis of Article 84 EPC which differed from the one refused by the Examining Division only by the insertion of the amount of metal. In response to these objections the Appellant filed new Claims 1 to 13, Claim 1 reading as follows:

"A catalyst which comprises a compound of a metal which is zinc, copper or nickel, supported on a clay, the metal compound being present in an amount of 0.1 to 20 m mol per gram of clay and the catalyst being one which gives a minimum rate of conversion of 20% per hour at room temperature and atmospheric pressure of benzylchloride to diphenyl-methane in a reaction mixture

59

comprising benzene (140 ml), benzylchloride (10 ml), and catalyst (8 g at 1 m mol metal ion per gramme of catalyst), and being obtainable by a method which comprises preparing a solution of a salt of zinc, copper or nickel in an alcohol, followed by mixing a clay with the solution, and removing the alcohol solvent by evaporation without preliminary separation of the clay from the solvent."

The Appellant argued that the subject-matter of this claim met the requirements of Article 84 because it was clear and was also supported by the description. In this connection he emphasised that the test indicated in present Claim 1 could be carried out by the skilled person without undue burden. Moreover, he submitted that the subject-matter of the claim was novel because the cited documents did not disclose the method for the preparation of the present catalyst indicated in present Claim 1, leading - on a regular basis - to catalysts having activities meeting the test defined in that claim, which activities could not be achieved by the prior art catalysts. In support to this submission he referred to the test-report filed on 10 November 1992.

V. The Appellant requested that the impugned decision be set aside, and a patent be granted on the basis of the Claims 1 to 13 submitted in the course of oral proceedings.

VI. At the conclusion of the oral proceedings, the Board's decision to set aside the decision under appeal, and to remit the case to the first instance for further prosecution was announced.

60

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC and is, therefore, admissible.

2. The subject-matter of present Claim 1 is based on Claims 1, 6 and 8 as originally filed in combination with page 3, lines 30 to 34, 48, 49 and 55 to 57 of the published patent application (which is identical with the originally filed patent application). The present dependent Claims 2 to 4 are supported by the respective Claims 2, 3 and 5 of the originally filed patent application.

The subject-matter of present independent Claim 5 is based on the originally filed Claims 6 and 8 in combination with page 3, lines 30 to 34, 48, 49 and 55 to 57 of the published patent application. Furthermore, the present dependent Claims 6 and 7 are supported by the respective originally filed Claims 7 and 9, and the present dependent Claims 8, 9 and 10 are based on page 3, lines 44 to 48, of the published patent application.

The subject-matter of independent Claim 11 is based on the originally filed Claims 10 to 12, and that of the present dependent Claims 12 and 13 is supported by page 4, line 11 to page 5, line 4, of the patent application as published.

Thus, all claims of the new set of claims comply with the requirement of Article 123(2) EPC.

3. The first issue to be dealt with is whether the subject-matter of Claim 1 meets the requirements of Article 84 EPC.

3.1 The objection raised by the Examining Division that the main claim under consideration at that time did not meet the requirements of Article 84 no longer exists with respect to the present Claim 1 for the following reasons. The subject-matter of present Claim 1 defines the catalyst not only by its product features and its activity in terms of the specified test, but also by the specified process for its preparation. Therefore, in the Board's judgment, the present Claim 1 comprises a clear definition of the catalyst, or in other words all its essential features, so that the provisions of Article 84 in combination with Rule 29(1) and (3) are met.

Furthermore, it is observed by the Board that the present main claim relates to a product per se conferring protection upon the product as such. In these circumstances, the Board finds that the term "obtainable" in relation to the specified process for the preparation of the catalyst is justified.

4. The next issue to be dealt with is whether the subject-matter of Claim 1 is novel in the light of the disclosure of any of the documents (1), (3) and (4).

4.1 As indicated above, the subject-matter of Claim 1 is partly defined in terms of a process for its preparation (i.e. as a product-by-process) by indicating that the catalyst is obtainable by a method as specified. This means, in the Board's judgment, that the scope of Claim 1 is restricted to such catalyst structures which can be obtained by the specified process. However, this does not mean that the scope of Claim 1 is restricted to a particular process for the preparation of the claimed catalyst, as long as the catalyst structure can be obtained by the specified method of Claim 1.

4.2 Document (1) concerns a process for the preparation of hydrocarbons by contacting a monohaloalkane having 1 to 4 carbon atoms at elevated temperature with a clay containing either hydrogen ions and/or metal cations introduced either by ion exchange and/or by deposition (cf. page 2, lines 21 to 33). Preferred metal cations which may be exchanged or deposited on the clay are, for example, beryllium, titanium, zirconium, hafnium, iron, cobalt, rhodium, silver, gold, zinc, aluminium, gallium, indium, silicon, germanium, tin, lead, polonium, uranium and copper (cf. page 5, last line to page 6, line 6). Furthermore, it discloses that the deposition of the desired metal may be accomplished by impregnation or precipitation, or by any other technique known in the art, and that the deposition is preferably effected by impregnation with a solution of a suitable metal compound, for example a salt of the desired metal, which is almost inevitably accompanied by an exchange of cations with cations of the desired metal (cf. page 6, lines 7 to 15). Furthermore, the experimental part of the disclosure of this document suggests that this method of deposition involves the separation of the treated clay loaded with metal salts by filtration and by washing the catalyst with distilled water (cf. page 8, lines 5 to 8, in combination with page 7, line 30 to page 8, line 4; all the examples indicating the catalyst as ion-exchanged clay; as well as page 6, lines 19 to 23).

In contrast, present Claim 1 discloses a catalyst which is obtainable by the specific method of depositing the desired metal cation on the clay which results in the distinguishing feature that by evaporating the solvent from the solution the metal salt is entirely deposited on the clay. This method is not disclosed in document (1).

It is true that a different method of preparing a catalyst does not necessarily result in a different catalyst. However, the Appellant submitted, by reference to the test-report filed on 11 November 1992, that catalysts prepared according to this particular method - on a regular basis - passed the test of Claim 1, whereas the catalysts prepared by using metal salts other than those of Zn, Cu or Ni as claimed (such as the other metal salts listed in Tables 1 and 2), or metal salts prepared by the process as indicated in present Claim 1 save the difference that the alcohol (methanol) is removed by filtration (Clayzic (filtered)), or metal salts prepared by the process of document (3) in which water is used as solvent and the solvent is separated from the treated clay by centrifugation and decanting (Compound X) failed to do so. In these circumstances, the Board finds it credible that the present catalyst having different properties owing to its particular preparation also has a different structure.

Therefore, the subject-matter of present Claim 1 has not been made available to the public by document (1).

4.3 The same conclusion can be reached with respect to the disclosures of documents (3) and (4).

Document (3) teaches that good conversion rates in Friedel-Crafts alkylations are achieved by using transition metal-exchanged phyllosilicates such as K 10 montmorillonite as catalysts (cf. the conclusion on page 585). According to the Experimental Part a Fe-, Cu-, Co- or Zn-catalyst is prepared by adding K 10 clay to a stirred aqueous solution of their respective chlorides, stirring for 24 hours, centrifuging and discarding of the supernatant solution, washing the

separated treated clay with distilled water, drying at 120°C and grounding (cf. page 585, under point 1 of the Experimental Part).

Furthermore, document (4) teaches that $ZnCl_2$ can be considered as the best activating agent for natural aluminosilicate in the alkylation of benzene (cf. page 95, first paragraph). Moreover, it describes under the heading "Experimental" that the roasted clay sample was soaked in a 10% $ZnCl_2$ solution and finally dried at 100°C till constant weight, and that the extent of Zn ions retained on the catalyst was not determined (cf. page 94, first paragraph). From the terms "extent of Zn ions retained on the catalyst" in this last statement the Board concludes that only a part of the metal halide was absorbed by the clay.

Thus, both these documents are wholly silent about the essential product-by-process features of the claimed catalyst as defined in Claim 1, which lead as showed by the test-report filed on 11 November 1992 to a more active and, therefore, different catalyst.

4.4 In conclusion, the Board finds that the subject-matter of the Claim 1 is novel. Furthermore, independent Claims 5 and 11, as well as the dependent claims are also novel for the reasons stated above.

5. It follows from the above considerations that the reasons for the refusal of the present patent application by the Examining Division based on Articles 84 and 54(1) and (2) EPC have been removed. In these circumstances, the Board exercises its power under Article 111(1) EPC and remits the case to the Examining Division for further prosecution.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Examining Division for further prosecution on the basis of the request submitted in the course of oral proceedings.

The Registrar: The Chairman:

E. Görgmaier

A. Jahn