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**D E C I S I O N**  
of 18 January 1995

**Case Number:** T 0979/93 - 3.3.1

**Application Number:** 89308329.5

**Publication Number:** 0357295

**IPC:** C10G 49/04

**Language of the proceedings:** EN

**Title of invention:**

Catalysts for hydrotreating of hydrocarbons and methods of preparing the same

**Applicant:**

SUMITOMO METAL MINING COMPANY LIMITED

**Opponent:**

-

**Headword:**

Catalyst/SUMITOMO

**Relevant legal provisions:**

EPC Art. 54(3) and 111(1)

**Keyword:**

"Novelty (yes) - novelty of product-by-process claim established by evidence"  
"Remittal for further prosecution"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 0979/93 - 3.3.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.1  
of 18 January 1995

**Appellant:** SUMITOMO METAL MINING COMPANY LIMITED  
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Tokyo 105 (JP)

**Representative:** Wilson, Nicholas Martin  
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**Decision under appeal:** Decision of the Examining Division of the European Patent Office dated 5 July 1993 refusing European patent application No. 89 308 329.5 pursuant to Article 97(1) EPC.

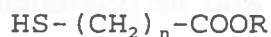
**Composition of the Board:**

**Chairman:** A. J. Nuss  
**Members:** J. M. Jonk  
R. E. Teschemacher

### Summary of Facts and Submissions

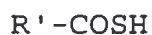
- I. European patent application No. 89 308 329.5, filed on 15 August 1989 (publication No. 0 357 295), was refused by a decision of the Examining Division dated 5 July 1993.
- II. The decision was based on amended application documents, including two sets of claims for different contracting states both filed on 7 January 1992. The first set of claims for all designated contracting states except BE contained Claims 1 to 21, independent Claim 1 reading as follows:

"A catalyst for hydrotreating hydrocarbons, which comprises a shaped body of a mixture composed of a carrier substance consisting of an oxide of aluminium and/or oxide hydrate of aluminium, at least one water-soluble compound of a metal of Group VI and/or Group VIII of the Periodic Table, phosphoric acid and at least one organic compound selected from the group consisting of mercapto-carboxylic acids of general formula:



where n is 1 to 3; and R represents a hydrogen atom, or an alkali metal, an alkaline earth metal, an ammonium group, or C<sub>1-10</sub> alkyl group;

thio-acids of a general formula:



where R' represents a monovalent C<sub>1-15</sub> hydrocarbon group;  
amino-substituted mercaptans of a general formula:



where R'' represents a divalent C<sub>1-15</sub> hydrocarbon group;  
dimercaptans of a general formula:



where R''' represents a divalent C<sub>1-15</sub> hydrocarbon group;  
and  
mercapto-alcohols of a general formula;



where R'''' represents a C<sub>1-15</sub> alkyl group, or a phenyl group; Ra represents a hydrogen atom or C<sub>1-2</sub> alkyl group; and n is 1 or 2 with the exception that where the carrier is alumina and molybdenum trioxide, nickel carbonate, or cobalt carbonate are used the organic compound is not mercaptoacetic acid, methyl mercaptoacetate, 2-amino-ethanethiol, ethane dithiol or thioacetic acid."

Independent Claim 10 concerned a method for preparing a catalyst for hydrotreating hydrocarbons, characterised in that a carrier substance consisting of an oxide of aluminium and/or an oxide hydrate of aluminium is blended and kneaded with a solution containing at least one water-soluble compound of a metal of Group VI and/or

Group VIII of the Periodic Table, phosphoric acid and at least one organic compound as defined in Claim 1, and the resulting blend is shaped and dried.

The second set of claims for BE was identical to the set of claims for the other designated contracting states, except that Claim 1 did not contain the disclaimer: "with the exception ..... or thioacetic acid".

III. The grounds of refusal were that the subject-matter of Claims 1 to 7 and 9 of the first set of claims (i.e. the set of claims for the contracting states other than BE) lacked novelty (Article 54(3) EPC) with respect to the content of document

(1) EP-A-0 300 629

and that the claims also lacked clarity within the meaning of Article 84 EPC, owing to some inconsistencies between the description of the patent application and the claims.

The Examining Division held that the catalyst as claimed was not rendered novel by disclaiming the examples of document (1). Moreover, this document not only disclosed catalysts having the same composition as the catalysts claimed in the present patent application, but also implicitly disclosed the shaping of the catalysts, since catalysts for hydrotreating hydrocarbons are normally used in shaped form and not as a powdered material.

IV. An appeal was lodged against this decision.

V. The Appellant withdrew both sets of claims on which the decision was based and replaced them with a single set of claims for all designated contracting states. The new set of claims was identical to the set previously on

file for the contracting state BE (filed on 7 January 1992), except that the words "a shaped body of a mixture" in line 2 of Claim 1 had been replaced by

"a body obtained by shaping a mixture"

(cf. page 1, fourth and fifth paragraphs of the Statement of Grounds of Appeal: it is noted that the difference between this requested amendment and the text annexed to the Statement of Grounds, namely the term "obtained" instead of the term "formed" as used in the annex, is of no relevance to the present decision).

He argued that the purpose of the amendment in Claim 1 was to make it clear that a mixture of all the components specified in Claim 1 was first prepared and that this mixture was subsequently shaped.

He further contended that according to document (1) the carrier was indeed shaped but that the shaping was carried out before the carrier was impregnated with the catalytic components. He also proposed some amendments to the description of the present patent application to meet the requirements of Article 84 EPC.

- VI. Furthermore, the Appellant filed a test report showing that the catalysts claimed in the present patent application had advantageous properties compared with those of document (1).
- VII. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of one single set of claims for all the contracting states, i.e. Claims 1 to 21, filed on 7 January 1992 for the contracting state BE, Claim 1 being amended as requested in the Statement of Grounds of Appeal (cf. Section V above).

### Reasons for the Decision

1. The appeal is admissible.
2. The subject-matter of present Claim 1 is based on Claim 1 in combination with page 22, lines 19 to 21, and page 24, lines 1 to 4, of the patent application as originally filed.

Independent Claim 10 is supported by Claim 32 of the patent application as originally filed.

The present dependent Claims 2 to 9 and 11 to 21 are based on Claims 24 to 31 and 39 to 49 respectively of the patent application as originally filed.

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

3. The issue to be dealt with is whether the subject-matters of the present claims are novel in the light of the disclosure of document (1).
- 3.1 The catalyst as claimed in present 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 comprises a body obtained by shaping a mixture composed of the components as specified. In the Board's judgment, this means that the scope of Claim 1 is **restricted to those catalyst structures** which can be obtained by **shaping a mixture of all the constituents** of the catalyst.
- 3.2 Document (1) concerns catalysts for the hydrotreatment of a hydrocarbon having supported on a carrier of an inorganic oxide, such as a gamma-alumina carrier, at

least one water-soluble compound of molybdenum, tungsten or a metal of Group VIII of the Periodic Table (such as molybdenum trioxide, nickel carbonate and cobalt carbonate), phosphorus and at least one mercapto group-containing organic compound (such as mercaptoacetic acid) (cf. Claim 1; page 4, lines 17 to 52; and Example 2). Thus, the catalysts described in this document comprise the same constituents as the catalysts as claimed in present Claim 1 (cf. also, for instance, Examples 5 to 9 of the patent application in suit).

This document also describes that the catalysts are prepared by simultaneously or separately impregnating a carrier of an inorganic oxide with one or more solutions of the other constituents of the catalyst (cf. page 3, line 44 to page 4, line 9; page 4, lines 33 to 36; and page 4, line 53 to page 5, line 6). The catalysts obtained are generally dried and may be used immediately for the hydrotreatment of a hydrocarbon oil (cf. page 5, lines 17 to 22).

- 3.3 The Examining Division held that the catalyst of the present patent application lacked novelty in the light of the disclosure of document (1), because the skilled reader would regard the forming of the catalyst after the impregnation of the carrier as implicit, since catalysts for hydrotreating hydrocarbons are normally used in shaped form and not as a powdered material.

The Appellant accepted that document (1) related to a formed catalyst, but he contended that the shaping of the carrier was carried out before its impregnation with the other components.

3.4 It is the Board's position that according to document (1), the porous inorganic carrier is impregnated - as contended by the Appellant - in a pre-shaped form, so that a final shaping step is not required. This is because (a) the entire specification of document (1) uses the terms "a **carrier** of an inorganic oxide" or "an inorganic oxide **carrier**" (instead of "an inorganic oxide" or "carrier substance"), (b) Claim 2 states that the inorganic oxide **of which said carrier is made** is at least one of the indicated members and because (c) the document says nothing about a shaping step after the impregnation of the carrier, which final shaping step is indeed superfluous in a preparation method where a pre-shaped carrier is impregnated.

3.5 It follows from the preceding consideration that the process feature as claimed in present Claim 1, namely the shaping of a mixture composed of a carrier substance and the other constituents specified, cannot be derived directly and unambiguously from the cited document.

3.6 It is true that a different method of preparing a catalyst does not necessarily result in a different catalyst. In the present case however, it is unlikely, in the Board's judgment, that a catalyst obtained by impregnating a pre-shaped carrier with the other components would have the same structure as a catalyst prepared by shaping a pre-mixture of a carrier substance with the other components, because of the different ways of distributing the catalytic components on the carrier. Moreover, referring to his test report, the Appellant submitted that, owing to its fine pore structure, a catalyst prepared using the mixing method as indicated in present Claim 1 remained active longer than a catalyst prepared by impregnating a pre-shaped carrier according to document (1) (cf. page 1, first paragraph;

and, in particular, page 3, points 3-3 and 4). Accordingly, the Board finds it credible that the claimed catalyst has a structure different from that of the known catalyst as it possesses different properties due to its particular method of preparation.

3.7 In conclusion, the Board finds that the subject-matter of the Claim 1 is novel. Furthermore, the subject-matters of independent Claim 10 and the dependent claims are also novel for the reasons stated above.

4. It follows from the above considerations that the reasons for the refusal of the present patent application by the Examining Division based on Article 54(3) EPC have been removed. The description, however, still has to be adapted to the new claims in order to meet the requirements of Article 84 EPC. Moreover, the Examining Division has not yet examined whether the subject-matters of the present claims meet the requirement of inventive step. 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:

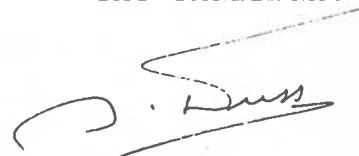
1. The decision under appeal is set aside.
  
2. The case is remitted to the Examining Division for further prosecution on the basis of Claims 1 to 21, filed on 7 January 1992 for the contracting state BE, Claim 1 being amended as requested in the Statement of Grounds of Appeal.

The Registrar:



E. Görgmaier

The Chairman:



A. Nuss

