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D E C I S I O N
of 19 June 2000

Case Number: T 1200/97 - 3.3.3

Application Number: 94110581.9

Publication Number: 0634429

IPC: C08F 297/06

Language of the proceedings: EN

Title of invention:
Process for preparing block copolymer of monoolefin

Applicant:
MITSUI CHEMICALS, INC.

Opponent:
-

Headword:
-

Relevant legal provisions:
EPC Art. 54, 113(1)

Keyword:
"Novelty - whole contents approach - implicit disclosure (no)"
"Basis of decisions - opportunity to comment (yes)"

Decisions cited:
T 0007/89

Catchword:
-



Case Number: T 1200/97 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 19 June 2000

Appellant:

MITSUI CHEMICALS, INC.
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Representative:

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Decision under appeal:

Decision of the Examining Division of the
European Patent Office posted 11 August 1997
refusing European patent application
No. 94 110 581.9 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: C. Gérardin
Members: B. ter Laan
A. Lindqvist

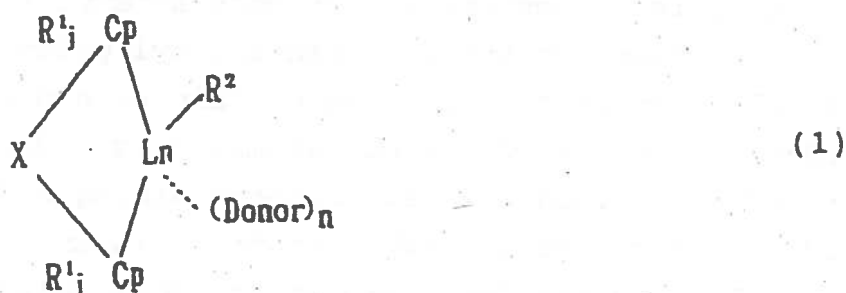
Summary of Facts and Submissions

I. The European patent application No. 94 110 581.9 was filed on 7 July 1994, claiming priority of 16 July 1993 of two earlier applications in Japan (JP 176422/93 and 176423/93), and published on 18 January 1995 (Bulletin 95/03) under the number 634 429 on the basis of 11 claims, Claim 1 reading as follows:

"1. A process for preparing a block copolymer of an α -olefin which comprises the steps of polymerizing the α -olefin having 3 or more carbon atoms by the use of a divalent or a trivalent rare earth metal complex, and then polymerizing a vinyl compound, a vinylidene compound or a lactone."

Claims 6 and 8 were dependent process claims worded respectively as follows:

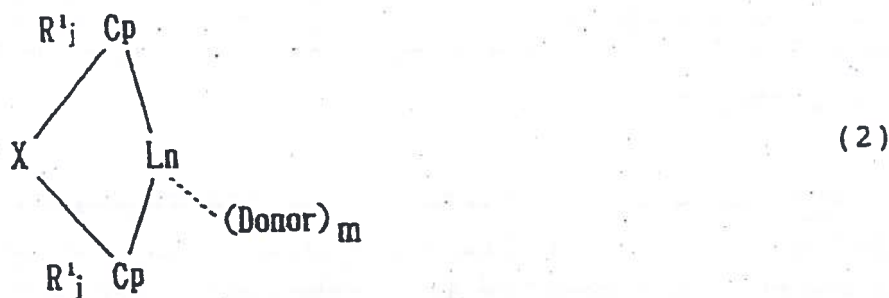
"6. The process for preparing a block copolymer of an α -olefin according to Claim 1 wherein the trivalent rare earth metal complex is a compound represented by the following formula (1)



wherein Cp is a cyclopentadienyl residue; R^1 is a substituent on the cyclopentadienyl group and it is an alkyl group or a silicon-containing hydrocarbon residue having 1 to 20 carbon atoms; X is a divalent hydrocarbon residue or a silicon-containing hydrocarbon

residue having 1 to 20 carbon atoms; j is an integer of 1 to 5; Ln is a trivalent rare earth metal selected from the group consisting of Y, Sc, La, Ce, Pr, Nd, Pm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Sm, Yb and Lu; R² is an alkyl group or a silicon-containing hydrocarbon residue having 1 to 12 carbon atoms; a Donor is a compound selected from the group consisting of a ketone, an ester, an ether and an amine having 1 to 12 carbon atoms; and n is 0 or 1."

"8. The process for preparing a block copolymer of an α -olefin according to Claim 1 wherein the divalent rare earth metal complex is a divalent compound represented by the following formula (2)



wherein Cp is a substituted cyclopentadienyl residue; R¹ is a substituent on the cyclopentadienyl group and it is an alkyl group or a silicon-containing hydrocarbon residue having 1 to 20 carbon atoms; X is a divalent hydrocarbon residue or a silicon-containing hydrocarbon residue having 1 to 20 carbon atoms; j is an integer of 1 to 5; Ln is a divalent rare earth metal selected from the group consisting of Sm, Yb and Eu; a Donor is a compound selected from the group consisting of a ketone, an ester, an ether and an amine having 1 to 12 carbon atoms; and m is an integer of from 0 to 2."

Claim 5 was a further independent process claim directed to the preparation of a block copolymer of ethylene by using a divalent rare earth metal complex.

The other claims were dependent claims concerning preferred embodiments of the process according to Claim 1 (Claims 2 to 4 and 6 to 9) or Claim 1 (Claims 10 and 11).

II. In reply to the first communication issued on 6 February 1996, in which an objection of lack of novelty of the process as defined in Claims 1 to 7 had been raised with respect to the teaching of

D1: EP-A-0 442 476,

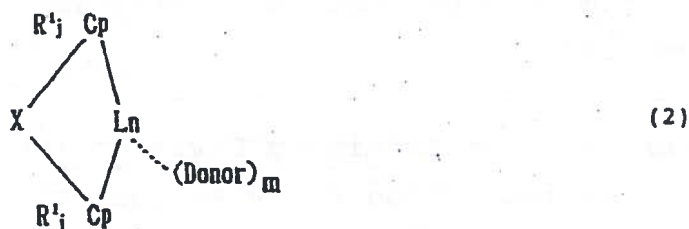
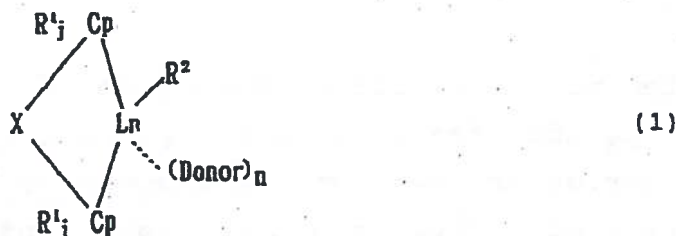
the Applicant filed an amended set of 11 claims on 20 July 1996, the rare metal earth complexes being restricted to those having a structure combining two substituted cyclopentadienyl groups.

In its statement the Applicant also pointed at the absence of specific features in the process disclosed in D1; in particular there was no example of polymerization of propylene and no example of a catalyst having a structure combining two cyclopentadienyl groups. The latter feature in the substituted form was, by contrast, essential for the present invention.

III. On 2 December 1996 the Examining Division issued a second communication taking the view that these amended claims contravened Article 123(2) as well as Article 84 EPC and indicating that the consideration of novelty and inventive step of the claimed subject-matter was postponed until these objections would be met.

IV. Together with its reply of 24 June 1997 filed on 10 July 1997 the Applicant submitted a revised set of 9 claims. Claim 1, which was said to incorporate the definition of compounds (1) and (2) from original Claims 6 and 8, reads as follows:

"1. A process for preparing a block copolymer of an α -olefin which comprises the steps of polymerizing the α -olefin having 3 or more carbon atoms using a divalent or a trivalent rare earth metal compound having a structure combining two substituted cyclopentadienyl groups, and then copolymerizing a vinyl compound, a vinylidene compound or a lactone to said α -olefin polymer, wherein the trivalent rare earth metal compound is a compound represented by the following formula (1) and wherein the divalent rare earth metal compound is a divalent compound represented by the following formula (2)



wherein Cp is a substituted cyclopentadienyl residue; R^1 is a substituent on the cyclopentadienyl group and it is an alkyl group or a silicon-containing hydrocarbon

residue having 1 to 20 carbon atoms; X is a divalent hydrocarbon residue or a silicon-containing hydrocarbon residue having 1 to 20 carbon atoms; j is an integer of 1 to 5; Ln is in the case of formula (1) a trivalent rare earth metal selected from the group consisting of Y, Sc, La, Ce, Pr, Nd, Pm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Sm, Yb and Lu and in the case of formula (2) a divalent rare earth metal selected from the group consisting of Sm, Yb and Eu; R² is an alkyl group or a silicon-containing hydrocarbon residue having 1 to 12 carbon atoms; a Donor is a compound selected from the group consisting of a ketone, an ester, an ether and an amine having 1 to 12 carbon atoms; n is 0 or 1; and m is an integer of from 0 to 2."

V. On 11 August 1997 the Examining Division refused the application on the ground of lack of novelty. Observing that Claim 1 as amended comprised the subject-matter of Claim 6 as filed (cf. Reasons for the Decision, point 2.1) the Examining Division merely repeated (cf. Reasons for the Decision, point 3.1) its previous objection of lack of novelty based on the general teaching of D1.

VI. On 25 September 1997 a Notice of Appeal was lodged by the Applicant (Appellant) against the decision with simultaneous payment of the prescribed fee. In the Statement of Grounds of Appeal filed on 28 November 1997 the Appellant argued essentially as follows:

(i) The generic definition of the trivalent initiator compounds described in D1 was very broad and unspecific; at most a portion of the initiators required in the process as claimed was encompassed by that definition. The divalent initiator compounds needed not be considered, since they were not envisaged in D1.

- (ii) The initiators used in the application in suit must contain two substituted cyclopentadienyl moieties which had to be connected via a bridging unit. None of the initiators exemplified in D1 met these two requirements. This situation corresponded to the situation underlying the decision T 7/86; in that case a substance was regarded as novel if it could only be construed from a prior art document by a selection of information from two lists of substitutes.
- (iii) The compounds specifically mentioned in D1 which were structurally closest to the initiators now required were effective to polymerize ethylene, but could not be used to polymerize propylene.
- (iv) Finally the Board of Appeal was asked to "consider" the question of the refund of the appeal fee according to Rule 67 EPC, since (1) the communication of 2 December 1996 gave the impression that the substantive issues would be handled at a later stage of prosecution and (2) the amended set of claims filed thereafter was followed immediately by the refusal of the application.

In annex to the Statement of Grounds of Appeal the Appellant also filed two alternative sets of claims labelled "second auxiliary request" and "third auxiliary request".

VII. The Appellant's requests are formulated as follows:

It is requested as main request "that the decision of the Examining Division to reject the above-identified patent application be dismissed and a patent be granted based on the set of claims filed with letter of June 24, 97."

"Should the Board of Appeal not be in a position to grant the main request in the written procedure the Applicant asks as a first auxiliary request for an oral hearing."

Alternatively, the Applicant asks that the decision of the Examining Division be dismissed and a patent be granted based on any of the sets of claims labelled "second auxiliary request" and "third auxiliary request" filed on 28 November 1997.

Reasons for the Decision

1. The appeal is admissible.
2. The Appellant's requests (cf. point VII above) need clarification in two respects.
 - 2.1 First, the Appellant's main request that a patent be granted on the basis of the claims filed with the reply of 24 June 1997 is not consistent with the history of the case.

As it appears from point V above, the sole ground of refusal was lack of novelty with respect to the disclosure of D1. Although the first communication (cf. points 3, 4.1 and 4.2) also contained a brief discussion of the other two documents of the search report, the issue of inventive step has not been dealt with at all, neither in relation to the process as defined in original Claim 1, nor in relation to the process according to the claims filed on 10 July 1997 with the letter of 24 June 1997. This means that the substantive examination has not been completed and

that, even if the Board is in the position to set aside the decision under appeal for the reasons which will be given hereinafter, a patent cannot be granted at this stage.

In order not to deprive the Appellant from the possibility to have the question of inventive step examined by two levels of jurisdiction, the Board regards it thus as appropriate to decide only the issue of novelty and to refer the case to the first instance for further prosecution.

Accordingly the Appellant's main request is interpreted as the request that the decision under appeal be set aside and the case be referred to the Examining Division for further prosecution on the basis of Claims 1 to 9 filed on 10 July 1997 with the letter of 24 June 1997.

- 2.2 Secondly, there is no explicit request for a reimbursement of the appeal fees pursuant to Rule 67 EPC, nor any allegation of a procedural violation within the terms of Article 113(1) EPC, but only a description of the circumstances which led to the decision of refusal of the application and an invitation to "consider" the question of the refund of the appeal fee.

However, in view of the facts reported in points I to V above, the Board finds it appropriate to deal with that issue and, accordingly, has decided to interpret the Appellant's conclusion as a proper request that the appeal fees be reimbursed.

3. In its broadest definition the process described in D1 is a process for efficiently preparing a syndiotactic polymer of an unsaturated carboxylic acid ester having a narrow molecular weight distribution and a high

molecular weight as well as a block copolymer of an α -olefin with such an unsaturated carboxylic acid ester (page 2, lines 1 to 4 and 36 to 40).

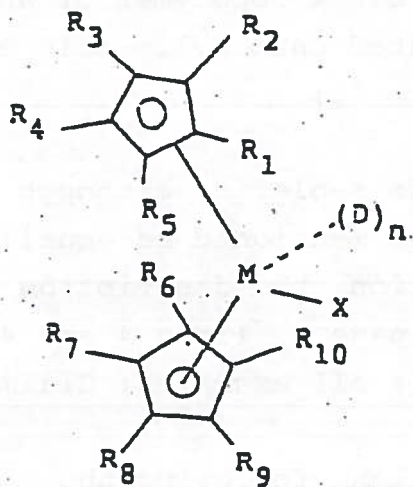
3.1 Regarding the definition of the α -olefin, although ethylene and propylene are both mentioned as equally suitable for the copolymerisation, the description generally refers to ethylene (page 2, lines 4 and 40; page 3, line 5; page 5, line 1; all examples; Claim 7).

3.2 In the case of a copolymerisation, following the α -olefin polymerisation performed in the presence of a rare earth metal complex selected from

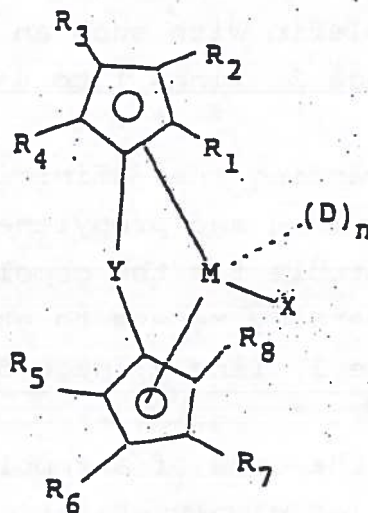
- (a) trivalent organic scandium compounds,
- (b) trivalent organic yttrium compounds,
- (c) trivalent organic lanthanide compounds and
- (d) compounds obtained therefrom with an organic aluminum compound,

the unsaturated ester is added to the system to carry out the copolymerisation and thereby obtain a block copolymer (page 2, lines 47 to 51; page 2, line 55 to page 3, line 7; page 4, lines 41 to 43; Examples 10 to 16).

3.3 The trivalent organic initiators, which comprise both bridged and unbridged structures, are represented by formulae (1) and (2)



(1)



(2)

wherein R_1 to R_{10} are a hydrogen atom, a hydrocarbon group having 1 to 5 carbon atoms or a hydrocarbon group containing silicon, and R_1 to R_{10} may be also bonded through a hydrocarbon group to an adjacent R group;

M is Sc, Y, La, Ce, Pr, Nd, Pm, Sm, Eu, Ga, Tb, Dy, Ho, Er, Tm, Yb, Lu;

X is a hydrogen atom, a hydrocarbon group having 1 to 10 carbon atoms or a hydrocarbon group containing silicon;

Y is an alkylene group having 1 to 3 carbon groups or an alkylsilyl group;

D is a solvent molecule; and

n is 0 to 3 (page 3, lines 8 to 36).

3.4 The 29 initiators which are exemplified (page 3, lines 38 to page 4, line 6) can be classified according to the degree of substitution of the cyclopentadienyl moieties or according to their structure. If one

considers the substitution, the initiators are either biscyclopentadienyl metal derivatives, including bisindenyl metal derivatives, hence compounds with unsubstituted cyclopentadienyl moieties (13 compounds), or bispentamethylcyclopentadienyl metal derivatives, hence compounds with fully substituted cyclopentadienyl moieties (16 compounds). If one considers the structure, i.e. the presence of a bridging unit in accordance with formula (2), it appears that only the last two compounds contain such a group and that both are unsubstituted.

4. Since, on the one hand, Claim 1 of the application in suit encompasses the use of divalent rare earth metal compounds according to formula (2) as well as trivalent rare earth metal compounds according to formula (1), and, on the other hand, the initiators envisaged in D1 are limited to trivalent compounds, only this alternative needs to be considered.

4.1 The above discussion of D1 (cf. points 3 to 3.4) shows that D1 is a broad disclosure encompassing bridged and unbridged structures as well as substituted and unsubstituted cyclopentadienyl moieties. Although there is a large overlap in the definition of the individual radicals and indices in the formulae of the initiators according to D1 and the application in suit, the class of compounds actually envisaged in the latter, which is based on the combination of a bridged structure with substituted cyclopentadienyl moieties, represents only a fraction of the initiators disclosed in the former.

Thus the issue of novelty reduces to the question whether, as alleged by the Appellant, this fraction should be regarded as a proper selection to which the usual criteria for selection inventions should be applied, or whether D1 interpreted on the basis of the

whole contents approach adopted by the Examining Division represents an implicit disclosure of the claimed subject-matter.

- 4.2 The latter being defined as a process for the preparation of a block copolymer of an α -olefin having three or more carbon atoms by using a trivalent rare earth metal complex, in which the cyclopentadienyl moieties are substituted and linked by a bridging unit, the first question to consider is whether the entire teaching of D1 disclosed in relation to ethylene can be extended to propylene.

As pointed out by the Appellant (cf. Statement of Grounds of Appeal, point 3), it is not justified to regard propylene as equivalent to ethylene in the known process. This is demonstrated by the two initiators disclosed in D4, which are structurally closest to the rare earth metal complexes of formula (1) in the application in suit in that they represent the sole example of compounds possessing a bridging unit, and which are effective for the polymerisation of ethylene, but not of propylene.

The second point to consider is the definition of the initiators. Following general formulae encompassing a large number of trivalent compounds (cf. page 3, formulae (1) and (2)), D1 exemplifies 29 initiators (cf. page 3, line 38 to page 4, line 6) which differ not only by the degree of substitution of the cyclopentadienyl moieties and a bridged or unbridged structure, but also by the rare earth metal, the radical bonded to the metal (X in D1, R² in the application in suit) and the solvent molecule (D in D1, Donor in the application in suit). Whilst it may be legitimate to extend the scope of a prior art teaching to an embodiment described as a mere alternative (cf. Statement of Grounds of Appeal, point 2), the

broad interpretation of a selection of several unrelated compositional and structural features results in the definition of a class of initiators not envisaged in D1, which represents an alteration of the teaching of this citation.

For these reasons the teaching of D1 cannot amount to a clear and unambiguous disclosure of the copolymerisation of propylene in the presence of trivalent initiators which are both substituted and bridged.

- 4.3 If, on the contrary, one regards the teaching of D1 as the generic disclosure of a copolymerisation process of an α -olefin in the presence of a trivalent rare earth metal complex having substituted or unsubstituted cyclopentadienyl moieties as well as a bridged or unbridged structure, the claimed subject-matter is based on the choice of higher α -olefins and on the definition of a sub-class of initiators characterized by substituted cyclopentadienyl moieties and a bridging unit. This means that the process as defined in Claim 1 of the application in suit requires a number of choices from several lists of possibilities and that, consequently, the novelty criteria for selection inventions apply.

According to established case law of the boards of appeal, a class of chemical compounds defined only by a general structural formula having at least two variable groups does not specifically each of the individual compounds (cf. T 7/86 (OJ EPO 1988, 381). By analogy, the known process defined by a general definition of the monomer and by general formulae of the initiators having at least two variable parameters (degree of

substitution and structure) does not specifically disclose the process as claimed, which requires the combination of propylene with a specific sub-class of initiators.

4.4 It follows that the teaching of D1 does not represent an implicit disclosure of the process as defined in Claim 1 and that, consequently, the requirement of novelty is met.

5. The appeal being allowable it remains to consider the request for reimbursement of the appeal fees pursuant to Rule 67 EPC.

5.1 The following points of the above Summary of Facts and Submissions are of importance:

(a) the first communication comprised an objection of lack of novelty of the process as defined in Claims 1 to 7 (cf. points I and II), hence including the process according to Claims 1 and 6, the latter specifying the initiators as being compounds of formula (1);

(b) the claims submitted in reply were regarded by the Examining Division as contravening Articles 123(2) and 84 EPC, so that the substantive examination had to be postponed (cf. point III);

(c) Claim 1 of the amended set of claims filed thereafter was a combination of original Claims 1, 6 and 8 (cf. point IV), hence including original Claims 1 and 6.

It is evident that the final version of Claim 1 called for the same objection of lack of novelty as Claims 1 and 6 as originally filed and that the Examining Division's declared intention to postpone the substantive examination until a set of claims complying with the requirements of Article 123(2) and 84 EPC would be filed had become without object. At that stage, consequently, the refusal of the application on the grounds already communicated to the Applicant/Appellant in the first communication was possible under Article 113(1) EPC.

- 5.2 The fact that the Examination Division did not rectify its decision, because it did not consider the appeal be admissible and well founded (Article 109(2) EPC), cannot be regarded as a procedural violation either.

Although the Statement of Grounds of Appeal contained arguments showing that D1 was a broad disclosure to which the novelty criteria for selection inventions should be applied, the Examining Division obviously was not convinced and maintained both its view that the citation should be interpreted in the light of the whole contents approach and, consequently, its finding of lack of novelty. This clearly is a matter of interpretation of the technical content of the citation which cannot amount to a procedural violation justifying the reimbursement of the appeal fees.

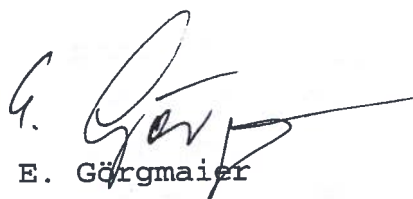
- 5.3 For these reasons the request for reimbursement of appeal fees is rejected.

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 9 filed on 10 July 1997 with the letter of 24 June 1997.
3. The request for reimbursement of the appeal fees is rejected.

The Registrar:


E. Görgmaier

The Chairman:


C. Gérardin