BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS | BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE | CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen
(D) [ ] No distribution

D E C I S I O N
of 3 April 2003

Case Number: T 0924/00 - 3.3.3

Application Number: 90125706.3

Publication Number: 0435332

IPC: C08F 210/00

Language of the proceedings: EN

Title of invention:
Solid catalyst components for olefin polymerization and processes for the polymerization of olefin using same

Patentee:
MITSUI CHEMICALS, INC.

Opponent:
BOREALIS A/S

Headword:
-

Relevant legal provisions:
EPC Art. 84, 100(c), 123(2), 123(3)

Keyword:
"Main request - added subject-matter (yes)"
"Auxiliary request - added subject-matter (no)"

Decisions cited:
G 0001/93, T 0002/80, T 0614/90, T 0615/95

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0924/00 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 3 April 2003

Appellant: (Proprietor of the patent)
MITSUI CHEMICALS, INC.
2-5, Kasumigaseki 3-chome
Chiyoda-ku
Tokyo (JP)

Representative:
Hansen, Bernd, Dr. Dipl.-Chem.
Hoffmann Eitle
Patent- und Rechtsanwälte
Postfach 81 04 20
D-81904 München (DE)

Respondent: (Opponent)
BOREALIS A/S
Lyngby Hovedgade 96
DK-2800 Lyngby (DK)

Representative:
Cockbain, Julian, Dr.
Frank B. Dehn & Co.
European Patent Attorneys
179 Queen Victoria Street
London EC4V 4EL (GB)

Decision under appeal: Decision of the Opposition Division of the European Patent Office posted 19 July 2000 revoking European patent No. 0 435 332 pursuant to Article 102(1) EPC.

Composition of the Board:

Chairman: R. Young
Members: C. Idez
U. Tronser

Summary of Facts and Submissions

I. The grant of European patent No. 0 435 332 in respect of European patent application No. 90 125 706.3 filed on 28 December 1990 and claiming priority from an earlier patent application in Japan (JP 340909/89 of 29 December 1989), was announced on 16 April 1997 (Bulletin 1997/16) on the basis of a set of 4 claims for the Contracting States AT, BE, CH, DE, DK, FR, GB, GR, IT, LI, LU, NL and SE and on the basis of a set of 6 claims for the Contracting State ES.

Independent Claims 1, 2 and 4 of the set of claims for the Contracting States AT, BE, CH, DE, DK, FR, GB, GR, IT, LI, LU, NL and SE (hereinafter "Contracting States except ES") as granted read as follows:

"1. An olefin polymerization catalyst comprising:

[I] a solid catalyst component for olefin polymerization formed by random prepolymerization of olefin on an olefin polymerization catalyst comprising:

a solid titanium catalyst component [A] comprising magnesium, titanium and halogen, and an ester of an organic carboxylic acid or an ether as an electron donor, as its essential ingredients,
an organometallic compound catalyst component [B] of a metal belonging to Group I to III of the periodic table, and optionally
an electron donor [C] which is either an organosilicon compound or a diether,
and being in suspension in either a liquid alpha-olefin or a liquid hydrocarbon solvent [D],

wherein at least two types of alpha-olefin, including said liquid alpha-olefin if this forms at least part of the liquid phase of the suspension, are prepolymerized on said olefin polymerization catalyst, one type being propylene, the other type being an other alpha-olefin having 2 to 10 carbon atoms (with the proviso that if the other type of alpha-olefin is ethylene, then the prepolymerization is conducted in such a way that the prepolymer is composed of 70 to 98 mole % of propylene units and 30 to 2 mole % of ethylene units), the amount of the prepolymer being from 0.2 to 4,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid alpha-olefin, and being from 0.2 to 2,000 g (based on lg of said titanium catalyst component [A]) if the suspension is in a liquid hydrocarbon solvent [D];

[II] an organometallic compound catalyst component of a metal belonging to Group I to III of the periodic table; and optionally

[III] an electron donor which is either a diether or a compound having a Si-O-C bond;

with the proviso that at least one of the electron donor [C] and the electron donor [III] is included in the olefin polymerization catalyst.

2. A process for the polymerization of an olefin, wherein polymerization or copolymerization of an α-olefin having 2 to 10 carbon atoms is carried out at a temperature of from 0 to 130°C in a gas phase, or in a state in which a suspension with a

solvent composed of monomer and a gas phase coexist, in the presence of an olefin polymerization catalyst according to claim 1.

4. A solid catalyst component for olefin polymerization formed by random prepolymerization of olefin on an olefin polymerization catalyst comprising:

a solid titanium catalyst component [A] comprising magnesium, titanium and halogen, and an ester of an organic carboxylic acid or an ether as an electron donor, as its essential ingredients,
an organometallic compound catalyst component [B] of a metal belonging to Group I to III of the periodic table, andan electron donor [C] which is either an organosilicon compound or a diether,

and being in suspension in either a liquid alpha-olefin or a liquid hydrocarbon solvent [D], wherein at least two types of alpha-olefin, including said liquid alpha-olefin if this forms at least part of the liquid phase of the suspension, are prepolymerized on said olefin polymerization catalyst, one type being propylene, the other type being an other alpha-olefin having 2 to 10 carbon atoms (with the proviso that if the other type of alpha-olefin is ethylene, then the prepolymerization is conducted in such a way that the prepolymer is composed of 70 to 98 mole % of propylene units and 30 to 2 mole % of ethylene units), the amount of the prepolymer being from 0.2 to 4,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid alpha-olefin, and being from 0.2 to 2,000 g

(based on 1g of said titanium catalyst component [A]) if the suspension is in a liquid hydrocarbon solvent [D]."

Claim 3 was dependent on Claim 2.

Independent Claims 1 and 4 for the Contracting State ES were the same as Claims 1 and 4 for the Contracting States except ES respectively.

Independent Claims 2, 5 and 6 read as follows:

"2. A process for the polymerization of an olefin, wherein polymerization or copolymerization of an α-olefin having 2 to 10 carbon atoms is carried out at a temperature of from 0 to 130°C in a gas phase, or in a state in which a suspension with a solvent composed of monomer and a gas phase coexist, in the presence of an olefin polymerization catalyst

[I] a solid catalyst component for olefin polymerization formed by random prepolymerization of olefin on an olefin polymerization catalyst comprising:

a solid titanium catalyst component [A] comprising magnesium, titanium and halogen, and an ester of an organic carboxylic acid or an ether as an electron donor, as its essential ingredients,
an organometallic compound catalyst component [B] of a metal belonging to Group I to III of the periodic table, and optionally
an electron donor [C] which is either an organosilicon compound or a diether,

and being in suspension in either a liquid alpha-olefin or a liquid hydrocarbon solvent [D],

wherein at least two types of alpha-olefin, including said liquid alpha-olefin if this forms at least part of the liquid phase of the suspension, are prepolymerized on said olefin polymerization catalyst, one type being propylene, the other type being an other alpha-olefin having 2 to 10 carbon atoms (with the proviso that if the other type of alpha-olefin is ethylene, then the prepolymerization is conducted in such a way that the prepolymer is composed of 70 to 98 mole % of propylene units and 30 to 2 mole % of ethylene units), the amount of the prepolymer being from 0.2 to 4,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid alpha-olefin, and being from 0.2 to 2,000 g (based on 1g of said titanium catalyst component [A]) if the suspension is in a liquid hydrocarbon solvent [D];

[II] an organometallic compound catalyst component of a metal belonging to Group I to III of the periodic table; and optionally

[III] an electron donor which is either a diether or a compound having a Si-O-C bond;

with the proviso that at least one of the electron donor [C] and the electron donor [III] is included in the olefin polymerization catalyst.

5. A process for preparing a solid catalyst component for olefin polymerization by random prepolymerization of olefin on an olefin polymerization catalyst comprising:

a solid titanium catalyst component [A] comprising magnesium, titanium and halogen, and an ester of an organic carboxylic acid or an ether as an electron donor, as its essential ingredients,

an organometallic compound catalyst component [B] of a metal belonging to Group I to III of the periodic table, and

an electron donor [C] which is either an organosilicon compound or a diether,

and being in suspension in either a liquid alpha-olefin or a liquid hydrocarbon solvent [D], wherein at least two types of alpha-olefin, including said liquid alpha-olefin if this forms at least part of the liquid phase of the suspension, are prepolymerized on said olefin polymerization catalyst, one type being propylene, the other type being an other alpha-olefin having 2 to 10 carbon atoms (with the proviso that if the other type of alpha-olefin is ethylene, then the prepolymerization is conducted in such a way that the prepolymer is composed of 70 to 98 mole % of propylene units and 30 to 2 mole % of ethylene units), the amount of the prepolymer being from 0.2 to 4,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid alpha-olefin, and being from 0.2 to 2,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid hydrocarbon solvent [D].

6. A process for preparing an olefin polymerization catalyst comprising combining:

[I] a solid catalyst component for olefin polymerization formed by random prepolymerization of olefin on an olefin polymerization catalyst comprising:

a solid titanium catalyst component [A] comprising magnesium, titanium and halogen, and an ester of an organic carboxylic acid or an ether as an electron donor, as its essential ingredients,
an organometallic compound catalyst component [B] of a metal belonging to Group I to III of the periodic table, and optionally
an electron donor [C] which is either an organosilicon compound or a diether,

and being in suspension in either a liquid alpha-olefin or a liquid hydrocarbon solvent [D],
wherein at least two types of alpha-olefin, including said liquid alpha-olefin if this forms at least part of the liquid phase of the suspension, are prepolymerized on said olefin polymerization catalyst, one type being propylene, the other type being an other alpha-olefin having 2 to 10 carbon atoms (with the proviso that if the other type of alpha-olefin is ethylene, then the prepolymerization is conducted in such a way that the prepolymer is composed of 70 to 98 mole % of propylene units and 30 to 2 mole % of ethylene units), the amount of the prepolymer being from 0.2 to 4,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid alpha-olefin, and being from 0.2 to 2,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid hydrocarbon solvent [D];

[II] an organometallic compound catalyst component of a metal belonging to Group I to III of the periodic table; and optionally

[III] an electron donor which is either a diether or a compound having a Si-O-C bond;

with the proviso that at least one of the electron donor [C] and the electron donor [III] is included in the olefin polymerization catalyst."

Claim 3 was dependent on Claim 2.

II. On 16 January 1998 a Notice of Opposition was filed against the granted patent, in which revocation of the patent in its entirety was requested on the grounds of lack of inventive step (Article 100(a) EPC) and of extension of subject-matter (Article 100(c) EPC).

III. By decision announced on 6 July 2000 and issued in writing on 19 July 2000, the Opposition Division revoked the patent. The decision of the Opposition Division was based on the following requests of the Proprietor:

(i) a main request consisting of the set of Claims 1 to 4 as granted for the Contracting States except ES and the set of Claims 1 to 6 as granted for ES and

(ii) an auxiliary request consisting on a set of Claims 1 to 4 as submitted at the oral proceedings of 6 July 2000 for the Contracting States except ES and a set of claims 1 to 6 for the Contracting State ES as amended at the oral proceedings of 6 July 2000.

The auxiliary request differed from the main request in that it had been indicated that the electron donor [C] had been restricted to either a organosilicon compound having of formula [1] or [2] (sic) or a diether having up to 20 carbon atoms and that the electron donor [III] had been limited to either a diether having up to 20 carbon atoms or a compound having a Si-O-C bond.

The Opposition Division revoked the patent on the grounds that Claim 1 of the set of claims for the Contracting States except ES of both pending requests violated the requirements of Article 123(2) EPC.

In its decision the Opposition Division referred to the list, submitted by the Opponent at the oral Proceedings, of seven features in Claim 1 of the granted set of Claims for the Contracting States except ES for which, in the Opponent's view, no support could be found in the application as originally filed. These seven features were as follows:

- the term "organosilicon compound" in the definition of electron donor [C] (referred to as point 1);

- the term "diether" used in the definition of electron donor [C] (referred to as point 2);

- the combination of "an organosilicon compound or a diether" in the definition of electron donor [C] (referred to as point 3);

- the expression "one type being propylene, the other type being an other alpha-olefin having 2 to 10 carbon atoms" in the definition of the olefins used for the prepolymerization (referred to as point 4);

- the expression "a diether or a compound having a Si-O-C bond" in the definition of electron donor [III] (referred to as point 5);
- the combination that when "electron donor [C] is either an organosilicon compound or a diether", then electron donor [III] is a diether or a compound having an Si-O-C bond" (referred to as point 6); and
- the proviso "that at least one of the electron donor [C] and the electron donor [III] is included in the olefin polymerization catalyst" (referred to aspoint 7).

While the Opposition Division stated that the objections according to points 1 to 4 of that list were not founded, since the use of either an organosilicon compound or a diether as electron donor [C] found its support in lines 24 to 25 on page 34 of the original description and since the use of propylene together with an other alpha-olefin having 2 to 10 carbon atoms was supported by the examples read in combination with lines 12 to 16 of page 41 of the original description, it accepted as well founded the objections mentioned under points 5 to 7 in that list.

More precisely, the decision stated concerning points 5 and 6 of that list that, although it could be accepted that original Claim 11 supported the limitation of electron donor [III] to be either an ether or a compound having a Si-O-C bond, original page 45, lines 3 to 7 together with original page 34, lines 24 to 25 did not support the replacement of "ether" by "diether" in this expression. According to the decision, this would require several choices from the disclosure of the originally filed documents.

By way of consequence, the combination that when electron donor [C] was either an organosilicon compound or a diether then electron donor [III] was a diether or a compound having a Si-O-C bond" was also not supported by the originally filed documents.

The decision held concerning the objection according to point 7 that the combined teachings of original Claim 9 and of the original Examples 4 to 7 would only support a limitation of Claim 1 of both requests to both the electron donor [C] and the electron donor [III] being included in the olefin polymerization catalyst. Therefore, the proviso in Claim 1 "that at least one of the electron donor [C] and the electron donor [III] is included in the olefin polymerization catalyst" was not supported by the originally filed documents.

IV. On 8 September 2000, the Appellant (Proprietor) lodged an appeal against the above decision. The prescribed fee was paid on the same day.

With the Statement of Grounds of Appeal filed on 20 November 2000, the Applicant maintained its main request, and submitted a new auxiliary request. The auxiliary request differed from the main request essentially in that the presence of the electron donor [C] had been made an essential feature of the olefin polymerization catalyst and that the reference to the optional presence of the electron donor [III] in the olefin polymerization catalyst had been deleted. The Appellant argued essentially as follows:

(i) Concerning the main request

(i.1) The possibility that the electron donor [III] might be *inter alia* a diether was supported by the combination of line 23 on page 11 of the published application with lines 55 to 56 on page 13 thereof.

(i.2) Original Claim 11 specified that the electron donor [III] might be an ether. The restriction of the electron donor [III] to diethers did not provide a technical contribution but merely excluded certain types of ethers encompassed by the application as filed. In that respect, reference was made to the decision G 1/93 of the Enlarged Board of Appeal (OJ EPO, 1994, 541).

(i.3) Thus, the characterisation of the electron donor [III] as being a diether did not contravene Article 123(2) EPC.

(i.4) The proviso in Claim 1 as granted that "at least one of the electron donor [C] and the electron donor [III] is included in the olefin polymerization catalyst" covered three possible combinations:

(a) the presence of the electron donor [C] but not electron donor [III];

(b) the presence of the electron donor [III] but not the electron donor [C]; and

(c) the presence of both electron donors [C] and [III].

(i.5) The original Examples 1 to 3 supported possibility (a).

(i.6) Possibility (b) was supported by the term "if necessary an electron donor [C]" mentioned at several times in the published application. In the case where [C] was absent, electron donor [III] must be present otherwise the composition would have no catalytic activity. This was also supported by the experiments submitted with the declaration of Mr Kioka filed with letter dated 23 December 1993.

(i.7) The Opposition Division had taken the view that possibility (c) was supported by the combination of original Claim 9 and Examples 4 to 7.

(ii) Concerning the auxiliary request:

(ii.1) The presence of the electron donor [C] had been made an essential feature of Claim 1. This was supported by Examples 1 to 3 and lines 45 to 49 on page 13 of the published application. The optional presence of electron donor [III] had been deleted from Claim 1 and made the subject of dependent Claim 2.

(ii.2) The nature of the electron donor [III] in Claim 2 was in accordance with original Claim 11.

V. The arguments presented by the Respondent (Opponent) in its letter dated 30 March 2001 may be summarized as follows:

(i) Concerning the main request:

(i.1) There were in fact seven features in Claim 1 for which no support could be found in the application as filed.

(i.2) Lines 22 to 23 on page 11 of the published application must be read in conjunction with line 22 on page 10. They did not provide a support for the term "organosilicon compound" on line 15 of page 20 of the patent in suit.

(i.3) The possibility of the electron donor [C] to be a diether was mentioned only in connection with a limit of 2 to 20 carbon atoms (cf. page 15, line 10). Thus, the term diether used in Claim 1 covered diether compounds falling outside this definition.

(i.4) The combination of "an organosilicon compound or a diether" was not unambiguously disclosed and represented an arbitrary selection.

(i.5) The wording "one type being propylene, the other type being an alpha olefin having 2 to 10 carbon atoms" in granted Claim 1 was not based on the application as filed, which only provided a support for the combinations of propylene with ethylene and of propylene with hexene.

(i.6) The wording "a diether or a compound having a Si-O-C bond used in the definition of electron donor [III] in granted Claim 1 was not based on the application as filed. Firstly, there is no support for this combination and secondly there was no teaching that diethers would be selected as electron donor [III]. Moreover the term "diether" in the absence of limit of carbon atoms was not supported by the application as filed.

(i.7) The reference made by the Appellant to the decision G 1/93 was not appropriate, since the restriction to diethers did not limit the

protection conferred electron because the presence of electron donor [III] was only optional.

(i.8) The combination that when "electron donor [C] is an organosilicon or a diether" then "the electron donor [III] is a diether or a compound having a Si-O-C bond" represented an impermissible selection from two lists.

(i.9) The proviso that "at least one of the electron donor [C] and the electron donor [III] is included in the olefin polymerization catalyst" was not based on the application as filed, which would only support a limitation of Claim 1 to electron donor [C] being included in the olefin polymerization catalyst.

(i.10) In that respect the reference made by the Appellant to the example in the Kioka declaration was not relevant, since the example was not present in the application as filed.

(i.11) Thus, granted Claim 1 violated Article 123(2) EPC.

(ii) Concerning the auxiliary request:

This request did not deal with all the added matter objections raised and therefore also violated Article 123(2) EPC.

VI. With its letter dated 23 September 2002, the Appellant maintained its main request, amended its first auxiliary request and submitted a second auxiliary request. While the amendments in the first auxiliary request were essentially of clerical nature, the second auxiliary request differed from the first in that the

electron donor [C] had been restricted to specific organosilicon compounds and specific diethers. Its arguments might be summarized as follows:

(i) Concerning the main request

(i.1) The term "organosilicon" was supported by lines 21 to 23 on page 11 of the published application.

(i.2) The term "diether" without restriction of the number of carbon atoms was supported by lines 46 to 51 on page 9 and line 23 on page 11.

(i.3) It was clear from the application as published that diethers and organosilicon compounds were preferred as electron donor [C]. The fact that esters of organic carboxylic acids were no longer mentioned as constituting the component [C] was not objectionable under Article 123(2) EPC. Reference was made to the decision T 615/95 of 16 December 1997 (not published in OJ EPO).

(i.4) All the inventive examples used propylene as one alpha-olefin. original Claims 1 and 2 required that at least two types of alpha-olefin be used for the prepolymerization. Thus, the skilled person was taught to use propylene as one of the comonomers when polymerizing the mixture of alpha-olefins.

(i.5) Since the definition of both electron donors [C] and [III] was supported by the application as filed, the combination that when electron donor [C] is an organosilicon or a diether" then the electron donor [III] is a diether or a compound having a SI-O-C bond must also be supported.

(ii) Concerning the second auxiliary request:

(ii.1) The organosilicon compound used as electron donor [C] had been restricted to those of formulae [1] or [2] disclosed on lines 22 to 28 and 48 to 58 on page 10 of the published application.

(ii.2) The diethers used as electron donor [C] had been restricted to those having up to 20 carbon atoms. This was supported by line 15 on page 10 of the published application.

VII. Oral proceedings were held on 3 April 2003. At the beginning of the Oral Proceedings, the Board presented its preliminary observations under Article 123(2) EPC concerning points 1 to 7 according to the list of objections submitted at the oral proceedings before the Opposition Division by the Respondent (Opponent) (cf. Section III, above). It also held that, taking into account the amendments made by the Appellant in the then pending second auxiliary request, point 4 (i.e. the objection relative to the wording "one type being propylene, the other type being an alpha olefin having 2 to 10 carbon atoms") still arose in the case of that request. In that respect, the Appellant essentially argued that the feature "one type being propylene, the other type being an alpha-olefin having 2 to 10 carbon atoms" (i.e. point 4 of the list) represented an allowable intermediate generalization on the basis of the examples which all disclosed propylene as one of the olefin for the copolymerization. In contrast, the Respondent took the view that there was no basis for such an intermediate generalization since, on the one hand Examples 1 to 3 were outside the scope of the claims, and, on the other hand, the remaining Examples referred to very specific embodiments with process features which could not be generalized.

The Appellant maintained its main request and submitted a new subsidiary request headed "first auxiliary request" as sole auxiliary request.

Independent Claims 1, 2 and 4 of the set of claims 1 to 4 for the Contracting States except ES of the auxiliary request read as follows:

"1. An olefin polymerization catalyst comprising:

[I] a solid catalyst component for olefin polymerization formed by random prepolymerization of olefin on an olefin polymerization catalyst comprising:

a solid titanium catalyst component [A] comprising magnesium, titanium and halogen, and an ester of an organic carboxylic acid or an ether as an electron donor, as its essential ingredients,
an organometallic compound catalyst component [B] of a metal belonging to Group I to III of the periodic table, and
an electron donor [C] which is an organosilicon compound of formula $R_nSi(OR')_{4-n}$ (formula [1]) wherein R and R' each represent a hydrocarbon group and n is a number satisfying $0 \leq n < 4$ or a diether having up to 20 carbon atoms,
and being in suspension in either a liquid alpha-olefin or a liquid hydrocarbon solvent [D],
wherein at least two types of alpha-olefin, including said liquid alpha-olefin if this forms at least part of the liquid phase of the suspension, are prepolymerized on said olefin polymerization catalyst, one type being propylene, the other type being ethylene, in such a way that the prepolymer is composed of 70

to 98 mole % of propylene units and 30 to 2 mole % of ethylene units, the amount of the prepolymer being from 0.2 to 4,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid alpha-olefin, and being from 0.2 to 2,000 g (based on lg of said titanium catalyst component [A]) if the suspension is in a liquid hydrocarbon solvent [D]; and

[II] an organometallic compound catalyst component of a metal belonging to Group I to III of the periodic table.

2. A process for the polymerization of an olefin, wherein polymerization or copolymerization of an α-olefin having 2 to 10 carbon atoms is carried out at a temperature of from 0 to 130°C in a gas phase, or in a state in which a suspension with a solvent composed of monomer and a gas phase coexist, in the presence of an olefin polymerization catalyst according to claim 1.

4. A solid catalyst component for olefin polymerization formed by random prepolymerization of olefin on an olefin polymerization catalyst comprising:

a solid titanium catalyst component [A] comprising magnesium, titanium and halogen, and an ester of an organic carboxylic acid or an ether as an electron donor, as its essential ingredients,
an organometallic compound catalyst component [B] of a metal belonging to Group I to III of the periodic table, and

an electron donor [C] which is an organosilicon compound as defined in Claim 1 or a diether having up to 20 carbon atoms,
and being in suspension in either a liquid alpha-olefin or a liquid hydrocarbon solvent [D],
wherein at least two types of alpha-olefin, including said liquid alpha-olefin if this forms at least part of the liquid phase of the suspension, are prepolymerized on said olefin polymerization catalyst, one type being propylene, the other type being ethylene, in such a way that the prepolymer is composed of 70 to 98 mole % of propylene units and 30 to 2 mole % of ethylene units, the amount of the prepolymer being from 0.2 to 4,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid alpha-olefin, and being from 0.2 to 2,000 g (based on lg of said titanium catalyst component [A]) if the suspension is in a liquid hydrocarbon solvent [D]."

Claim 3 is dependent on Claim 2.

Independent Claims 1 and 4 for the Contracting State ES are the same, except for the retention in the definition of the electron donor [C] in Claim 1 of the word "either" before "an organosilicon compound", as Claims 1 and 4 for the Contracting States except ES, respectively. Independent Claims 2, 5 and 6 read as follows:

"2. A process for the polymerization of an olefin, wherein polymerization or copolymerization of an α-olefin having 2 to 10 carbon atoms is carried out at a temperature of from 0 to 130°C in a gas phase, or in a state in which a suspension with a

solvent composed of monomer and a gas phase coexist, in the presence of an olefin polymerization catalyst comprising:

[I] a solid catalyst component for olefin polymerization formed by random prepolymerization of olefin on an olefin polymerization catalyst comprising:

a solid titanium catalyst component [A] comprising magnesium, titanium and halogen, and an ester of an organic carboxylic acid or an ether as an electron donor, as its essential ingredients,

an organometallic compound catalyst component [B] of a metal belonging to Group I to III of the periodic table, and

an electron donor [C] which is an organosilicon compound as defined in Claim 1 or a diether having up to 20 carbon atoms,

and being in suspension in either a liquid alpha-olefin or a liquid hydrocarbon solvent [D],

wherein at least two types of alpha-olefin, including said liquid alpha-olefin if this forms at least part of the liquid phase of the suspension, are prepolymerized on said olefin polymerization catalyst, one type being propylene, the other type being ethylene, in such a way that the prepolymer is composed of 70 to 98 mole % of propylene units and 30 to 2 mole % of ethylene units, the amount of the prepolymer being from 0.2 to 4,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid alpha-olefin, and being from 0.2 to 2,000 g (based on lg of said titanium catalyst component [A]) if the suspension is in a liquid hydrocarbon solvent [D]; and

[II] an organometallic compound catalyst component of a metal belonging to Group I to III of the periodic table.

5. A process for preparing a solid catalyst component for olefin polymerization by random prepolymerization of olefin on an olefin polymerization catalyst comprising:

a solid titanium catalyst component [A] comprising magnesium, titanium and halogen, and an ester of an organic carboxylic acid or an ether as an electron donor, as its essential ingredients,
an organometallic compound catalyst component [B] of a metal belonging to Group I to III of the periodic table, and
an electron donor [C] which is an organosilicon compound as defined in Claim 1 or a diether having up to 20 carbon atoms,
and being in suspension in either a liquid alpha-olefin or a liquid hydrocarbon solvent [D],
wherein at least two types of alpha-olefin, including said liquid alpha-olefin if this forms at least part of the liquid phase of the suspension, are prepolymerized on said olefin polymerization catalyst, one type being propylene, the other type being ethylene, in such a way that the prepolymer is composed of 70 to 98 mole % of propylene units and 30 to 2 mole % of ethylene units, the amount of the prepolymer being from 0.2 to 4,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid alpha-olefin, and

being from 0.2 to 2,000 g (based on 1g of said titanium catalyst component [A]) if the suspension is in a liquid hydrocarbon solvent [D].

6. A process for preparing an olefin polymerization catalyst comprising combining:

[I] a solid catalyst component for olefin polymerization formed by random prepolymerization of olefin on an olefin polymerization catalyst comprising:
a solid titanium catalyst component [A] comprising magnesium, titanium and halogen, and an ester of an organic carboxylic acid or an ether as an electron donor, as its essential ingredients,
an organometallic compound catalyst component [B] of a metal belonging to Group I to III of the periodic table, and
an electron donor [C] which is an organosilicon compound as defined in Claim 1 or a diether having up to 20 carbon atoms,
and being in suspension in either a liquid alpha-olefin or a liquid hydrocarbon solvent [D],
wherein at least two types of alpha-olefin, including said liquid alpha-olefin if this forms at least part of the liquid phase of the suspension, are prepolymerized on said olefin polymerization catalyst, one type being propylene, the other type being ethylene, in such a way that the prepolymer is composed of 70 to 98 mole % of propylene units and 30 to 2 mole % of ethylene units, the amount of the prepolymer being from 0.2 to 4,000 g (based on 1 g of said titanium catalyst component [A]) if the suspension is in a liquid alpha-olefin, and

being from 0.2 to 2,000 g (based on 1g of said titanium catalyst component [A]) if the suspension is in a liquid hydrocarbon solvent [D]; and

[II] an organometallic compound catalyst component of a metal belonging to Group I to III of the periodic table."

Claim 3 is dependent on Claim 2.

VIII. The Appellant requested that the decision under appeal be set aside, and the case be remitted to the Opposition Division for consideration of the substantive aspects on the basis of the patent as granted or in the alternative on the basis of the set of claims 1 to 4 for the Contracting States except ES and of set of claims 1 to 6 for the Contracting State ES submitted as first auxiliary request at the oral proceedings.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Wording of the claims*

2.1 Claim 1 of the set of claims for the Contracting States except ES differs from Claims 9 and 10 as originally filed by the features referred as points 1 to 7 of the list submitted by the Respondent (Opponent) at the oral proceedings before the Opposition Division.

2.2 While the application as originally filed mentions (cf. line 17 on page 28 to line 3 on page 29) that ethers and alkoxysilanes may be used as electron donor [C] and further discloses concrete examples of electron donors [C] (cf. page 29, line 7 to page 34, line 21) it indicates, however, at the end of that enumeration (cf. lines 22 to 25 on page 34) that "Of these electron donors" i.e., in the Board's view, those listed above as concrete examples, organosilicon compounds and diethers are preferred.

2.3 This implies, in the Board's view, that the mention of organosilicon compounds and of diethers at lines 21 to 25 of the page 34 must be read in the above context and by way of consequence that these terms indeed refer only to the organosilicon compounds of formula [1] as mentioned on page 31, lines 8 to 14 (those of formula [2] on page 33, lines 1 to 10, representing only a subgroup thereof), and to the diethers having 2 (sic) to 20 carbon atoms mentioned at line 18 on page 30. Such a reading does not provide an adequate basis for the generalization to "organosilicon compounds" or to "diether" as made in Claim 1 in the definition of the electron donor [C].

2.4 It thus follows that the indication of electron donor [C] as being either an organosilicon compound or a diether without the relevant contextual limitations is objectionable under Article 123(2) EPC.

2.5 Although the application as originally filed generally discloses that at least two types of alpha-olefins are used in the prepolymerization step (cf. page 36, lines 6 to 12; page 40, lines 11 to 13), further states that alpha-olefins having 2 to 10 carbon atoms are preferred (cf. page 37, lines 1 to 2; page 41, lines 15 to 16) and specifically discloses the combination of ethylene and propylene (cf. page 37, line 8 to 9; cf.

page 41, lines 22 to 24), it neither mentions that propylene may be combined with any alpha-olefin having up to 10 carbon atoms nor emphasises that propylene is the preferred comonomer for the prepolymerization.

2.6 Furthermore, although, as argued by the Appellant, propylene is used in all the Examples 1 to 7, it is conspicuous that firstly Examples 1 to 3 do not fall under the scope of the claims, since component [II] is not present in the catalyst used, and that secondly Examples 4 to 7 merely refer to one aspect of the claimed invention (prepolymerization in a liquid hydrocarbon suspension) and disclose the use of propylene only in the specific framework of its combination with ethylene (Examples 4 to 6) or with 1-hexene. Thus, Examples 1 to 7 cannot, in the Board's view, provide an adequate support for the generalization made (cf. also T 614/90 of 25 February 1994, not published in OJ EPO, point 6 of the Reasons for the Decision).

2.7 Even if one would consider that the two alpha-olefins used in the prepolymerization on the titanium catalyst should be selected from two lists of alpha olefins having 2 to 10 carbon atoms, selecting only propylene from one list would result in singling out combinations (e.g. propylene with a C_{10}-alpha olefin) which were not disclosed originally (cf. also T 615/95, point 6 of the Reasons for the Decision).

2.8 Thus, the indication in Claim 1 of the feature "one type being propylene, the other type being an other alpha olefin having 2 to 10 carbon atoms" is not supported by the originally filed documents. It therefore contravenes the provisions of Article 123(2) EPC.

2.9 It thus follows that, at least for the reasons mentioned above in paragraphs 2.2 to 2.8 above, Claim 1 of the set of Claims for the Contracting States except ES does not meet the requirements of Article 123(2) EPC and that the main request of the Appellant must be rejected. There is therefore no need for the Board to deal with the further objections mentioned as points 5 to 7 in the list submitted by the Respondent at the oral proceedings before the Opposition Division.

Auxiliary request

3. *Wording of the claims*

3.1 Article 123(2) EPC

3.1.1 Claim 1 of the set of Claims for the Contracting States except ES differs from Claims 9 and 10 as originally filed by:

(i) the indication that the solid titanium catalyst component [A] comprises an ester of an organic carboxylic acid or an ether as an electron donor;

(ii) the indication that an electron donor [C] which is either an organosilicon compound of formula $R_nSi(OR')_{4-n}$ (formula I) wherein R and R' each represent a hydrocarbon group and n is a number satisfying $0 \leq n < 4$ or a diether having up to 20 carbon atoms or a diether having up to 20 carbon atoms is also present in the catalyst composition;

(iii) the indication that ethylene and propylene are used in the prepolymerization step and this in such a way that the prepolymer is composed of 70 to 98 mole% of propylene units and 30 to 2 mole% of ethylene units; and

(iv) the deletion of the reference to the optional possibility for an electron donor [III] to be present in the catalyst composition.

3.1.2 It is evident from the original disclosure that the claimed olefin polymerization catalyst comprises a solid polymerization catalyst component as defined in original Claims 1 and 2 with the specific electron donor species set out in original Claim 3 (cf. page 8, lines 3 to 7; page 4, line 20 to page 5, line 12; page 6, lines 10 to 25). Thus, amendment (i) is supported by original Claim 3 read in combination with the passages mentioned above.

3.1.3 The fact that an electron donor [C] is also present in the olefin polymerization catalyst is supported by the expression "if necessary an electron donor [C]" in original Claims 9 and 10. The possibility for the electron donor [C] to be an organosilicon compound having the formula [1] is disclosed on page 31, lines 8 to 13 of the application as originally filed. The further possibility for electron donor [C] to be a diether having up to 20 carbon atoms finds its support on page 30, line 18 of the application as originally filed. The deletion of the lower value (i.e. 2) of the number of carbon atoms range (i.e. 2 to 20) does not permit the range to become open-ended, since there is no diether having 2 or less carbon atoms. This deletion cannot therefore be held to involve the addition of subject-matter (cf. T 2/80, OJ EPO, 1981, 431).

3.1.4 It is also evident that the selection of two types of compounds from the single list of the compounds originally disclosed as electron donors [C] cannot *per se* be objectionable under Article 123(2) EPC. Nor can the fact that both the electron donor used in the titanium catalyst [A] and the electron donor [C] have been restricted to specific compounds result in singling out a specific combination of these electron donors and is therefore not objectionable under Article 123(2) EPC (cf. T 615/95, cited above).

3.1.5 It thus follows that no objection under Article 123(2) EPC arises in respect of amendment (ii).

3.1.6 Amendment (iii) is based on page 37, lines 8 to 14 and on the passage from page 41, line 22 to page 42, line 3 of the application as originally filed, according to which this combination of ethylene and propylene is especially preferred.

3.1.7 Since the presence of an electron donor [III] was merely optional according to Claims 9 and 10 as originally filed, its deletion cannot represent an extension of subject-matter. Amendment (iv) is therefore not objectionable under Article 123(2) EPC.

3.1.8 It thus follows from the above that Claim 1 of the set of claims for the Contracting States except ES meets the requirements of Article 123(2) EPC.

3.1.9 By way of consequence, independent Claim 2, which is based on original Claim 12 and which relates to a process for the polymerization of an olefin in the presence of an olefin polymerization catalyst according to Claim 1, also meets the requirements of Article 123(2) EPC.

3.1.10 Dependent Claim 3 finds in support in original Claim 13 and is therefore allowable under Article 123(2) EPC.

3.1.11 Independent Claim 4 differs from original Claims 1 and 2 by the features (i), (ii) and (iii) indicated above in paragraph 3.1.1. Since, as shown above, these features are supported by the original application, Claim 4 is not objectionable under Article 123(2) EPC.

3.1.12 By the same token, Claims 1 to 4 of the set of Claims for the Contracting State ES which are in substance the same as Claims 1 to 4 of the set of Claims for the Contracting States except ES, also meet the requirements of Article 123(2) EPC.

3.1.13 The same conclusion applies for independent Claims 5 and 6 which are directed to the manufacture of a solid catalyst component having all the features of the catalyst component according to Claim 4, and to the manufacture of an olefin polymerization catalyst having all the features of the olefin polymerization catalyst according to Claim 1.

3.1.14 Thus, the set of Claims 1 to 4 for the Contracting States except ES and the set of Claims 1 to 6 for the Contracting State ES of the auxiliary request meet the requirements of Article 123(2) EPC.

3.2 Article 123(3) EPC

3.2.1 Amendments (ii) and (iii) carried out in independent Claims 1, 2 and 4 of the set of claims for the Contracting States except ES amount to limitations, since the nature of the electron donor [C] and of the other alpha-olefin used in the prepolymerization step is more precisely defined than in the corresponding granted Claims 1, 2 and 4 and since the presence of electron donor [C] has become a compulsory feature of

Claims 1 and 2. They cannot therefore extend the scope of protection. The deletion of the reference to the optional presence of electron donor [III] in Claims 1 and 2 cannot result in a broadening of scope of protection, since it corresponds only to one of the three alternatives represented by the proviso present in the granted claims. It thus follows that Article 123(3) EPC is complied with by the set of Claims 1 to 4 for the Contracting States except ES.

3.2.2 The Board comes to the same conclusion for the set of Claims 1 to 6 for the Contracting State ES, since for the same reasons as in paragraph 3.2.1 above, the amendments carried out in independent Claims 1, 2, 4, 5 and 6 amount to limitations in respect of the corresponding granted Claims 1, 2, 4, 5 and 6.

3.3 Article 84 EPC

No objection pursuant to Article 84 EPC arises from the amendments made in the set of Claims for the contracting States except ES and in the set of Claims for the Contracting State ES, since they aim at a more specific definition of the electron donor [C] and of the alpha-olefins used in the prepolymerization step and at anarrower definition of the catalyst composition and component thereof.

4. As a consequence of the above the Appellant's auxiliary request is allowable.

5. The Opposition Division revoked the patent on the grounds of Article 100(c) EPC and, as a consequence did not express an opinion regarding the ground of opposition under Article 100(a) (inventive step) EPC. In order not to deprive any of the parties of the possibility to be heard by two instances, the Board makes use of its power under Article 111(1) EPC and

refers the case back to the Opposition Division for further prosecution on the basis of the set of Claims 1 to 4 for the Contracting States except ES and the set of Claims 1 to 6 for the Contracting State ES of the auxiliary request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the Opposition Division for further prosecution on the basis of the set of Claims 1 to 4 for the Contracting States except ES and the set of Claims 1 to 6 for the Contracting State ES submitted as first auxiliary request at the oral proceedings.

The Registrar: The Chairman:

E. Görgmaier R. Young