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Datasheet for the decision of 31 July 2013

Case Number: T 0011/09 - 3.3.03

Application Number: 94304054.3

Publication Number: 629632

IPC: C07F17/00, C08F10/00, C08F4/602, C08F210/06, C08F110/06

Language of the proceedings: EN

Title of invention:
Polypropylene

Patent Proprietor:
Mitsui Chemicals, Inc.

Opponents:
ExxonMobil Chemical Patents Inc.
LyondellBasell Industries Holdings B.V.
Borealis Technology OY

Headword:

Relevant legal provisions:
EPC Art. 88, 54

Keyword:
Priority - main request (no) - auxiliary request (yes)
Novelty - main request (no) - auxiliary request (yes)

Decisions cited:

Catchword:

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Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 0011/09 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 31 July 2013

Appellant: (Patent Proprietor)	Mitsui Chemicals, Inc. 5-2, Higashi-Shimbashi 1-Chome Minato-ku Tokyo (JP)
Representative:	Benson, John Everett J A Kemp 14 South Square Gray's Inn London WC1R 5JJ (GB)
Respondent I: (Opponent 01)	ExxonMobil Chemical Patents Inc. Law Technology P.O. Box 2149 5200 Bayway Drive Baytown, TX 77520-2149 (US)
Representative:	Gerstberger, Gisela ExxonMobil Chemical Europe Inc. IP Law Shared Services Hermeslaan 2 1831 Machelen (BE)
Respondent II: (Opponent 02)	LyondellBasell Industries Holdings B.V. Weena 737 3013 AM Rotterdam (NL)
Representative:	Colucci, Giuseppe Basell Poliolefine Italia S.r.l. Intellectual Property P.le Privato G. Donegani, 12 Casella Postale 19 44100 Ferrara (IT)
Respondent III: (Opponent 03)	Borealis Technology OY P.O.Box 330 06101 Porvoo (FI)
Representative:	Cockbain, Julian Dehns

St Bride's House
10 Salisbury Square
London
EC4Y 8JD (GB)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 6 October 2008 revoking European patent No. 629632 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chair: B. ter Laan
Members: D. Marquis
C. Vallet

Summary of Facts and Submissions

I. The appeal by the patent proprietor lies from the decision of the opposition division posted on 06 October 2008 to revoke European patent N° 0 629 632 based on application number 94 304 054.3 having a filing date of 6 June 1994.

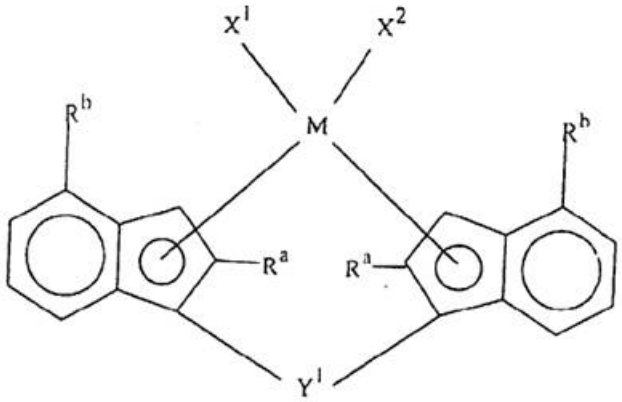
II. The patent was granted with a set of nine claims of which claims 1 to 3 read as follows:

"1. A propylene copolymer having the following properties:
(i) a content of propylene units of 95 to 99.5% by mol and a content of ethylene units of 0.5 to 5% by mol;
(ii) a triad tacticity of propylene units chain consisting of heat-to-tail bonds, as measured by ^{13}C-NMR, of not less than 95.0%;
(iii) a proportion of inversely inserted propylene units, based on 2,1-insertion of a propylene monomer in all propylene insertions, as measured by ^{13}C-NMR, of 0.05 to 0.5%; and
(iv) an intrinsic viscosity, as measured in decahydronaphthalene at 135°C, of 0.1 to 12 dl/g."

"2. A propylene elastomer having the following properties:
(i) a content of propylene units of 50 to 95% by mol and a content of ethylene units of 5 to 50% by mol;
(ii) a triad tacticity of propylene units chain consisting of head-to-tail bonds, as measured by ^{13}C-NMR, of not less than 90.0%;
(iii) a proportion of inversely inserted propylene units, based on 2,1-insertion of a propylene monomer in all propylene insertions, as measured by ^{13}C-NMR, of 0.05 to 0.5%; and

(iv) an intrinsic viscosity, as measured in decahydronaphthalene at 135°C, of 0.1 to 12 dl/g."

"3. A propylene copolymer of claim 1 or a propylene elastomer of claim 2, which is obtainable by copolymerizing propylene and ethylene in the presence of an olefin polymerization catalyst comprising a transition metal compound represented by the following formula (Ia):



(Ia)

wherein in the formula (Ia):
M is a transition metal of Group IVa, Group Va or Group IVa of the periodic table;
R^a is a hydrogen atom, a halogen atom, a hydrocarbon group of 1 to 20 carbon atoms, a halogenated hydrocarbon group of 1 to 20 carbon atoms, a silicon-containing group, an oxygen-containing group, a sulfur-containing group, a nitrogen-containing group or a phosphorous-containing group;
R^b is an aryl group of 6 to 16 carbon atoms which may optionally be substituted by a halogen atom, a hydrocarbon group of 1 to 20 carbon atoms or a halogenated hydrocarbon group of 1 to 20 carbon atoms;
X^1 and X^2 are each a hydrogen atom, a halogen atom, a hydrocarbon group of 1 to 20 carbon atoms, a halogenated hydrocarbon group of 1 to 20 carbon atoms,

an oxygen-containing group or a sulfur-containing group; and
Y^1 is a divalent hydrocarbon group of 1 to 20 carbon atoms, a divalent halogenated hydrocarbon group of 1 to 20 carbon atoms, a divalent silicon-containing group, a divalent germanium-containing group, a divalent tin-containing group, -O-, -CO-, -S-, -SO-, $-SO_2-$, $-NR^3-$, $-P(R^3)-$, $-P(O)(R^3)-$, BR^3- or $-AlR^3-$ wherein R^3 is a hydrogen atom, a halogen atom, a hydrocarbon group of 1 to 20 carbon atoms or a halogenated hydrocarbon group of 1 to 20 carbon atoms."

Claims 4 to 7 were directed to preferred embodiments of claim 3. Claim 8 concerned a film or sheet formed form the polymers defined in claims 1 to 7. Claim 9 was directed to the use of a propylene elastomer according to claims 2 to 7 as a modifier in a thermoplastic resin composition.

III. Three notices of opposition against the patent were filed on 04 July 2001. The opponents requested the revocation of the patent in its entirety based on grounds according to Article 100(a) EPC (novelty and inventive step; all opponents), Article 100(b) EPC (all opponents) and Article 100(c) EPC (opponent 03).

IV. By a decision which was announced orally on 17 September 2008 and issued in writing on 6 October 2008, the opposition division revoked the patent.

The oppositions were based *inter alia* on the following documents:

D5: EP-A-0 646 624

D12: Zambelli et al, Makromol. Chem., Rapid Commun. 12, 523-528 (1991)
Annex 1: Experimental Annex filed with Opponent 01's submissions of 29 January 2004
Annex 5: Experimental Annex filed with Opponent 03s submissions of 28 January 2004

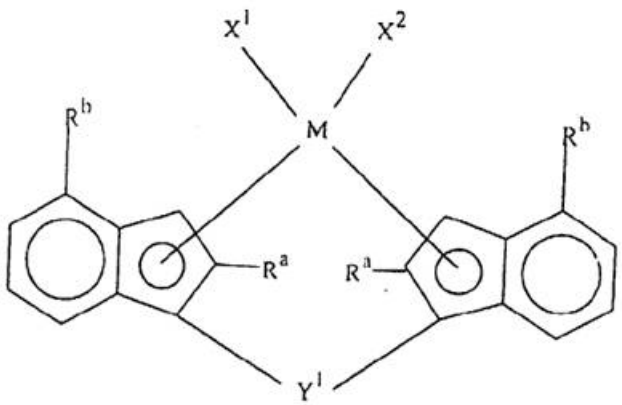
Priority documents of the patent in suit as well as their English translations:
P2: JP 23856193 of 24.09.1993
P3: JP 25074293 of 06.10.1993

The decision was based on a main and three auxiliary requests. According to the opposition division, claim 3 of the patent as granted was not entitled to the priority dates of P2 and P3. Therefore, D5 was considered to be state of the art pursuant to Article 54(3) EPC, so that claim 3 lacked novelty in view of D5. Also, claim 1 of auxiliary request 1 lacked novelty over D1 and claim 2 lacked novelty over D1 and D12 in the light of the experimental evidence of Annex 1 and Annex 2. Auxiliary request 2 lacked an inventive step starting from D6 for claim 1 and D12 for claim 2, because no unexpected technical effect had been demonstrated. The grounds of opposition under Articles 100(b) and 100(c) EPC were not decided upon.

V. On 15 December 2008, the patent proprietor lodged an appeal against the decision and paid the prescribed appeal fee on the same day. The statement setting out the grounds of appeal was filed on 16 February 2009. The appellant requested that the patent be maintained on the basis of the main request (claims as granted) or one of the three auxiliary requests filed with the statement of grounds of the appeal.

The claims of auxiliary request 1 are identical to the claims of auxiliary request 1 decided upon in the decision of the opposition division. Claims 1 and 2 of that auxiliary request are identical to those of the main request (as granted). Claim 3 reads (additions indicated in bold by the Board):

"3. A propylene copolymer of claim 1 or a propylene elastomer of claim 2, which is obtainable by copolymerizing propylene and ethylene in the presence of an olefin polymerization catalyst comprising **(A)** a transition metal compound represented by the following formula (Ia):



(Ia)

wherein in the formula (Ia):
M is a transition metal of Group IVa, Group Va or Group IVa of the periodic table;
R^a is a hydrogen atom, a halogen atom, a hydrocarbon group of 1 to 20 carbon atoms, a halogenated hydrocarbon group of 1 to 20 carbon atoms, a silicon-containing group, an oxygen-containing group, a sulfur-containing group, a nitrogen-containing group or a phosphorous-containing group;
R^b is an aryl group of 6 to 16 carbon atoms which may optionally be substituted by a halogen atom, a hydrocarbon group of 1 to 20 carbon atoms or a halogenated hydrocarbon group of 1 to 20 carbon atoms;

X^1 and X^2 are each a hydrogen atom, a halogen atom, a hydrocarbon group of 1 to 20 carbon atoms, a halogenated hydrocarbon group of 1 to 20 carbon atoms, an oxygen-containing group or a sulfur-containing group; and
Y^1 is a divalent hydrocarbon group of 1 to 20 carbon atoms, a divalent halogenated hydrocarbon group of 1 to 20 carbon atoms, a divalent silicon-containing group, a divalent germanium-containing group, a divalent tin-containing group, -O-, -CO-, -S-, -SO-, $-SO_2-$, $-NR^3-$, $-P(R^3)-$, $-P(O)(R^3)-$, BR^3- or $-AlR^3-$ wherein R^3 is a hydrogen atom, a halogen atom, a hydrocarbon group of 1 to 20 carbon atoms or a halogenated hydrocarbon group of 1 to 20 carbon atoms,
(B) at least one compound selected from
(B-1) an organoaluminium-oxy compound, and
(B-2) a compound which reacts with the transition metal compound to form an ion pair and, optionally
(C) an organoaluminium compound."

The claims of the second and third auxiliary request are of no relevance for the present decision.

VI. In their replies to the statement of grounds of the appeal (respondent I/opponent 01: letter dated 21 August 2009; respondent II/opponent 02: letter dated 23 June 2009, respondent III/opponent 03: letter 2 July 2009) all respondents requested the dismissal of the appeal; respondents I and II argued a lack of novelty and inventive step and respondent II also a lack of disclosure for all requests. Respondent III merely referred to the arguments filed in the first instance proceedings.

VII. On 14 February 2013, the Board issued a summons to attend oral proceedings on 31 July 2013. In a

communication by the Board of 24 June 2013 the issues to be discussed were pointed out.

VIII. All respondents announced that they would be absent at the oral proceedings (respondent III: letter of 22 May 2013; respondent I: letter of 28 May 2013; respondent II: letter of 18 June 2013).

IX. By letter of 30 May 2013 the appellant filed two further requests as fourth and fifth auxiliary requests as well as an experimental Annex 6. Those documents do not play a role for the present decision.

X. Oral proceedings were held on 31 July 2013 in the absence of the respondents.

XI. The arguments of the appellant may be summarised as follows:

Claim 3 of the main request validly claimed the priority of P2 and P3. The polymerization of ethylene and propylene was described on page 25, lines 8 to 10 and the catalyst itself was disclosed on page 9, line 14 of P2. D5 could not be cited against novelty.

Auxiliary request 1 validly claimed the priority of P2 and P3, as confirmed by the appealed decision.

Regarding novelty, Annex 1 did not represent an accurate repetition of examples 13 and 14 of D1 because the preparation of the copolymers had not been disclosed in the annex. Annex 5 did not disclose the intrinsic viscosity of the copolymers and it did not present an identical repetition of the process described in D12. Therefore, there was no evidence that

D1 and D12 disclosed all the parameters of claims 1 and 2 of auxiliary request 1.

XII. The respondents' arguments may be summarised as follows:

Claims 1 and 2 of the main request were not entitled to the claimed priority. The general disclosure of P2 and P3 did not describe how to prepare the whole class of copolymers claimed, particularly in view of the proprietor's assertion that it was not sufficient to use a compound of formula (I) in a polymerization reaction in order to achieve the claimed compound. The only copolymers that could be prepared in view of the Japanese priority documents P2 and P3 were those of the examples, obtained with a metallocene compound that did not fall within formula (I). However, the English translation of documents P2 and P3 contained discrepancies in the examples compared to the original Japanese text so that those could not form a basis for a valid priority claim. The subject-matter of present claim 3 had not been disclosed in any of P2 or P3 since an obligatory feature had been omitted. Therefore, the main request lacked novelty over D1 and D5.

Auxiliary request 1 was not entitled to the priority of P2 and P3 for the same reasons as the main request.

As to novelty, the claimed subject-matter was not novel in view of D5 and D1. Claim 2 lacked novelty also in view of D12. The repetition of the processes of D1 and D12 shown in Annexes 1 and 5 was accurate since it followed the preparations as disclosed in D1 and D12.

XIII. The appellant (patent proprietor) requested that the decision under appeal be set aside and that the European patent N° 0 629 632 be maintained as granted or, alternatively, on the basis of one of the auxiliary requests 1 to 3 filed on 16 February 2009 or on the basis of auxiliary requests 4 and 5 filed on 30 May 2013. The appellant further requested that the case be remitted to the first instance for further prosecution.

The respondents (opponents 01, 02 and 03) requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. Priority

2.1 The priority documents P2 and P3 (English translations) describe the preparation of propylene copolymers (in P2) or propylene elastomers (in P3) by copolymerizing propylene with ethylene in the presence of an olefin polymerization catalyst system. The olefin polymerization catalyst systems have the same definition in P2 and P3 (page 9, lines 1 to 10 of P2; page 8, lines 15 to 23 of P3). The catalyst system comprises a transition metal compound [A] of formula 1 in combination with at least one compound of an organoaluminum oxy compound [B-l] and a compound [B-2] capable of forming an ion pair by reaction with the

transition metal compound [A]. A third compound, an organoaluminium compound [C] is optional.

2.2 Formula 1 of P2 and P3 is identical to Formula (Ia) of the contested patent in which M is a transition metal of Group IVa, Group Va or Group VIa in the periodic table; R^a(indicated as R^1) is hydrogen, halogen, a hydrocarbon group of 1 to 20 carbon atoms, a halogenated hydrocarbon group of 1 to 20 carbon atoms, a silicon-containing group, an oxygen-containing group, a sulfur-containing group, a nitrogen-containing group or a phosphorus-containing group; R^b(indicated as R^2) is an aryl group of 6 to 16 carbon atoms which may optionally be substituted by a halogen atom, a hydrocarbon group of 1 to 20 carbon atoms or a halogenated hydrocarbon group of 1 to 20 carbon atoms; X^1 and X^2 are hydrogen, halogen, a hydrocarbon group of 1 to 20 carbon atoms, a halogenated hydrocarbon group of 1 to 20 carbon atoms, an oxygen-containing group or a sulfur-containing group; and Y^1(indicated as Y) is a bivalent hydrocarbon group of 1 to 20 carbon atoms, a bivalent halogenated hydrocarbon group of 1 to 20 carbon atoms, a bivalent silicon-containing group, a bivalent germanium-containing group, a bivalent tin-containing group, -O-, -CO-, -S-, -SO-, $-SO_2-$, $-NR^3-$, $-P(R^3)-$, $-P(O)(R^3)-$, BR^3- or $-AlR^3-$ in which R^3 is hydrogen, halogen, a hydrocarbon group of 1 to 20 carbon atoms or a halogenated hydrocarbon group of 1 to 20 carbon atoms.

2.3 P2 and P3 disclose an olefin polymerization catalyst comprising a transition metal compound [A] according to claim 3 of the main request only in combination with at least one of [B-1] or [B-2]. Thus the examples of P2 and P3 disclose a catalyst system comprising the transition metal compound rac—dimethylsilyl—bis(1—(2-

methyl-4-phenylindenyl)) zirconium dichloride as compound [A] in combination with methylaluminoxane as the organoaluminum oxy compound [B-1]. However, according to claim 3 of the main request, the presence of neither [B-1] nor [B-2] is required.

2.4 Therefore, the subject matter of claim 3 of the main request does not meet the requirements for a valid priority claim because an olefin polymerization catalyst comprising a transition metal compound [A] alone is not derivable from the priority documents P2 and P3 (G 2/98, OJ EPO 2001, 413). Consequently, the subject matter of claim 3 cannot claim priorities from P2 or P3 so that its effective date is the filing date of the patent in suit namely 6 June 1994.

3. Novelty

3.1 D5, a published European application designates all states designated in the patent in suit and has a filing date of 11 January 1994. It was published on 05 April 1995. Therefore, D5 is citable against claim 3 of the main request under Article 54(3) EPC.

D5 (claim 1) discloses a propylene polymer composition comprising two propylene polymers having different properties, each obtained by polymerizing propylene in the presence of an olefin polymerization catalyst comprising:
(i) (a) a compound of a Group IVB transition metal in the periodic table containing a ligand having a cyclopentadienyl skeleton, and
(ii) at least one compound selected from the group consisting of
(b) an organoaluminum oxy-compound and

(c) a compound which reacts with the transition metal compound (a) to form an ion pair.

On pages 73 and 74 of D5 propylene copolymers designated 12, 13 and 14 prepared from propylene and ethylene are described. These copolymers have contents of ethylene units of 5,1 % by mol (copolymer 12) and 5,6 % by mol (copolymers 13 and 14); triad tacticities of 99,2 % (copolymers 12 and 14) and 99,3 % (copolymer 13); proportions of inversely inserted propylene units based on 2,1-insertion of a propylene monomer in all propylene insertions of 0,08 % (copolymer 12), 0,13 % (copolymer 13) and 0,11 % (copolymer 14) and intrinsic viscosities of 0,68 dl/g (copolymer 12), 3,10 dl/g (copolymer 13) and 1,67 dl/g (copolymer 14). The preparation is carried out in the presence of a catalyst system comprising triisobutylaluminium, methylaluminoxane and rac—dimethylsilyl—bis(2—ethyl-4-phenylindenyl)zirconium dichloride, of a formula according to claim 3 of the main request.

The copolymers 12, 13 and 14 of D5 fall therefore within the scope of claim 3 of the main request. The appellant did not contest the findings of the opposition division in that respect. Therefore, the subject matter of claim 3 of the main request lacks novelty over D5.

4. In view of the above, the main request has to be refused.

Auxiliary Request 1

5. Priority

5.1 The validity of the priority of the claims of auxiliary request 1 was disputed on the grounds that the disclosure found in the documents P2 and P3 was too generic to allow a skilled person to carry it out. The respondents based their argument on a statement made by the appellant in a letter of 5 December 2002 purporting to document D1 and which read:
"*the triad tacticity and the proportion of inversely inserted units of a composition will to same degree be affected by the nature of the reaction..[omissis].. it is not possible to conclude that the copolymers of example 13 falls within claim 1*".

The respondents did not show how this statement, which only pertained to the reaction conditions disclosed in example 13 of D1, was relevant to the disclosure of the propylene copolymers described in the priority documents P2 and P3. Furthermore, the respondents did not not provide any evidence based on the priority documents showing why the skilled person could not perform the subject matter claimed in auxiliary request 1. In view of this, it cannot be concluded that the priority claimed from P2 and P3 by the claims of the auxiliary request is invalid.

5.2 A further point upon which the respondents based their argumentation was a discrepancy between the substitution options in formula (Ia) of the claims of auxiliary request 1 and those of some compounds disclosed in the examples of the priority documents P2 and P3 in Japanese language. The respondents did however not show why the claims of auxiliary request 1

would not be entitled to the priority of P2 and P3 as a result of any such discrepancy. In that respect, the respondents only contested the English translation of some examples of the priority documents but did not contest that both P2 and P3 disclose the subject matter of the claims of auxiliary request 1.

Furthermore, claim 3 of auxiliary request 1 now mentions the presence of catalyst component (B) as well as the optional presence of component (C), as disclosed in P2 and P3.

The claims of the auxiliary request 1 are therefore entitled to the priority of P2 and P3.

6. Novelty

In view of D5

6.1 Auxiliary request 1 validly claims the priorities of P2 (24 September 1993) and P3 (06 October 1993). The polymers 12, 13 and 14 disclosed in D5 were however not mentioned in D5's priority document. Therefore, the earliest date for polymers 12, 13 and 14 is the filing date of D5 (11 January 1994) which is posterior to the priority dates of the claims of auxiliary request 1. Hence, these polymers are not part of the prior art citable against the claims of auxiliary request 1. D5 does not disclose any other polymers having the combination of features now being claimed and is for that reason not novelty destroying.

Claims 1 and 2 in view of D1

6.2 D1 describes catalyst systems based on specific metallocene compounds (claim 1), in particular it

discloses metallocenes with arylsubstituted indenyl-derivatives as ligands, their preparation and their use as catalysts for the copolymerization of ethylene. In examples 13 and 14 ethylene and propylene are copolymerized according to a process described in example 3 of D1. The copolymers obtained have an ethylene content of 2,4 weight-% (example 13) and 7 weight-% (example 14). D1 does however not disclose the triad tacticity, the proportion of inversely inserted propylene units and the intrinsic viscosity of the copolymers prepared.

Annex 1 is a test report concerning D1. It mentions that examples 13 and 14 have been repeated but it provides no details about the preparation of the copolymers described. Also, Annex 1 does not describe the preparation of the catalyst system containing methylaluminoxane on silica and rac-Dimethylsilylbis(2-methyl-4-phenyl-indenyl)zirkoniumdichlorid (rac-5) which was used in D1. Under these circumstances, it cannot be ascertained that the copolymers described in Annex 1 are prepared according to examples 13 and 14 of D1 and therefore would have the same properties. In view of that, it cannot be concluded that the disclosure of D1 discloses the combination of features as required in claims 1 and 2 of auxiliary request 1.

Claim 2 in view of D12

6.3 D12 describes the polymerization of ethylene with propylene in the presence of homogeneous catalytic systems based on Group 4 metallocenes and methylaluminoxane. Example 1e (Table 2) of D12 discloses a copolymer obtained by polymerization of ethylene and propylene in the presence of rac-ethylene-bis(1-indenyl)zirconium dichloride/methylaluminoxane,

named catalyst I. Table 3 of D12 reports the mole ratio of ethylene to polypropylene of the obtained copolymer of 0,41 which corresponds to an ethylene content of 29.1 mol%, as well as an inherent viscosity at a concentration of 0,25 weight% measured in 1,2,3,4-tetrahydronaphthalene (tetralin) at 135°C of 0,62. D12 does not disclose the intrinsic viscosity of the copolymer as measured in decahydronaphthalene as claimed and it was not shown that an intrinsic viscosity measured in tetralin was identical to that in decalin for the same copolymer. Furthermore, D12 does not report the triad tacticity and the proportion of inversely inserted propylene units.

Annex 5 is a test report concerning D12. It describes in detail how an ethylene/propylene copolymer was prepared according to the polymerization of example 1e. The triad tacticity and the proportion of inversely inserted propylene units of the copolymer so obtained are given. However, Annex 5 does not disclose the value of the intrinsic viscosity of the copolymer as measured at 135°C in decahydronaphthalene.

As the intrinsic viscosity of the copolymer in decahydronaphthalene is neither disclosed in D12 nor Annex 5, it cannot be concluded that the copolymer of example 1e of D12 falls within the scope of claim 2 of auxiliary request 1.

6.4 In summary, the subject matter of claims 1 and 2 of auxiliary request 1 is novel over D1 and D12. Claim 3 is dependent on claims 1 and 2 and is therefore also novel over D1 and D12.

6.5 Since the decision under appeal only relied on a lack of novelty of the claims of auxiliary request 1 over D1

and D12, it remains to be examined whether the other requirements of the EPC are also fulfilled. For this purpose the case is, in accordance with Article 111(1) EPC, remitted to the first instance.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance for further prosecution on the basis of the first auxiliary request (claims 1 to 7) filed on 16 February 2009.

The Registrar: The Chairman:

E. Goergmaier B. ter Laan

Decision electronically authenticated