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**D E C I S I O N**  
**of 3 June 2003**

**Case Number:** W 0008/03 - 3.3.3

**Application Number:** PCT/EP 01/11131

**Publication Number:** W00224769

**IPC:** IPCL:C08F10/02

**Language of the proceedings:** EN

**Title of invention:**

Process for the preparation of ethylene polymers with a bis-amido titanium compound

**Applicant:**

Basell Polyolefine GmbH  
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D-50389 Wesseling

**Opponent:**

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**Headword:**

-

**Relevant legal provisions:**

EPC Art. 17(3)(a)  
EPC R. 13.1, 13.2, 40.2(c)(d)(e)

**Keyword:**

"Oligomerisation and polymerisation - different technical concept (yes)"  
"Unity of invention (yes)"

**Decisions cited:**

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**Catchword:**

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**Case Number:** W 0008/03 - 3.3.3  
**International Application No. PCT/EP** 01/11131

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

**Applicant:** Basell Polyolefine GmbH  
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**Subject of the Decision:** Protest according to Rule 40.2(c) of the Patent Cooperation Treaty made by the applicants against the invitation (payment of additional fees) of the European Patent Office (International Searching Authority) dated 14 August 2002.

**Composition of the Board:**

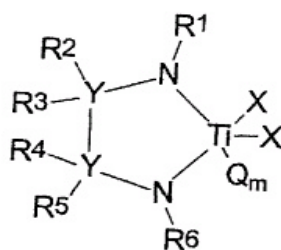
**Chairman:** R. Young  
**Members:** P. Kitzmantel  
B. Günzel

### Summary of Facts and Submissions

- I. International application PCT/EP01/11131 entitled "Process for the preparation of ethylene polymers" comprising 14 claims was filed on 24 September 2001.
- II. Independent Claims 1, 13 and 14 of the application as filed read as follows:

"1. A process for homopolymerizing ethylene or copolymerizing ethylene and one or more olefins comprising contacting under polymerization condition ethylene and optionally one or more olefins with a catalyst system obtainable by contacting:

A) a bis amido compound of formula (I)



(I)

wherein

Ti is titanium;

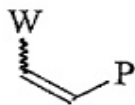
N is a trivalent nitrogen atom; the Y atoms, the same or different from each other, are selected from the group consisting of Si, Ge and Sn; the X groups, the same or different from each other, are selected from the group consisting of hydrogen, halogen, linear or branched, saturated or unsaturated C<sub>1</sub>-C<sub>20</sub> alkyl, C<sub>1</sub>-C<sub>20</sub> alkoxy, C<sub>3</sub>-C<sub>20</sub> cycloalkyl, C<sub>6</sub>-C<sub>20</sub> aryl, C<sub>6</sub>-C<sub>20</sub> aryloxy, C<sub>7</sub>-C<sub>20</sub> alkylaryl and C<sub>7</sub>-C<sub>20</sub> arylalkyl radicals, optionally containing one or more Si, Ge, O, S, P, B or N atoms;

or two X groups form a ring having from 4 to 8 members;  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$ ,  $R^5$  and  $R^6$ , equal to or different from each other, are selected from the group consisting of hydrogen, linear or branched, saturated or unsaturated  $C_1$ - $C_{20}$  alkyl,  $C_3$ - $C_{20}$  cycloalkyl,  $C_6$ - $C_{20}$  aryl,  $C_7$ - $C_{20}$  alkylaryl or  $C_7$ - $C_{20}$  arylalkyl radicals, optionally containing one or more Si, Ge, O, S, P, B or N atoms; or are  $Si(R^7)_3$  groups, wherein the groups  $R^7$ , the same or different from each other, are linear or branched, saturated or unsaturated  $C_1$ - $C_{10}$  alkyl,  $C_3$ - $C_{10}$  cycloalkyl,  $C_6$ - $C_{15}$  aryl,  $C_7$ - $C_{15}$  alkylaryl or  $C_7$ - $C_{15}$  arylalkyl groups; or two or four substituents of  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$ ,  $R^5$  and  $R^6$ , linked to two vicinal atoms, form one or two rings having from 4 to 8 members; Q is a neutral Lewis base; and m is an integer ranging from 0 to 2; said bis-amido compound being optionally present in the form of a dimer;

B) one or more activating cocatalysts selected from compounds having formula  $U^+Z^-$ , wherein  $U^+$  is a cation able of reacting irreversibly with a substituent X of the compound of formula (I), and  $Z^-$  is a compatible non-coordinating anion comprising at least one boron atom; and neutral strongly Lewis acidic compounds comprising at least one boron atom; and when in the compound of formula (I) X is halogen

C) one or more aluminum alkyls or alumoxanes."

"13. A copolymer of ethylene and an olefin having from 4 to 30 carbon atoms characterized in that at least 80% of the polymer chains are terminated with the following structure:



wherein W represents an hydrocarbon group of general formula  $C_{v-f}H_{2(v-f)+1}$ , wherein v is the number of carbon atoms of the comonomer and f is 2 or 3 and P represents the polymer chain."

"14. A copolymer of ethylene obtainable by the process of any one of claims 1 to 12."

Claims 2 to 12 are dependent on Claim 1.

III. On 14 August 2002 the European Patent Office (EPO), acting as International Searching Authority (ISA), in compliance with Article 17(3)a) PCT issued an "Invitation to pay Additional Fees" (hereinafter "Invitation") stating that the application did not fulfil the requirements of unity of invention stipulated in Rules 13.1, 13.2 and 13.3 PCT and inviting the Applicant to pay, within a time limit of 30 days, 1 (one) additional search fee.

IV. This "Invitation" resulted from the EPO/ISA's conclusion that the general concept underlying the claimed subject-matter, i.e. the use in olefin (co)polymerisation processes of catalytic compositions comprising an ionising cocatalyst and alkylaluminium, plus a "procatalyst" comprising a titanium metal centre and  $(Si)_2$ -bridged diamide ligands, was known from WO-A-99 52631 (hereinafter WO-A), *inter alia* because the term "oligomerisation" in Claim 1 of the WO-A meant concomitant oligomerisation and polymerisation.

It followed, according to the "Invitation", that "the problem arising from such production of polyolefins can be solved in two ways, as grouped below but, according to the above reasoning, there is no single general inventive concept (Rule 13.1 PCT) and no same or corresponding special technical feature (Rule 13.2, PCT) linking these groups:

Group 1: the subject-matter of claims 1-12

Group 2: the subject-matter of claims 13 and 14".

- V. On 4 September 2002 the Applicant paid under protest one additional search fee and simultaneously requested reimbursement of this fee.

In the letter announcing the afore-mentioned payment the Applicant argued as follows:

- (i) Annex B of the Administrative Instructions Under the Patent Cooperation Treaty (as in force from July 1998) (hereinafter "Administrative Instructions"), page 42, point (e), item (i) set out that unity of invention was met for the case that there is *"in addition to an independent claim for a given product, an independent claim for a process specially adapted for the manufacture of said product and an independent claim for a use of the said product"*.
- (ii) In contrast to the WO-A which disclosed the oligomerisation of ethylene by using {1,2 bis(t-butylamide)tetramethyldisilane}-zirconium dibenzyl, the present invention comprised the production of ethylene homo- and copolymers by using

{1,2 bis(t-butylamide)tetramethyldisilane}-  
titanium dibenzyl.

- (iii) In view of these differences unity of invention among claims 1 to 12 and 13 to 14 could not be questioned.
- (iv) Furthermore, the process for the preparation of ethylene copolymers according to Claims 1 to 12 was specially adapted for the provision of the ethylene copolymers according to Claims 13 and 14.
- (v) On the basis of this analysis, unity of invention should also be recognized in view of Example 16 on page 47, Annex B of the "Administrative Instructions" which acknowledged unity of invention for claims of the type:

*Claim 1: An insecticide composition comprising compound A (consisting of  $a_1$ ,  $a_2$  ...) and a carrier,*

*Claim 2: Compound  $a_1$*

provided that  $a_1$  had the insecticidal activity which was also the special technical feature for compound A in claim 1; in the present case the special technical feature linking homo- and copolymer was that they are different from oligomers.

- VI. On 27 January 2003 the EPA/ISA issued a "Notification regarding Review of Justification for Invitation to pay Additional Search Fees" (hereinafter "Review Notification").

In its paragraph 1 the Applicant is notified that after review of the protest the "Invitation" was considered justified (see also paragraph 2.3.4) and is invited within one month to pay a protest fee.

In paragraph 2.3.2 the "Review Notification" essentially confirms the reasoning of the "Invitation".

The reference in paragraph 2.1 of the Reasons of the "Review Notification" to an "Invitation" to pay eight (in lieu of one) additional search fees is an obvious mistake (cf. Section III supra).

VII. The International Search Report (ISR), also issued on 27 January 2003, confirms that, as a result of the prior review under Rule 40.2(e) PCT, no additional search fees are to be refunded.

VIII. On 27 February 2003 the Applicant paid the protest fee requested by the "Review Notification" and submitted the following additional comments:

- (i) The WO-A related to ethylene oligomerisation; ethylene homopolymers were reported only as undesirable by-products in amounts of from 0.3 to 6.3 % by weight. The skilled person would not contemplate the use of these catalyst systems for producing polyethylene.
- (ii) Furthermore, the polyethylene homopolymers were not characterized.



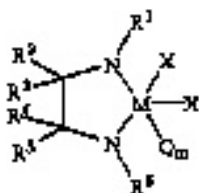
- (iii) Claims 13 and 14 of the application related to ethylene copolymers; the by-products of the WO-A were homopolymers. There was thus no possible anticipation of copolymers and no lack of unity *a posteriori*.
  
- (iv) Oligomerisation and polymerisation were completely different terms: cf. "The Ransom House Dictionary of The English Language".
  
- (v) Also, according to G1/89 and G2/89, additional fees should be required only in clear cases.

### **Reasons for the Decision**

1. The protest is admissible.
  
2. Claim 1 of the application in suit is directed to a process for homopolymerising ethylene or copolymerising ethylene and one or more olefins with a catalyst system obtainable by contacting (A) a bis amido titanium complex, (B) an activating boron containing cocatalyst and, optionally (C) aluminum alkyls or alumoxanes (cf. Section II supra).

According to the worked Examples of the application "inventive" ethylene homopolymers have a number average molecular weight Mn of between 17200 (Example 14) and 26500 (Example 11) and "inventive" ethylene/propylene copolymers have number average molecular weights Mn of, respectively, 6115 (Example 23) and 1750 (Example 24) (cf. Tables 3, 4a and 6).

3. Claim 1 of the WO-A is directed to a catalyst system for  $\alpha$ -olefin oligomerisation comprising three components (A), (B) and (C) whose chemical constitution overlaps those of the corresponding components of Claim 1 of the present application. In particular, component (A) comprises a bis amido complex of the formula



wherein M is Ti, Zr or Hf.

Claim 26 of the WO-A relates to a process for the (co)oligomerisation of certain  $\alpha$ -olefins in the presence of a catalyst system as described in Claim 1.

According to the description the oligomerisation product is a mixture of  $\alpha$ -olefins having a chain length ranging from 4 to 30 carbon atoms (cf. page 18, last paragraph; Table 2) from which a maximum molecular weight of about 420 of a linear oligomer having one unsaturated C=C bond can be calculated.

All worked Examples are concerned with the oligomerisation of ethylene and use {1,2-bis(t-butylamide)tetramethyldisilane}-zirconium dibenzyl) as catalyst component (A). Apart from the desired oligomer product small amounts of polyethylene, i.e. from 0.1 to 6.3 weight percent (page 26, Table 2, Examples 10, 15) are obtained as by-product.

4. The polymerisation process of Claim 1 of the present application is different from the oligomerisation process of Claim 26 of the WO-A by the different molecular weights of the products resulting from (co)polymerisation on the one hand and (co)oligomerisation on the other hand as referred to in the preceding paragraphs 2 and 3. These different molecular weights establish that, in the present circumstances, the products of the (co)polymerisation carried out according to the application in suit and the products of the oligomerisation carried out according to the WO-A are distinguished from one another.
  
5. The disclosure in the WO-A of the formation of small amounts of polyethylene homopolymer as by-product of the ethylene oligomerisation reaction cannot be equated with a process for homopolymerising ethylene as specified in present Claim 1. The skilled person being the addressee of a patent specification will not consider the undesired formation of minor amounts of a by-product as a relevant teaching for its preparation as a main product. However, the language of present Claim 1: "A process for homopolymerizing ethylene or copolymerizing ethylene and one or more olefins" is clearly directed to the preparation of ethylene homo- and copolymers as main products.
  
6. In the Board's view, the subject-matter of present Claim 1 is therefore novel over the disclosure of the WO-A.
  
7. The same applies for the same reasons to the subject-matter of Claims 13 and 14, i.e. the ethylene copolymers referred to in these claims which are

furthermore distinguished from the polyethylene homopolymer by-products disclosed in the WO-A by the presence of further repeating units.

8. In view of the novelty of the subject-matter of present Claims 1, 13 and 14 over the WO-A, and since the process of present Claim 1 and the copolymers of present Claims 13 and 14 are conceptually linked by the use of the catalyst system specified in Claim 1, either directly by reference (Claim 14) or by its responsibility for the desired unsaturation structure (Claim 13), this catalyst system qualifies as unifying "special technical feature" within the meaning of Rule 13.2 PCT.
9. The subject-matters of Claim 1 on the one hand, and of Claims 13 and 14 on the other hand, are therefore so linked as to form a single general inventive concept within the meaning of Rule 13.1 PCT.
10. In summary, the reasons of the "Invitation" do not warrant the proposed lack of unity objection and the Applicant's protest against the payment of one additional search fee is therefore justified.

**Order**

**For these reasons it is decided that:**

The refund of the additional search fee and the protest fee is ordered.

The Registrar:

The Chairman:

E. Görgmaier

R. Young