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**D E C I S I O N**  
**of 14 March 2005**

**Case Number:** W 0038/04 - 3.3.3

**Application Number:** PCT/EP 03/07485

**Publication Number:** WO 2004/005360 A2

**IPC:** C08F 10/00

**Language of the proceedings:** EN

**Title of invention:**

Catalyst system for the polymerization of olefins

**Applicant:**

BASELL POLYOLEFINE GMBH

**Opponent:**

-

**Headword:**

-

**Relevant legal provisions:**

PCT Art. 17(3) (a)

PCT R. 13.1, 13.2, 40.2(c), (d), (e)

**Keyword:**

"Lack of unity - no"

**Decisions cited:**

-

**Catchword:**

-



Case Number: W 0038/04 - 3.3.3

International Application No. PCT/EP 03/007485

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.3  
of 14 March 2005

**Applicant:** BASELL POLYOLEFINE GMBH  
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**Subject of this 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  
9 January 2004.

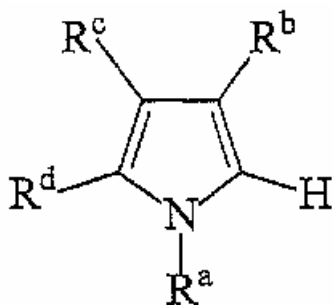
**Composition of the Board:**

**Chairman:** R. Young  
**Members:** C. Idez  
B. Günzel

## Summary of Facts and Submissions

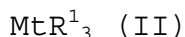
- I. International application PCT/EP03/007485 entitled "Catalyst system for the polymerization of olefins" comprising 20 claims was filed on 9 July 2003.
- II. Independent Claims 1, 9, 15 and 20 of the application as filed read as follows:

"1. An organometallic compound obtainable by contacting:  
a) a compound having the following formula (I):



wherein:

R<sup>a</sup> is a linear or branched, saturated or unsaturated, C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>6</sub>-C<sub>20</sub> aryl, C<sub>7</sub>-C<sub>20</sub> arylalkyl or C<sub>7</sub>-C<sub>20</sub> alkylaryl group, optionally containing O, S, N, P, Si or halogen atoms; or R<sup>a</sup> can join R<sup>d</sup> to form a C<sub>4</sub>-C<sub>7</sub> ring; R<sup>b</sup>, R<sup>c</sup> and R<sup>d</sup>, equal to or different from each other, are hydrogen atoms, halogen atoms, linear or branched, saturated or unsaturated, C<sub>1</sub>-C<sub>10</sub> alkyl, C<sub>6</sub>-C<sub>20</sub> aryl, C<sub>7</sub>-C<sub>20</sub> arylalkyl or C<sub>7</sub>-C<sub>20</sub> alkylaryl groups, optionally containing O, S, N, P, Si or halogen atoms, or two or more adjacent substituents R<sup>b</sup>, R<sup>c</sup> and R<sup>d</sup> form one or more C<sub>4</sub>-C<sub>7</sub> rings, optionally containing O, S, N, P or Si atoms, that can bear substituents; with  
b) a Lewis acid of formula (II)

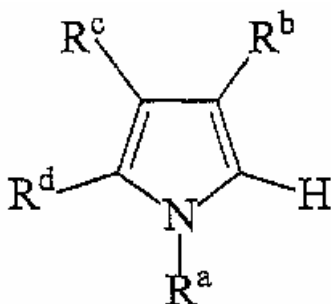


wherein Mt is a metal belonging to Group 13 of the Periodic Table of the Elements;  $\text{R}^1$ , equal to or different from each other, are halogen atoms, halogenated  $\text{C}_6\text{-C}_{20}$  aryl and halogenated  $\text{C}_7\text{-C}_{20}$  alkylaryl groups; two  $\text{R}^1$  groups can also form with the metal Mt one condensed ring.

9. A salt obtainable by contacting, in any order:
- a) a compound having formula (I) as described in claim 1;
  - b) a Lewis acid of formula (II) as described in claim 1; and
  - c) a compound of formula  $\text{KR}^f_3$  wherein K is a nitrogen (N) or phosphorous (P) atom;  $\text{R}^f$ , equal to or different from each other, are linear or branched, saturated or unsaturated,  $\text{C}_1\text{-C}_{30}$  alkyl,  $\text{C}_6\text{-C}_{20}$  aryl,  $\text{C}_7\text{-C}_{20}$  arylalkyl or  $\text{C}_7\text{-C}_{20}$  alkylaryl groups, optionally containing O, S, N, P, Si or halogen atoms, or two  $\text{R}^f$  can form one  $\text{C}_4\text{-C}_7$  ring, optionally containing O, S, N, P or Si atoms, that can bear substituents.

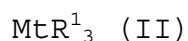
15. A catalyst system for the polymerization of olefins comprising the product obtained by contacting:

- (A) at least one transition metal organometallic compound, and
- (B) an organometallic compound obtainable by contacting:
  - a) a compound having the following formula (I):



wherein  $R^a$ ,  $R^b$ ,  $R^c$  and  $R^d$  are described as in claim 1;

b) a Lewis acid of formula (II)



wherein  $Mt$  and  $R^1$  are described as in claim 1;

and c) optionally a compound of formula  $KR^f_3$

wherein  $K$  and  $R^f$  are described as in claim 9.

20. A process for the polymerization of one or more olefins comprising contacting one or more olefins under polymerization conditions in the presence of a catalyst system as described in claim 15."

Claims 1 to 8 are directly or indirectly dependent on Claim 1 and Claims 10 to 14 are directly or indirectly dependent on Claim 9.

Claims 16 to 19 are dependent on Claim 15.

III. On 9 January 2004 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 contravened the requirements of unity of invention according to Rule 13 PCT and inviting the Applicant to pay, within a time limit of 30 days, 1 additional search fee.

IV. According to the "Invitation" the general concept underlying the claimed subject-matter was an olefin polymerization process employing a group 13 element activator obtainable by contacting a heterocyclic compound according to claim 1 (formula I) of the present application with a compound of said group 13 element according to claim 1 (formula II). The "Invitation" stated that document WO-A-0162764 (hereinafter referred to as D1) described very similar compounds employed as activators obtainable by contacting compounds of formula II with compounds identical to those of formula I save that they were not N-alkyl substituted, but no special technical effect had been demonstrated for the products of the present application over those of D1. According to the "Invitation" the problem relating to the production of these olefin polymers could be solved in various ways, which were linked by the heterocyclic compound mentioned above as same or corresponding feature. In the light of D1, there was, however, no single general inventive concept (Rule 13.1 PCT) and no demonstrated same or corresponding special technical feature (Rule 13.2 PCT) linking the following groups of claims:

Group I: The subject-matter of Claims 1-20 (in part) insofar as any of R<sup>a</sup>, R<sup>b</sup>, R<sup>c</sup>, and R<sup>d</sup> in the heterocyclic compound of formula I in Claim 1 does not form part of a C<sub>4</sub> to C<sub>7</sub> ring; and

Group II: the subject-matter of Claims 1-20 (in part) insofar as any of R<sup>a</sup>, R<sup>b</sup>, R<sup>c</sup>, and R<sup>d</sup> in the heterocyclic compound of formula I in Claim 1 forms part of a C<sub>4</sub> to C<sub>7</sub> ring.

V. On 9 February 2004 the Applicant paid under protest this additional search fee and simultaneously requested reimbursement of this fee.

As reasons for its protest, the Appellant, in its letter dated 9 February 2004, argued essentially as follows:

(i) Document D1 neither mentioned nor suggested that the nitrogen atom could be substituted. Thus, Claim 1 of the present application was novel and inventive over D1.

(ii) The products of D1 and those of the present application were different products. This could be seen by comparing the structure of formula (III) of D1 and that of formula (III) of the present application, which differed by the position of the ring to which the Lewis base was bound.

(iii) If one considered D1 as relevant for Claim 1 of the present application, furthermore, it would remain relevant for the compounds belonging to the two groups defined by the Examiner, since the definition of the substituents on the carbon atoms 1, 2 and 3 were the same in D1 and in the present application.

(iv) The different substitution on the carbon atom 4 was one of the key steps of the present application in combination with the substitution of the nitrogen atom.

(v) Reference was further made to the decision G 1/89 (OJ EPO, 1991, 155), according to which, while the ISA might consider the request of additional fees, this should be done only in clear cases.

VI. On 17 August 2004 the Review Panel of EPO/ISA issued a "Notification regarding Review of Justification for Invitation to pay Additional Search Fees" (hereinafter "Review Notification"), in which the Applicant was invited to pay a protest fee within a time limit of one month.

In paragraph 1 of the "Review Notification", the Applicant was told that after review of the protest the additional search fee should not be reimbursed.

The position of the Review Board (cf. paragraph 2.3) of the Review Notification) can be summarized as follows:

(i) The subject-matter of Claims 1 to 20 of the present application differed from D1 in that the C4N ring was N-alkylated.

(ii) The technical effect of this feature was claimed to be to increase catalyst stability and to reduce the amount of cocatalyst.

(iii) In the absence of comparative data over D1, the technical problem could only be formulated as providing alternative cocatalyst for olefin polymerization.



(iv) The skilled person would surely have considered it a normal option to replace the hydrogen atom of D1, which was a standard chemical group, by an alkyl or aryl group which were also standard chemical groups.

(v) Furthermore the carbon atom 4 could also bear a hydrogen atom according to D1.

(vi) There was no evidence that the group R<sup>a</sup> bound to the nitrogen led to a specific technical effect over the compounds of D1.

(vii) Consequently the present activators could not serve as technical feature linking the present inventions.

(viii) Contrary to the submissions of the applicant, D1 was not relevant for all the compounds because the present activators made a contribution over the prior art in that R<sup>a</sup> and R<sup>d</sup> could be joined to form a C<sub>4</sub>-C<sub>7</sub> ring whilst other R substituents might or might not form ring systems on their own.

VII. On 6 September 2004 the Applicant paid the protest fee requested in the "Review Notification". In its letter dated 6 September 2004 announcing the afore-mentioned payment the Applicant submitted the following additional comments:

(i) It was well known that the hydrogen atom of a N-H group could be easily displaced by a Lewis acid, while this reaction was very hard to carry with a N-R group.

(ii) Starting from D1, the skilled person, looking for an alternative cocatalyst, should carry out the following steps in order to arrive at the present invention:

(a) choose to replace the N-H by a N-R group,

(b) choose an hydrogen atom as substituent in position 4 of the pyrrole ring;

(c) obtain a different completely unexpected compound and find it active as cocatalyst.

(iii) D1 did not however suggest these steps.

(iv) If, according to the Examiner, it was a normal option to replace the hydrogen atoms of D1, there would be no basis to select only some replacing groups.

(v) Therefore any replacement described in Claim 1 should have the same weight and consequently D1 was relevant for Claim 1 as a whole.

VIII. The Applicant requested the reimbursement of the additional search fee and of the protest fee which had been paid.

### **Reasons for the Decision**

1. The protest is admissible.
2. As can be deduced from the description, the aim of the present application is the preparation of olefin

polymers in the presence of a metallocene catalyst and of a cocatalyst which could be used in lesser amount than alkylaluminumoxane cocatalysts and which provides a stable catalyst composition. This problem is solved, according to the present application, by using as cocatalyst an organometallic compound obtainable by contacting an heterocyclic compound of formula (I) as set out in claim 1 of the present application with a Lewis acid of formula (II) as set out in Claim 1 of the present application.

3. As indicated above in Section II, the present application comprises 4 independent claims. Thus, in the Board's view, the claims of the present application should be grouped in the following manner:

Group I: Claims 1 to 8 which refer to the organometallic compound *per se*;

Group II: Claims 9 to 14 which refer to a salt obtainable from the organometallic compound.

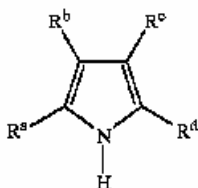
Group III: Claims 15 to 19 which are directed to a catalyst system comprising the organometallic compound; and

Group IV: Claim 20 which refers to a process for olefin polymerization in the presence of a catalyst system comprising the organometallic compound.

4. In the Board's view, the subject-matter of the Group I is conceptually linked by the use of the organometallic compound specified in Claim 1 as cocatalyst with the subject-matter of the Groups II, III and IV. Thus, this

organometallic compound would qualify as common unifying "special technical feature" within the meaning of Rule 13.2. PCT, provided this common concept is novel and has an inventive character.

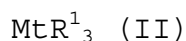
5. In this connection, it has been considered in the "Review Notification" (Section VI above) that the subject-matter of Claim 1 was novel over D1 but that it lacked inventive step in view of this document.
6. Document D1 relates to an organometallic compound obtainable by contacting an heterocyclic compound having the following formula (I):



(I)

wherein  $R^a$ ,  $R^b$ ,  $R^c$  and  $R^d$ , equal to or different from each other, are hydrogen atoms, halogen atoms, linear or branched, saturated or unsaturated,  $C_1$ - $C_{10}$  alkyl,  $C_6$ - $C_{20}$  aryl,  $C_7$ - $C_{20}$  arylalkyl or  $C_7$ - $C_{20}$  alkylaryl group, optionally containing O, S, N, P, Si or halogen atoms, or two or more adjacent substituents  $R^a$ ,  $R^b$ ,  $R^c$ , and  $R^d$  form one or more  $C_4$ - $C_7$  rings, optionally containing O, S, N, P or Si atoms, that can bear substituents;  
with

b) a Lewis acid of formula (II)



wherein Mt is a metal belonging to Group 13 of the Periodic Table of the Elements;  $R^1$ , equal to or

different from each other, are halogen atoms, halogenated C<sub>6</sub>-C<sub>20</sub> aryl and halogenated C<sub>7</sub>-C<sub>20</sub> alkylaryl groups; two R<sup>1</sup> groups can also form with the metal Mt one condensed ring. (Claim 1).

These organometallic compounds are used as cocatalysts in catalyst system comprising a metallocene catalyst in the polymerization of olefins. They allow a reduction of the amount of cocatalyst used in comparison to that of alkylaluminumoxane cocatalysts and they provide stable catalyst compositions (page 1, lines 7-9; page 3, lines 1 to 6).

7. In view of the formula I given for the heterocyclic component in Claim 1 of D1, it thus evident that the organometallic compounds according to Claim 1 of the present application are novel over those of D1, since the nitrogen atom of the pyrrole ring bears an hydrocarbyl radical instead of an hydrogen atom as disclosed in D1.
8. As indicated above in paragraph 1, the present application in suit is concerned with organometallic compounds and use thereof as cocatalysts in the preparation of olefin polymers in the presence of metallocene catalysts. Such organometallic compounds are known from D1.
9. As indicated in paragraph 6 above, the organometallic compounds disclosed in D1 are used as cocatalysts in the preparation of olefin polymers in the presence of metallocene catalyst and they allow a reduction of the amount of the cocatalyst in comparison to that of alkylaluminumoxanes and they provide stable catalyst

compositions, so that it is evident that D1 deals with the same technical problem as the present application.

10. Thus, starting from D1 and in the absence of comparative data between the organometallic compounds according to the present Claim 1 and those of D1, the technical problem underlying the present application may be seen in the provision of further organometallic compounds useful as cocatalysts in the preparation of olefin polymers in the presence of metallocene catalyst which allow a reduction of the amount of the cocatalyst in comparison to that of alkylaluminoxanes and which provide stable catalyst compositions.
11. The solution proposed in Claim 1 of the present application is to use an heterocyclic compound of formula (I), in which the nitrogen atom is substituted by an hydrocarbyl group, and in which the carbon atom in position 4 bears an hydrogen atom, in the preparation of the organometallic compound.
12. It thus remains to be decided whether the subject-matter of Claim 1 of the present application was obvious to a skilled person in view of D1.
13. In that respect, it has been argued by the Review Board, that the replacement of the hydrogen atom on the nitrogen by an hydrocarbyl group would have represented a normal option to the skilled person seeking to prepare alternative cocatalysts.
14. In this connection, the Board notes, however, that Claim 1 of the present application requires not only that an hydrocarbyl group be present on the nitrogen

- atom, but, in addition, that an hydrogen atom be present on the carbon in position 4.
15. These structural changes in the heterocyclic compound have for their consequences that the organometallic compounds obtained have a totally different structure from those obtained in D1, i.e. the metal belonging to the group 13 of the Periodic Table is no longer bound to the nitrogen atom as in D1 but to a carbon atom in an  $\alpha$ -position to the nitrogen of the heterocyclic ring.
  16. In the Board's view, document D1 would provide no hint to the skilled person that, despite these structural differences in the organometallic compounds, the organometallic compounds according to the present application would still not only work as cocatalysts in metallocene comprising catalyst compositions, but furthermore, that they would allow a reduction of the amount of cocatalyst in respect to alkylaluminoxanes and that they would stabilize such catalyst compositions, since D1 is totally silent on a substitution on the nitrogen atom of the heterocyclic compound, let alone on the influence of such substitution on the cocatalyst activity of the organometallic compound.
  17. It thus follows that the subject-matter of Claim 1 of the present application cannot be considered as obvious in view of D1.
  18. Consequently, the common concept as defined in paragraph 4 above is novel and inventive over D1 and the subject-matter of Claims 1 to 8, of Claims 9 to 14, of Claims 15 to 19, and of Claim 20 must hence be

considered as so linked as to form a single general inventive concept within the meaning of Rule 13.1 PCT.

19. It thus follows from the above that the reasons given in 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:

C. Eickhoff

R. Young