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Datasheet for the decision of 15 July 2008

Case Number: T 1063/07 - 3.3.03

Application Number: 93907617.0

Publication Number: 0632819

IPC: C08F 10/00

Language of the proceedings: EN

Title of invention:
Addition polymerization catalysts comprising reduced oxidation state metal complexes

Patentee:
THE DOW CHEMICAL COMPANY

Opponent:
ExxonMobil Chem. Pat. Inc.

Headword:
-

Relevant legal provisions:
EPC Art. 123(2)

Relevant legal provisions (EPC 1973):
-

Keyword:
"Amendments - added subject-matter (yes) - all requests"

Decisions cited:
-

Catchword:
-

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Case Number: T 1063/07 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 15 July 2008

Appellant: (Patent Proprietor)	THE DOW CHEMICAL COMPANY 2030 Dow Center Midland Michigan 48674 (US)
Representative:	Hatzmann, Martin VEREENIGDE Johan de Wittlaan 7 NL-2517 JR Den Haag (NL)
Respondent: (Opponent)	ExxonMobil Chem. Pat. Inc. 5200 Bayway Drive Baytown Texas 77520-5200 (US)
Representative:	Veldhuizen, Albert Dirk Willem Exxon Chemical Europe Inc. P.O. Box 105 BE-1830 Machelen (BE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office dated 25 April 2007 and posted 11 May 2007 revoking European patent No. 0632819 pursuant to Article 102(1) EPC 1973.**

Composition of the Board:

Chairman: R. Young
Members: W. Sieber
H. Preglau

Summary of Facts and Submissions

I. The mention of the grant of European patent no. 0 632 819, in respect of European patent application no. 93907617.0, based on International application PCT/US93/02584, in the name of The Dow Chemical Company, filed on 19 March 1993 and claiming US priorities of 26 March 1992 (US 857886), 4 September 1992 (US 941014) and 21 January 1993 (US 8003), was published on 2 September 1998 (Bulletin 1998/36). The granted patent contained 22 claims, whereby Claim 1 read as follows:

"A composition useful as an addition polymerization catalyst comprising:

(i) a metal complex corresponding to the formula: $Cp_aZY)_bML_c$, wherein:

a is 1 or 2; b is 0 or 1; c is 1 or 2;
the sum of a, b and c is 3;
Cp independently at each occurrence is a cyclopentadienyl group π-bound to M, or a hydrocarbyl, silyl, halo, halohydrocarbyl, hydrocarbylmetalloid or halohydrocarbylmetalloid substituted derivative of said cyclopentadienyl group, said Cp containing up to 50 nonhydrogen atoms, and, when a is 2, optionally both Cp groups may be joined together by a bridging group;
L independently each occurrence is hydride, halo, or a monovalent anionic ligand selected from covalently bonded hydrocarbyl, silyl, amido, phosphido, alkoxy, aryloxy, and sulfido groups optionally being further substituted with amine, phosphine, ether, and thioether; mixtures thereof; said ligand having up to

50 nonhydrogen atoms, with the proviso that in at least one occurrence L is a stabilizing ligand comprising an amine, phosphine, ether, or thioether functionality able to form a coordinate-covalent bond or chelating bond with M, or except when a is 2, comprising an ethylenic unsaturation able to form an η^3 bond with M;
M is a metal of Group 4 of the Periodic Table of the Elements in the +3 oxidation state;

when b is 1:

Y is a linking group comprising nitrogen, phosphorus, oxygen or sulfur covalently bonded to M and Z through said nitrogen, phosphorus, oxygen or sulfur atom;
Z is a divalent moiety comprising a member of Group 14 of the Periodic Table of the Elements having up to 30 nonhydrogen atoms;
Cp, Z and Y form a ligand moiety consisting of -Cp-Z-Y-; and

(ii) an activating cocatalyst but excluding activating cocatalysts that comprise an oxidizing agent capable of oxidizing the metal M, which activating cocatalyst is selected from the group consisting of aluminium alkyls, i.e. no alkylaluminium halides, alkylalumoxanes, and boron compounds of the formula R""$_3$B, wherein R"" independently each occurrence is selected from hydrogen, silyl, hydrocarbyl, halohydrocarbyl, alkoxide, aryloxide, amide, or combinations thereof, or R""3B is triphenylboron, halogenated triphenylboron or fluoro substituted triarylboron, said R"" having up to 30 nonhydrogen atoms."

The remaining claims are not of importance for this decision and consequently they will not be considered in further detail.

II. A notice of opposition was filed on 2 June 1999 by Exxon Chemical Patents Inc. (now ExxonMobil Chemical Patents Inc.) requesting revocation of the patent in its entirety on the grounds of Article 100(a) (lack of novelty and lack of inventive step) and (b) EPC.

In the letter dated 14 September 2001, the opponent raised a further objection under Article 100(b) EPC. Further, it requested to introduce the new ground of opposition pursuant to Article 100(c) EPC because, firstly, the term in subparagraph (i) of granted Claim 1 "**except when a = 2**" and, secondly, the wording in subparagraph (ii) "**but excluding activating cocatalysts that comprise an oxidizing agent capable of oxidizing the metal M**" contravened Article 123(2) EPC.

III. By a decision which was announced orally on 14 November 2001 and issued in writing on 28 November 2001, the opposition division rejected the opposition, whereby the late-filed ground of opposition according to Article 100(c) EPC and the late-filed objections under Article 100(b) EPC were disregarded under Article 114(2) EPC as they were found to be *prima facie* not relevant.

IV. On 28 January 2002, the opponent lodged an appeal against the above decision of the opposition division.

In its decision T 117/02 of 7 November 2005, the board of appeal found that the opposition division's discretionary decision pursuant to Article 114(2) EPC

was based on grounds and evidence on which the Opponent had not had an opportunity to present its comments, contrary to Article 113(1) EPC. Consequently, the decision of the Opposition Division was set aside and the case was remitted to the first instance for further prosecution.

V. By a decision which was announced orally on 25 April 2007 and issued in writing on 11 May 2007, the opposition division revoked the patent because the Proprietor's various claim sets did not meet the requirements of the EPC. In particular, the expression "but excluding activating cocatalysts that comprise an oxidizing agent capable of oxidizing the metal M" in Claim 1 as granted did not find a basis in the application as filed, so that the main request (claims as granted) did not comply with Article 100(c)/ Article 123(2) EPC. The various attempts of the proprietor in three auxiliary requests to overcome this deficiency by deletion and/or replacement of the objected expression were found to contravene Article 123(3) EPC.

VI. On 3 July 2007, the appellant (proprietor) lodged an appeal against the decision of the opposition division to revoke the patent with simultaneous payment of the prescribed fee. A statement setting out the grounds of appeal, including a new main request and auxiliary requests I to VI, was filed on 20 September 2007.

Claim 1 of the main request read as follows:

"A composition useful as an addition polymerization catalyst consisting of:

(i) a metal complex selected from A_1, A_2, or A_3 wherein:

A_1 corresponds to the formula:

(Ia) Cp'_2ML',

wherein:
Cp' independently each occurrence is a cyclopentadienyl group η-bound to M, or a hydrocarbyl, silyl, halo, halohydrocarbyl, hydrocarbylmetalloid or halohydrocarbylmetalloid substituted derivative of said cyclopentadienyl group, said Cp' containing up to 50 nonhydrogen atoms, and optionally both Cp groups may be joined together by a bridging group;
M is a metal of Group 4 of the Periodic Table of the Elements in the +3 oxidation state;
L' is a monovalent anionic stabilizing ligand selected from the group consisting of: covalently bonded hydrocarbyl, silyl, amido, phosphido, alkoxy, aryloxy, sulfido groups and mistures thereof, said group being further substituted with an amine, phosphine, ether, or thioether containing substituent able to form a coordinate-covalent bond or chelating bond with M; said ligand having up to 50 nonhydrogen atoms;

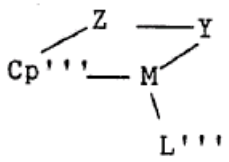
A_2 corresponds to the formula:

(Ib) $Cp"ML"_2$,

wherein:
Cp" is a cyclopentadienyl group η-bonded to M, or a hydrocarbyl, silyl, halo, halohydrocarbyl, hydrocarbylmetalloid, or halohydrocarbylmetalloid substituted derivative thereof, said Cp" containing up to 50 nonhydrogen atoms;

M is a metal of Group 4 of the Periodic Table of the Elements in the +3 oxidation state;
L" independently each occurrence is hydride, halo or a monovalent anionic ligand selected from the group consisting of covalently bonded hydrocarbyl, silyl, amido, phosphido, alkoxy, aryloxy, and sulfido groups; mixtures thereof; and amine, phosphine, ether, and thioether derivatives of the foregoing, said ligand having up to 50 nonhydrogen atoms, with the proviso that in at least one occurrence L" is a stabilizing ligand comprising an amine, phosphine, ether, or thioether functionality able to form a coordinate-covalent bond or chelating bond with M, or comprising an ethylenic unsaturation able to form an η^3 bond with M; and

A_3 corresponds to the formula:



(Ic)

wherein:
M is a metal of Group 4 of the Periodic Table of the Elements in the +3 oxidation state;
Cp"' is a cyclopentadienyl group, or a hydrocarbyl, silyl, halo, halohydrocarbyl, hydrocarbylmetalloid, or halohydrocarbylmetalloid substituted derivative thereof, said Cp"' containing up to 50 nonhydrogen atoms;
Z is a divalent moiety comprising a member of Group 14 of the Periodic Table of the Elements said moiety having up to 30 nonhydrogen atoms.
Y is a linking group comprising nitrogen, phosphorus, oxygen or sulfur covalently bonded to M and Z through said nitrogen, phosphorus, oxygen or sulphur atom, the

ligand moiety consisting of -Cp"'-Z-Y- being dianionic and having the ionic charges residing formally on Cp"' and Y; and
L"' is a monovalent anionic stabilizing ligand selected from the group consisting of L' and linear C_{3-15} hydrocarbyl groups comprising an ethylenic unsaturation able to form an an η^3 bond with M; and

(ii) an activating cocatalyst, which activating cocatalyst is selected from the group consisting of aluminium alkyls, i.e. no alkylaluminium halides, alkylalumoxanes, and boron compounds of the formula R""3B, wherein R"" independently each occurrence is selected from hydrogen, silyl, hydrocarbyl, halohydrocarbyl, alkoxide, aryloxide, amide, or combinations thereof, or $R""_3B$ is triphenylboron, halogenated triphenylboron or fluoro substituted triarylboron, said R"" having up to 30 nonhydrogen atoms."

Claim 1 of auxiliary requests I to VI corresponded to Claim 1 of the main request except that the activating cocatalyst (ii) was defined differently. However, the exact wording of the various definitions for the activating cocatalyst (ii) is not relevant for the decision and will therefore not be discussed in further detail.

VII. In its reply dated 31 January 2008, the respondent (opponent) objected that the claims of all requests failed to meet the requirements of Article 123(2) and (3) EPC and/or Article 84 EPC. In particular, there was no disclosure in the application as filed of a catalyst that was made up only of the metal complex of

general formulae Ia, Ib and Ic with the specific activating cocatalyst recited in Claim 1 and nothing else. Consequently, the replacement in Claim 1 of all requests of "comprising" by "consisting of" did not meet the requirements of Article 123(2) EPC.

VIII. Following the summons to oral proceedings scheduled for 15 July 2008, the respondent indicated in the letter dated 19 February 2008 that it would not attend these oral proceedings and withdrew its request for oral proceedings.

In the letter dated 21 February 2008, the representative of the appellant requested to reschedule the oral proceedings because of his summer holidays and because it would be highly unpractical if the file would need to be transferred to one his colleagues.

In a communication dated 29 February 2008, the board pointed out that the reasons given by the representative of the appellant did not meet the criteria set out in the Notice of the Vice-Presidents Directorates-General 2 and 3 (OJ EPO 2000, pages 456 to 458) and that it appeared from the representative's letter that the case could be transferred to another person. Consequently, the oral proceedings would be held as scheduled.

IX. In the letter dated 9 June 2008, the representative of the appellant informed the board that he would be unable to attend the oral proceedings scheduled for 15 July 2008 and requested that the board decided on the written submissions. Further, he provided arguments as to why the wording "consisting of" would be clear.

X. On 15 July 2008, oral proceedings were held before the board at which both parties were, as announced, not represented. Since they had been duly summoned, however, the oral proceedings were continued in their absence in accordance with Rule 115(2) EPC.

XI. The appellant requested to set aside the decision under appeal and to decide that the claims of the main request or of auxiliary requests I-VI, all filed with the letter dated 20 September 2007, met the requirements of Article 123(2) and (3) EPC, and to remit the case to the Opposition Division for further prosecution.

The respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request*

2.1 In its statement of grounds of appeal the appellant has not presented any reasons why the findings of the opposition division should be reversed. The appellant instead offers an alternative amendment for Claim 1 of the main request (point VI, above), namely

- replacement of the single general formula by the complexes A_1, A_2 and A_3,
- replacement of "comprising" by "consisting of",

– along with the deletion of the expression "but excluding activating cocatalysts that comprise an oxidizing agent capable of oxidizing the metal M".

2.2 It is apparent from pages 3 and 4 of the application as originally filed as well as from Claim 2, 3 and 5 as originally filed that the composition useful as an addition polymerisation catalyst can comprise complexes A_1, A_2 and A_3. However, both at pages 3 and 4 and in Claims 2, 3 and 5 as originally filed, the composition is described as either

"**comprising in combination**: (i) a metal complex … and (ii) an activating cocatalyst" - Claims 2 and 3 and page 3, lines 3 and 23 of the application as originally filed;

or

"**comprising** a metal complex … and an activating cocatalyst" - Claim 5 of the application as originally filed;

or

"**comprising**: (i) the complex … and (ii) an activating cocatalyst" - page 4, line 31 of the application as originally filed.

It is conspicuous to the board that there is no disclosure in the application as originally filed of a composition useful as an addition polymerization catalyst that is made up **only** of the metal complexes A_1, A_2 or A_3 and an activating cocatalyst **and nothing else**, which is the meaning of the term "consisting of" in Claim 1. In fact, the wording "consisting of" does not appear in the application as filed. The replacement in Claim 1 of "comprising" by "consisting of" creates a

criticality as to the presence of only the metal complexes A_1, A_2 or A_3 and an activating cocatalyst in the composition which is not present as a sub-combination in the application as originally filed. Claim 1 of the main request therefore contains added subject-matter.

2.3 Apart from an allegation of implicit support for the replacement of "comprising" by "consisting of" "in the entire application as originally filed" the appellant specifically referred to the paragraph bridging pages 4 and 5 of the application as originally filed and page 5, lines 7-12, teaching the combination of only these two starting compounds, as well as the working examples.

Firstly, it is conspicuous to the board that the passages referred to by the appellant rather generally refer to the formation of the composition and not to the composition as such (ie "… the metal complexes A_1, A_2, and A_3 when combined with the activating cocatalyt …" and "The catalyst formed from these complexes by combination with the activating cocatalyst …").

Secondly, the expressions used in the above cited passages, namely "combined with" and "formed from" do not necessarily imply that no other component is present. In fact, these passages have to be read in the context of the statement at page 12, lines 4-6:

> "The catalyst can be formed by combining the activating cocatalyst (where required) with the complex, with or without a neutral Lewis base, optionally in the presence of a diluent."

This statement contemplates that the composition can contain other components than the metal complex and the activating cocatalyst. Thus, it is not appropriate to draw from the rather general statements referred to by the appellant the conclusion that no other component should be present during the formation of the composition, ie that the application as originally filed is directed to a composition consisting of metal complex and activating cocatalyst.

Finally, the appellant suggests that the examples of the application as filed support the replacement of "comprising" by "consisting of". However, they do not, as in each case the catalyst composition contains a diluent as is apparent from the statement on page 15, lines 21-23 of the application as originally filed:

> Metal complex and cocatalyst (when used) were mixed in a drybox by syringing the desired amount of 0.0050 M metal complex solution (in Isopar-E™ or toluene) into a solution of the cocatalyst (in Isopar-E™ or toluene). This solution was then transferred to a catalyst addition tank and injected into the reactor."

Thus, none of the catalyst compositions used in the examples of the application as filed consists of only metal complex and activating cocatalyst.

2.4 Taking into account all these aspects, it is evident that there is no clear and unambiguous disclosure in the application as originally filed to a catalyst composition **consisting of** a metal complex and an

activating cocatalyst. Consequently, Claim 1 of the main request does not meet the requirements of Article 123(2) EPC.

2.5 Claim 1 of the main request being not allowable, the main request has to be refused.

3. *Auxiliary requests I to VI*

In Claim 1 of each auxiliary request "comprising" has been replaced by "consisting of". In fact, Claim 1 of each auxiliary request differs from Claim 1 of the main request only in that the activating cocatalyst is defined in different terms. Hence, the objection raised against the term "consisting of" in Claim 1 of the main request under Article 123(2) EPC applies equally to Claim 1 of each auxiliary request so that none of the auxiliary requests is allowable.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

E. Görgmaier R. Young