

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
20 September 2007 (20.09.2007)

PCT

(10) International Publication Number
WO 2007/106348 A3

(51) International Patent Classification:
C08F 10/00 (2006.01) C08F 4/656 (2006.01)

(21) International Application Number:
PCT/US2007/005744

(22) International Filing Date: 8 March 2007 (08.03.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
11/373,003 10 March 2006 (10.03.2006) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(88) Date of publication of the international search report:
28 February 2008



WO 2007/106348 A3

(54) Title: ZIEGLER-NATTA CATALYST WITH IN SITU-GENERATED DONOR

(57) Abstract: In one aspect, the invention relates to a method for producing a polymerization catalyst, the method comprising: (a) providing a catalyst support material comprising a magnesium component bound or complexed to a metal oxide component, the magnesium component being either a magnesium (Y) component wherein Y is an alkoxide group or amido group, or an alcohol-adsorbed magnesium halide component; (b) reacting the magnesium component with one or more silane halide compounds to provide a modified catalyst support material containing in situ-generated alkoxy silane or amidosilane electron donor compounds; (c) combining the modified catalyst support material with one or more catalytically active transition metal compounds to provide a catalyst precursor; and d) combining the catalyst precursor with one or more catalytically active main group metal compounds. In another aspect, the invention relates to a method for polymerizing one or a combination of olefins by contacting the one or combination of olefins with the above polymerization catalyst under polymerization conditions.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/005744

A. CLASSIFICATION OF SUBJECT MATTER INV. C08F10/00 C08F4/656		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) C08F		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, CHEM ABS Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 052 266 A (BP CHEMICALS SNC [FR]) 15 November 2000 (2000-11-15) example 2	1-3, 8-13, 22-25, 32-34, 37, 39
X	EP 0 206 172 A1 (IDEMITSU PETROCHEMICAL CO [JP]) 30 December 1986 (1986-12-30) examples 25-29; table 1 <div style="text-align: center;">----- -/--</div>	1-4, 6, 8-14, 22, 23, 32-37, 39
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.		
<input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents :		
A document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family	
Date of the actual completion of the international search	Date of mailing of the international search report	
21 August 2007	09/01/2008	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer Parry, Julian	

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/005744

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/127349 A1 (GAO KEJING [CN] ET AL) 1 July 2004 (2004-07-01) example 1	1-3, 8-13,22, 23, 32-34, 37,39
X	US 5 001 099 A (SHELLY JAVAN [US]) 19 March 1991 (1991-03-19) example 15	1-3, 8-13,22, 23, 32-34, 37,39
X	US 5 064 798 A (CHANG MAIN [US]) 12 November 1991 (1991-11-12) example 20	1-3, 8-13,22, 23, 32-34, 37,39
X	US 4 981 826 A (SPECIA ANTHONY N [US]) 1 January 1991 (1991-01-01) examples 1-20	1-3, 8-13,22, 23, 32-34, 37,39
X	US 4 634 746 A (ETHERTON BRADLEY P [US] ET AL) 6 January 1987 (1987-01-06) examples 17,18,2	1-4,6, 8-13,22, 23, 32-37,39
X	EP 0 193 281 A2 (TOA NENRYO KOGYO KK [JP]) 3 September 1986 (1986-09-03) example 1	1-3, 8-13,22, 23, 32-34, 37-39

INTERNATIONAL SEARCH REPORT

International application No.
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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1 - 14, 22 - 25, 32 - 39 (in part)

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-14,22-25,32-39 (in part)

The subject matter of claims 1-14,22-25,32-39 (in part where applicable) where Y = alkoxide group.

2. claims: 1-14,22-25,32-38 (in part)

The subject matter of claims 1-14,22-25,32-38 (in part where applicable), where Y = amido group.

3. claims: 1-38,40 (in part)

The subject matter of claims 1-38,40 (in part where applicable), where an alcohol-adduct magnesium halide is employed.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2007/005744

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1052266	A	15-11-2000	NONE
EP 0206172	A1	30-12-1986	DE 3680394 D1 FI 862585 A
US 2004127349	A1	01-07-2004	CN 1490343 A FI 20031511 A
US 5001099	A	19-03-1991	DE 69018005 D1 DE 69018005 T2 EP 0424919 A2 JP 3153710 A
US 5064798	A	12-11-1991	NONE
US 4981826	A	01-01-1991	AU 6647890 A WO 9107444 A1
US 4634746	A	06-01-1987	NONE
EP 0193281	A2	03-09-1986	AU 5276286 A CA 1262717 A1 DE 3670295 D1 JP 1973614 C JP 7002776 B JP 61174205 A