



(51) International Patent Classification:

C08F 210/16 (2006.01) C08L 23/04 (2006.01)  
C08F 4/6592 (2006.01) C08J 5/18 (2006.01)  
C08F 4/65 (2006.01) B29D 7/01 (2006.01)

(21) International Application Number:

PCT/KR2009/005190

(22) International Filing Date:

11 September 2009 (11.09.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

10-2008-0090522  
12 September 2008 (12.09.2008) KR  
10-2009-0082291  
2 September 2009 (02.09.2009) KR

(71) Applicant (for all designated States except US): **SK ENERGY CO., LTD.** [KR/KR]; 99, Seorin-dong, Jongno-gu, Seoul 110-110 (KR).

(72) Inventors: **SHIN, Daeho**; 304-1303, Expo APT., 464-1, Jeonmin-dong, Yuseong-gu, Daejeon 305-761 (KR). **SHIM, Choonsik**; 101-901, Jangdae Prugio, Jangdae-dong, Yuseong-gu, Daejeon 305-308 (KR). **JEONG, Jisu**; SK Daedeok Energy Institute of Technology Green-Pol Development Project, Wonchon-dong, Yuseong-gu, Daejeon 305-712 (KR). **CHAE, Sungseok**; 212-901, Daedeok Techno Valley, 665, Gwanpyeong-dong,

Yuseong-gu, Daejeon 305-509 (KR). **OK, Myungahn**; 209-302, Gyeongnam Anusville APT., Yongsan-dong, Yuseong-gu, Daejeon 305-500 (KR). **KWON, Seungbum**; 210-404, Daedeok Techno Valley, Gwanpyeong-dong, Yuseong-gu, Daejeon 305-509 (KR). **SHIN, Dongcheol**; 501-1303, Expo APT., Jeonmin-dong, Yuseong-gu, Daejeon 305-762 (KR). **LEE, Hoseong**; 1602-6ho, Bongcheon 7-dong, Gwanak-gu, Seoul 151-050 (KR).

(74) Agents: **KWON, Oh-Sig** et al.; 4F, Joeeunleaderstel, 921, Dunsan-dong, Seo-gu, Daejeon 302-120 (KR).

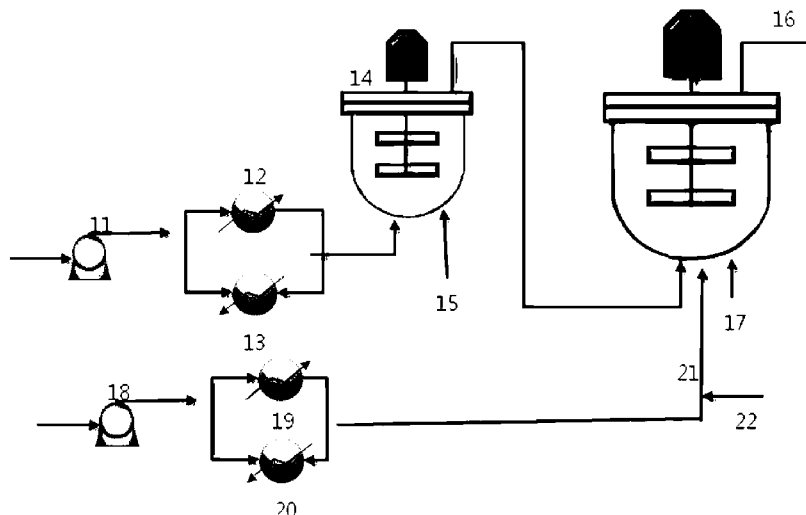
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG,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

[Continued on next page]

(54) Title: ETHYLENE COPOLYMER AND A METHOD OF PREPARING THE SAME

[Fig. 1]



(57) Abstract: Provided are ethylene copolymers and a process for preparing the same. More specifically, provided are ethylene copolymers exhibiting excellent processibility and physical properties due to its multimodal molecular weight distribution index, through a multi-stage process by using reactors connected in series or in parallel in the presence of catalyst composition containing transition metal catalyst, and a process for preparing the same.





MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM,  
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,  
ML, MR, NE, SN, TD, TG).

— before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments (Rule 48.2(h))

**Published:**

— with international search report (Art. 21(3))

**(88) Date of publication of the international search report:**

24 June 2010

## INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/KR2009/005190****A. CLASSIFICATION OF SUBJECT MATTER***C08F 210/16(2006.01)i, C08F 4/6592(2006.01)i, C08F 4/65(2006.01)i, C08L 23/04(2006.01)i, C08J 5/18(2006.01)i, B29D 7/01(2006.01)i*

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 210/16; B01J 21/06; C07F 17/00; C07F 7/00; C08F 10/02; C08F 4/64; C08F 4/642; C08F 4/646; C08F 4/649

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models  
Japanese utility models and applications for utility models  
(Chinese Patents and application for patent)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) &amp; Keywords:aryphenoxy,catalyst,ethylene copolymer

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2008-047957 A1 (SK ENERGY CO., LTD. et al.) 24 April 2008 See pages 18-20, Claims and Examples	13-19
X	KR 10-0639696 B1 (SK CORPORATION) 30 October 2006 See pages 8-9, Claims and Examples	13-19
A	KR 10-2007-0029565 A (SK CORPORATION) 14 March 2007 See Abstract, Claims and Examples	1-19
A	KR 10-2007-0104845 A (SK ENERGY CO., LTD.) 29 October 2007 See Abstract, Claims and Examples	1-19
A	JP 2003-231693 A (KANTO CHEM CO INC) 19 August 2003 See Abstract, Claims and Examples	1-19

 Further documents are listed in the continuation of Box C. 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 application or patent 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 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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

20 APRIL 2010 (20.04.2010)

Date of mailing of the international search report

**22 APRIL 2010 (22.04.2010)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office  
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

SHIN Gwi Im

Telephone No. 82-42-481-8392



**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/KR2009/005190**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2008-047957 A1	24.04.2008	CA 2665557-A1	24.04.2008
		EP 2076551 A1	08.07.2009
KR 10-0639696 B1	30.10.2006	CA 2615215-A1	12.04.2007
		CN 101213217 A0	02.07.2008
		EP 1910427 A1	16.04.2008
		JP 2008-545040 A	11.12.2008
		US 2007-0004586 A1	04.01.2007
		US 2007-0135297 A1	14.06.2007
		US 2009-0326175 A1	31.12.2009
		US 7589042 B2	15.09.2009
		WO 2007-040294 A1	12.04.2007
KR 10-2007-0029565 A	14.03.2007	CA 2621307-A1	15.03.2007
		CN 101258171 A	03.09.2008
		CN 101258171 A0	03.09.2008
		EP 1934266 A1	25.06.2008
		EP 1934266 A4	24.09.2008
		JP 2009-507954 A	26.02.2009
		US 2008-0262174 A1	23.10.2008
		WO 2007-029986 A1	15.03.2007
KR 10-2007-0104845 A	29.10.2007	CA 2649614-A1	01.11.2007
		CN 101426818 A	06.05.2009
		EP 2010576 A1	07.01.2009
		JP 2009-534517 A	24.09.2009
		US 2007-0249490 A1	25.10.2007
		US 7645715 B2	12.01.2010
WO 2007-123362 A1	01.11.2007		
JP 2003-231693 A	19.08.2003	None	