

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
10 November 2005 (10.11.2005)

PCT

(10) International Publication Number
WO 2005/105863 A3

(51) International Patent Classification⁷: **C08F 10/00**,
C07F 17/00

(21) International Application Number:
PCT/US2005/014340

(22) International Filing Date: 18 April 2005 (18.04.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/828,814 21 April 2004 (21.04.2004) US

(71) Applicant (for all designated States except US): **NOV-OLEN TECHNOLOGY HOLDINGS C.V.** [NL/NL];
Oostduinlaan 75, NL-2596 JJ The Hague (NL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SCHOTTEK, Joerg** [DE/DE]; Ginnheimerstrasse 39D, 60487 Frankfurt (DE). **PACZKOWSKI, Nicola, Stefanie** [DE/US]; 9269 kemper Grove Lane, Loveland, OH 45140 (US). **WINTER, Andreas** [DE/DE]; An den Brunnengaerten 3, 67271 Neuleiningen (DE). **SELL, Thorsten** [DE/DE]; Falkstrasse 84, 60487 Frankfurt (DE).

(74) Agents: **CALDERONE, Adrian, T.** et al.; Dilworth & Barrese, LLP, 333 Earle Ovington Boulevard, Uniondale, NY 11553 (US).

(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, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, 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, MC, 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:
19 January 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METALLOCENE LIGANDS, METALLOCENE COMPOUNDS AND METALLOCENE CATALYSTS, THEIR SYNTHESIS AND THEIR USE FOR THE POLYMERIZATION OF OLEFINS

(57) Abstract: A catalyst system includes a metallocene compound having the formula $R^9 L^1 L^2 M^1 R^1 R^2$ wherein R^9 is a bridge between ligands L^1 and L^2 and M^1 is a metal of Group IVB of the Periodic Table such as titanium, zirconium and hafnium and R^1 and R^2 can be hydrogen or aliphatic or aromatic groups. Bridge R^9 can include silicon, germanium or tin. The metallocene compound of the invention as synthesized has a racemic to meso isomer ratio of greater than 5 to 1, thereby precluding the need for subsequent separation of the meso isomer.



WO 2005/105863 A3