

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
24 May 2007 (24.05.2007)

PCT

(10) International Publication Number
WO 2007/057458 A1

(51) International Patent Classification:
C07C 2/36 (2006.01) *B01J 31/24* (2006.01)
C07C 11/107 (2006.01)

(74) Agent: ZEESTRATEN, Albertus, Wilhelmus, J.; C30,
PO Box 384, NL-2501 CJ The Hague (NL).

(21) International Application Number:
PCT/EP2006/068659

(22) International Filing Date:
20 November 2006 (20.11.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
05257159.3 21 November 2005 (21.11.2005) EP

(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, LV, 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, 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).

(71) Applicant (for all designated States except US): SHELL
INTERNATIONALE RESEARCH MAATSCHAPPIJ
B.V. [NL/NL]; Carel Van Bylandtlaan 30, NL-2596 HR
The Hague (NL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): DE BOER, Eric
Johannes Maria [NL/NL]; Badhuisweg 3, NL-1031
CM Amsterdam (NL). VAN DER HEIJDEN, Harry
[NL/NL]; Badhuisweg 3, NL-1031 CM Amsterdam (NL).
ON, Quoc An [NL/NL]; Badhuisweg 3, NL-1031 CM
Amsterdam (NL). SMIT, Johan Paul [NL/NL]; Bad-
huisweg 3, NL-1031 CM Amsterdam (NL). VAN ZON,
Arie [NL/NL]; Badhuisweg 3, NL-1031 CM Amsterdam
(NL).

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

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: CATALYTIC PROCESS FOR THE OLIGOMERIZATION OF OLEFINIC MONOMERS

(57) Abstract: A process for the simultaneous trimerization and tetramerization of olefinic monomers, wherein the process comprises contacting at least one olefinic monomer with catalyst system comprising: a) a source of chromium, molybdenum or tungsten; b) a ligand having the general formula (I); $(R^1)_2P-X-P(R^1)_m(R^2)_n$ wherein X is a bridging group of the formula $-N(R^3)-$, wherein R^3 is selected from hydrogen, a hydrocarbyl group, a substituted hydrocarbyl group, a heterohydrocarbyl group, a substituted heterohydrocarbyl group, a silyl group or derivative thereof; the R^1 groups are independently selected from an optionally substituted aromatic group bearing a polar substituent on at least one of the ortho-positions; and the R^2 groups are independently selected from hydrocarbyl, substituted hydrocarbyl, heterohydrocarbyl and substituted heterohydrocarbyl groups and c) a cocatalyst, at a pressure in the range of from below atmospheric to about 40 barg and at a temperature in the range of from about 0 °C to about 120 °C. The present invention further relates to a process for the simultaneous trimerization and tetramerization of ethylene to 1-hexene and 1-octene.

WO 2007/057458 A1