

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
22 July 2004 (22.07.2004)

PCT

(10) International Publication Number  
**WO 2004/060835 A3**

(51) International Patent Classification<sup>7</sup>: **C07C 11/02**,  
C01B 3/34, C08F 10/00, C07C 1/20, C01B 3/24

SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA,  
GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(21) International Application Number:  
PCT/US2003/037004

**Declarations under Rule 4.17:**

(22) International Filing Date:  
18 November 2003 (18.11.2003)

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
10/327,767 23 December 2002 (23.12.2002) US

(71) Applicant (for all designated States except US): **EXXON-MOBIL CHEMICAL PATENTS INC.** [US/US]; 5200 Bayway Drive, Baytown, TX 77520-5200 (US).

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SHER, Jaimes** [US/US]; 7815 Betty Jane Lane, Houston, TX 77055 (US). **ZBORAY, James, A.** [US/US]; 17 Glen Drive, Voorhees, NJ 08043 (US).

(74) Agent: **SHER, Jaimes**; ExxonMobil Chemical Company, Law Technology, P.O. Box 2149, Baytown, TX 77522-2149 (US).

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

**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

(84) Designated States (regional): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE,

(88) Date of publication of the international search report:  
2 September 2004

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: INTEGRATED GAS TO OLEFINS PROCESS WITH RECOVERY AND CONVERSION OF BY-PRODUCTS

(57) Abstract: This invention provides a method for producing a light olefin product from a hydrocarbon feed, as well as a method for converting by-product to light olefin. In one embodiment, the process includes production of a synthesis gas from the hydrocarbon feed, conversion of the synthesis gas to an oxygenate composition, and conversion of the oxygenate components to an olefin stream. A by-product stream can also be separated and ultimately converted to additional light olefin product.

WO 2004/060835 A3

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/37004

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC 7 C07C11/02 C01B3/34 C08F10/00 C07C1/20 C01B3/24

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)

IPC 7 C07C C01B

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, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 318 282 A (UOP INC) 31 May 1989 (1989-05-31) column 2, line 8 - line 39 column 25, line 3 - line 44 column 27, line 38 - column 28, line 20 figure 1	1-22
A	EP 0 933 345 A (NORSK HYDRO; UOP) 4 August 1999 (1999-08-04) claims	1-22

Further documents are listed in the continuation of box C.

Patent family members are listed in 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.
- \*Z\* document member of the same patent family

Date of the actual completion of the international search

30 June 2004

Date of mailing of the international search report

12/07/2004

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

O'Sullivan, P

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/US 03/37004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date			
EP 0318282	A	31-05-1989	US 4849575 A 18-07-1989			
			AT 100786 T 15-02-1994			
			AU 2591088 A 08-06-1989			
			BR 8806210 A 15-08-1989			
			CA 1323358 C 19-10-1993			
			DE 3887469 D1 10-03-1994			
			DE 3887469 T2 11-05-1994			
			EP 0318282 A2 31-05-1989			
			JP 1909731 C 09-03-1995			
			JP 2000121 A 05-01-1990			
			JP 6037405 B 18-05-1994			
			MX 167629 B 31-03-1993			
			ZA 8808821 A 30-08-1989			
			<hr style="border-top: 1px dashed black;"/>			
EP 0933345	A	04-08-1999	AU 744933 B2 07-03-2002			
			CA 2228738 A1 02-08-1999			
			CN 1224705 A 04-08-1999			
			NO 980381 A 29-07-1999			
			NZ 329645 A 29-06-1999			
			RU 2165955 C2 27-04-2001			
			US 5714662 A 03-02-1998			
			ZA 9800735 A 27-07-1998			
			EP 0933345 A1 04-08-1999			
			AU 5274798 A 26-08-1999			
			DE 69801643 D1 18-10-2001			
			DE 69801643 T2 04-07-2002			
			<hr style="border-top: 1px dashed black;"/>			