

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
31 July 2003 (31.07.2003)

PCT

(10) International Publication Number
WO 03/062172 A2

- (51) International Patent Classification⁷: **C07C**
- (21) International Application Number: PCT/US02/22817
- (22) International Filing Date: 17 July 2002 (17.07.2002)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
10/054,004 24 January 2002 (24.01.2002) US
- (71) Applicants: **GRT, INC.** [US/US]; P.O. Box 130906, The Woodlands, TX 77381 (US). **THE REGENTS OF THE UNIVERSITY OF CALIFORNIA** [US/US]; 1111 Franklin Street, 12th floor, Oakland, CA 94607 (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, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (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, IE, IT, LU, MC, NL, PT, SE, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

- (72) Inventors: **ZHOU, Xiao, Ping**; 733 Elkus Walk, Apt. #102, Goleta, CA 93117-4127 (US). **LORKOVIC, Ivan, Marc**; 22 West Islay Street, Santa Barbara, CA 93101 (US). **SHERMAN, Jeffrey, A.**; 301 B South Wimbrow Drive, Sebastian, FL 32958 (US).

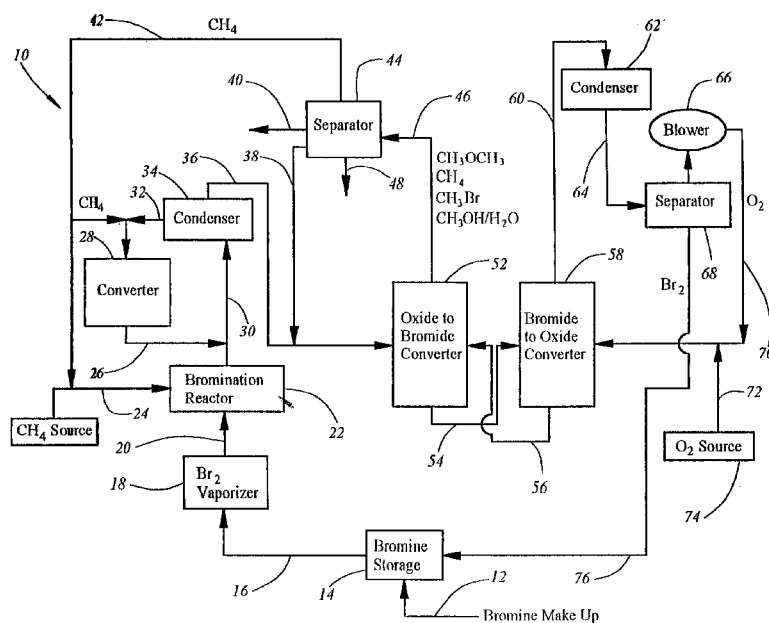
Published:

— without international search report and to be republished upon receipt of that report

- (74) Agent: **O'NEIL, Michael, A.**; Michael A. O'Neil, P.C., Suite 1030, 5949 Sherry Lane, Dallas, TX 75225 (US).

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 PROCESS FOR SYNTHESIZING ALCOHOLS, ETHERS, AND OLEFINS FROM ALKANES



(57) Abstract: Alcohols, ethers, and olefins are manufactured from alkanes by mixing an alkane and bromine in a reactor to form alkyl bromide and hydrogen bromide. The alkyl bromide only or the alkyl bromide and the hydrogen bromide are directed into contact with metal oxide to form an alcohol and/or an ether, or an olefin and metal bromide. The metal bromide is oxidized to form original metal oxide and bromine, both of which are recycled.



WO 03/062172 A2