

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
13 December 2007 (13.12.2007)

PCT

(10) International Publication Number  
**WO 2007/142864 A3**

(51) International Patent Classification:  
C07C 2/76 (2006.01) C07C 2/66 (2006.01)

(21) International Application Number:  
PCT/US2007/012419

(22) International Filing Date: 24 May 2007 (24.05.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/810,095 31 May 2006 (31.05.2006) US

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

(72) Inventors; and

(75) Inventors/Applicants (for US only): **IACCINO, Larry, L.** [US/US]; 2409 Menard Street, Seabrook, TX 77586 (US). **PATT, Jeremy, J.** [US/US]; 2117 Emerald Cove Dr., League City, TX 77573 (US).

(74) Agents: **FENG, Xiaobing** et al.; Exxonmobil Chemical Company, Law Technology, P.o.box 2149, Baytown, TX 77522-2149 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, 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, LY, MA, MD, ME, 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, MT, 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:  
14 February 2008

(54) Title: USE OF ISOTOPIC ANALYSIS FOR DETERMINATION OF AROMATIC HYDROCARBONS PRODUCED FROM METHANE

(57) Abstract: Benzene and xylene are described having a unique distribution of deuterium and  $^{13}\text{C}$  such that  $\delta(\text{deuterium})$  for each of the benzene and xylene is less than -250 and  $\delta(^{13}\text{C})$  for the benzene is greater than -36 and for xylene is less than -24, wherein  $\delta(\text{deuterium}) = (\text{R}'_{\text{sample}}/\text{R}'_{\text{standard}} - 1) \times 1000$  where  $\text{R}'_{\text{sample}}$  is the ratio of deuterium to hydrogen in the benzene/xylene; and  $\text{R}'_{\text{standard}}$  is the ratio of the natural abundance of deuterium to the natural abundance of hydrogen; and wherein  $\delta(^{13}\text{C}) = (\text{R}''_{\text{sample}}/\text{R}''_{\text{standard}} - 1) \times 1000$  where  $\text{R}''_{\text{sample}}$  is the ratio of  $^{13}\text{C}$  to  $^{12}\text{C}$  in the benzene/xylene; and  $\text{R}''_{\text{standard}}$  is the ratio of the natural abundance of  $^{13}\text{C}$  to the natural abundance of  $^{12}\text{C}$ .



WO 2007/142864 A3