

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
20 January 2005 (20.01.2005)

PCT

(10) International Publication Number
WO 2005/005402 A3

(51) International Patent Classification⁷: **C07D 301/19**

(21) International Application Number:
PCT/US2004/020719

(22) International Filing Date: 28 June 2004 (28.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/483,709 30 June 2003 (30.06.2003) US

(71) Applicant (for all designated States except US): **SHELL OIL COMPANY** [US/US]; One Shell Plaza, P.O. Box 2463, Houston, TX 77252-2463 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MURRAY, Brendan, Dermot** [US/US]; 1118 Stoney Hill Drive, Houston, TX 77077 (US). **VAPORCIYAN, Garo, Garbis** [US/US]; One Shell Plaza, 910 Louisiana, Houston, TX 77002-4901 (US).

(74) Agent: **ADAMSON, Jennifer, D.**; Shell Oil Company, One Shell Plaza, P.O. Box 2463, Houston, TX 77252-2463 (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, 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, 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, IT, 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:
21 April 2005

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: PROCESS FOR PRODUCING ALKYLENE OXIDE

(57) Abstract: A process for preparing an alkylene oxide, which process comprises: (i) oxidizing an alkylbenzene to obtain a stream comprising alkylbenzene hydroperoxide; (ii) contacting at least part of the alkylbenzene hydroperoxide obtained in step (i) with an olefin to obtain a product stream comprising an alkylene oxide; (iii) separating alkylene oxide compound from the product stream of step (ii) to obtain (a) a residual product stream comprising alkylphenyl alcohol, and (b) alkylene oxide; (iv) feeding at least a part of the residual product stream comprising alkylphenyl alcohol to a reactor having a catalytic distillation zone, and concurrently in the reactor: (a) contacting the residual product stream comprising alkylphenyl alcohol with hydrogen in the catalytic distillation zone to convert the alkylphenyl alcohol in the residual product stream to alkylbenzene and from a reaction mixture; and, (b) separating alkylbenzene from the reaction mixture by fraction distillation; (v) withdrawing a stream comprising alkylbenzene and having a reduced concentration of alkylphenyl alcohol than the feed stream from the reactor at a position upper from the catalytic reaction zone; withdrawing from the reactor at a position lower than the catalytic distillation zone a bottom stream comprising dimer(s) of alkylbenzene; alkylbenzene; and, (viii) recycling at least a part of the alkylbenzene produced from (iv)(b) and/or (vi) to step (i).



WO 2005/005402 A3