

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
1 July 2004 (01.07.2004)

PCT

(10) International Publication Number
WO 2004/054946 A1

(51) International Patent Classification⁷: **C07C 29/16**,
B01J 23/75

(21) International Application Number:
PCT/EP2003/051027

(22) International Filing Date:
16 December 2003 (16.12.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
02258669.7 17 December 2002 (17.12.2002) EP

(81) Designated States (*national*): 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, 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 (*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, SI, SK, TR), OAPI patent (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*): **DRENT, Eit** [NL/NL]; Badhuisweg 3, NL-1031 CM Amsterdam (NL).
SUYKERBUYK, Jacoba Catherina Lucia Johanna [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: HYDROFORMYLATION PROCESS FOR THE CONVERSION OF AN ETHYLENICALLY UNSATURATED COMPOUND TO AN ALCOHOL

(57) Abstract: The invention pertains to a hydroformylation process for the conversion of an ethylenically unsaturated compound to an alcohol comprising a first step of reacting at an elevated temperature in a reactor the ethylenically unsaturated compound, carbon monoxide, hydrogen, and a phosphine-containing cobalt hydroformylation catalyst, which are dissolved in a solvent, followed by a second step of separating a mixture comprising the alcohol and heavy ends from a solution comprising the catalyst and the solvent, followed by a third step of recycling the solution to the reactor.

