(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
17 June 2004 (17.06.2004)

PCT

(10) International Publication Number
WO 2004/050238 A1

(51) International Patent Classification[7]: B01J 23/887, 27/192, 37/00, C07C 253/26, 255/08

(21) International Application Number:
PCT/US2003/036940

(22) International Filing Date:
19 November 2003 (19.11.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/430,163 2 December 2002 (02.12.2002) US
10/717,130 18 November 2003 (18.11.2003) US

(71) Applicant: THE STANDARD OIL COMPANY [US/US]; 4101 Winfield Road, Warrenville, IL 60555 (US).

(72) Inventors: PAPARIZOS, Christos; 5750 Hartshire Drive, Willoughby, OH 44094 (US). JEVNE, Stephen, C.; 1017 Sunset Road, Wheaton, IL 60187 (US). SEELY, Michael, J.; 258 East Bailey Road, Unit F, Naperville, IL 60565 (US).

(74) Agent: YUSKO, David, P.; BP America Inc., BP Legal, 4101 Winfield Road, Mail Code 5 East, Warrenville, IL 60555 (US).

(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, 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).

Published:
— *with international search report*

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.

WO 2004/050238 A1

(54) Title: MIXED OXIDE CATALYST OF RB, CE, CR, NI, FE, BI AND MO FOR THE MANUFACTURE OF ACRYLONITRILE

(57) Abstract: A catalyst comprising a complex of catalytic oxides comprising rubidium, cerium, chromium, iron, bismuth, molybdenum, and at least one of nickel or nickel and cobalt, optionally magnesium, and optionally one of phosphorus, antimony, tellurium, sodium, lithium, potassium, cesium, thallium, boron, germanium, tungsten calcium, wherein the relative ratios of these elements are represented by the following general formula: $Rb_a Ce_b Cr_c Mg_d A_e Fe_f Bi_g Y_h Mo_{12} O_x$ wherein A is Ni or the combination of Ni and Co, Y is at least one of P, Sb, Te, Li, Na, K, Cs, TI, B, Ge, W, Ca, Zn, a rare earth element, or mixtures thereof, a is about 0.01 to about 1, b is about 0.01 to about 3, c is about 0.01 to about 2, d is 0 to about 7, e is about 0.01 to about 10, f is about 0.01 to about 4, g is about 0.05 to about 4, h is 0 to about 3, x is a number determined by the valence requirements of the other elements present, wherein "b" + "c" is greater than "g" and wherein the catalyst is substantially free of manganese, a noble metal and vanadium. The catalyst is useful in processes for the ammoxidation of an olefin selected from the group consisting of propylene, isobutylene or mixtures thereof, to acrylonitrile, methacrylonitrile and mixtures thereof, respectively.