

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
23 July 2009 (23.07.2009)

PCT

(10) International Publication Number
WO 2009/091336 A1

(51) International Patent Classification:

B01J 29/06 (2006.01) **B01J 29/076** (2006.01)
B01J 29/40 (2006.01) **B01J 29/48** (2006.01)
B01J 37/00 (2006.01)

(21) International Application Number:

PCT/SG2008/000018

(22) International Filing Date: 16 January 2008 (16.01.2008)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicants (for all designated States except US):
AGENCY FOR SCIENCE, TECHNOLOGY AND RESEARCH [SG/SG]; 20 Biopolis Way, #07-01 Centros, Singapore 138668 (SG). **MITSUI CHEMICALS INC.** [JP/JP]; 5-2, Higashi-Shimbashi 1-chome, Minatu-ku-7117, Tokyo 105-7117 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **LIU, Yan** [SG/SG]; C/O Institute of Chemical and Engineering Sciences, 1 Pesek Road, Jurong Island, Singapore 627833 (SG). **NISHIMURA, Toru** [JP/SG]; c/o Mitsui Chemicals Singapore Technical Centre 1Pesek Road, Jurong Island, Singapore 627833 (SG).

(74) Agent: **YU SARN AUDREY & PARTNERS**; 190 Middle Road #12-04, Singapore 188979 (SG).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, 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, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- of inventorship (Rule 4.17(iv))

Published:

- with international search report

(54) Title: CATALYST PREPARATION AND METHODS OF USING SUCH CATALYSTS

(57) Abstract: A process for the pre-treatment of Mo/ZSM-5 and Mo/MCM-22 catalysts is provided, which process comprises heating the catalyst at 500° C in the presence of propane. The treated catalyst, when used in the non-oxidative dehydrogenation of methane demonstrates improved benzene yield and catalyst stability as compared to catalysts pre-treated with He, methane or H₂.

WO 2009/091336 A1