

CORRECTED VERSION

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
27 August 2009 (27.08.2009)

PCT

(10) International Publication Number
WO 2009/105270 A8

(51) International Patent Classification:

B01D 53/02 (2006.01) **B01J 20/00** (2006.01)
B01D 53/22 (2006.01) **C01B 39/00** (2006.01)
B01D 71/00 (2006.01)

(21) International Application Number:

PCT/US2009/001123

(22) International Filing Date:

20 February 2009 (20.02.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/066,550	21 February 2008 (21.02.2008)	US
12/321,752	23 January 2009 (23.01.2009)	US
12/322,363	30 January 2009 (30.01.2009)	US

(71) Applicant (for all designated States except US):

EXXONMOBIL RESEARCH AND ENGINEERING COMPANY [US/US]; 1545 Route 22 East, P.O. Box 900, Annandale, NJ 08801-0900 (US).

(72) Inventor: REYES, Sebastian, C. (deceased).

(72) Inventors; and

(75) **Inventors/Applicants (for US only):** **NI, Zheng** [US/US]; 11 School Street, Apt. 49, Clinton, NJ 08809 (US). **PAUR, Charanjit, S.** [IN/US]; 222 E. Westfield Avenue, Apt. B-2, Roselle Park, NJ 07204 (US). **KORTUNOV, Pavel** [RU/US]; 155 Broad Street, Apt. 25, Flemington, NJ 08822 (US). **ZENGEL, John** [US/US]; 40 Overlook Drive, Clinton, NJ 08809 (US). **DECKMAN, Harry, W.** [US/US]; 2 Woods Edge Court, Clinton, NJ 08809 (US).

(74) **Agents:** **PURWIN, Paul, E.** et al.; Exxonmobil Research And Engineering Company, 1545 Route 22 East, P.O. Box 900, Annandale, NJ 08801-0900 (US).

(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, ST, 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, MK, 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).

Published:

— with international search report (Art. 21(3))

(88) Date of publication of the international search report:

10 December 2009

(48) Date of publication of this corrected version:

21 January 2010

(15) Information about Correction:

see Notice of 21 January 2010

(54) **Title:** SEPARATION OF HYDROGEN FROM HYDROCARBONS UTILIZING ZEOLITIC IMIDAZOLATE FRAMEWORK MATERIALS

(57) **Abstract:** The present invention relates to the selective separation of hydrogen ('H₂') from hydrocarbons in streams containing both hydrogen and hydrocarbons (e.g. methane, ethylene, ethane, propylene, propane, etc.) utilizing a zeolitic imidazolate framework ('ZIF') material. Preferably, the stream to be separated is fed to the present process in a substantially gaseous phase. In preferred embodiments, the current invention is utilized in either a pressure swing adsorption process, a temperature swing adsorption process, or a membrane separations process to separate hydrogen from hydrocarbons present in hydrogen production streams or petrochemical/petroleum refining product streams and intermediate streams.



WO 2009/105270 A8