



(51) International Patent Classification:
B01D 15/08 (2006.01) *C10L 1/02* (2006.01)
C10G 31/00 (2006.01)

(21) International Application Number:
PCT/US2010/024625

(22) International Filing Date:
18 February 2010 (18.02.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/153,919 19 February 2009 (19.02.2009) US

(71) Applicant (*for all designated States except US*): **PRIMA-FUEL, INC.** [US/US]; 2774 Dawson Avenue, Signal Hill, California 90755 (US).

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): **WOODS, Richard R.** [US/US]; 10 Valley View, Irvine, California 92612 (US). **KRIKORIAN, Vahik** [IR/US]; 5708 Alder Ridge Drive, La Canada, California 91011 (US). **SMITHERS, Justin** [US/US]; 3200 South Barrington Avenue, #12, Los Angeles, California 93130 (US).

(74) Agent: **KOBZEFF, Joseph M.**; Law Office Of Joseph M. Kobzeff, PO Box 50502, Irvine, California 92619 (US).

[Continued on next page]

(54) Title: HIGH EFFICIENCY SEPARATIONS METHOD AND APPARATUS

(57) Abstract: The invention concerns separation methods and systems including those comprising a continuous chromatographic simulated moving bed integrated with vapor compression distillation to create a high efficiency separations platform applicable to a broad range of separation functions.

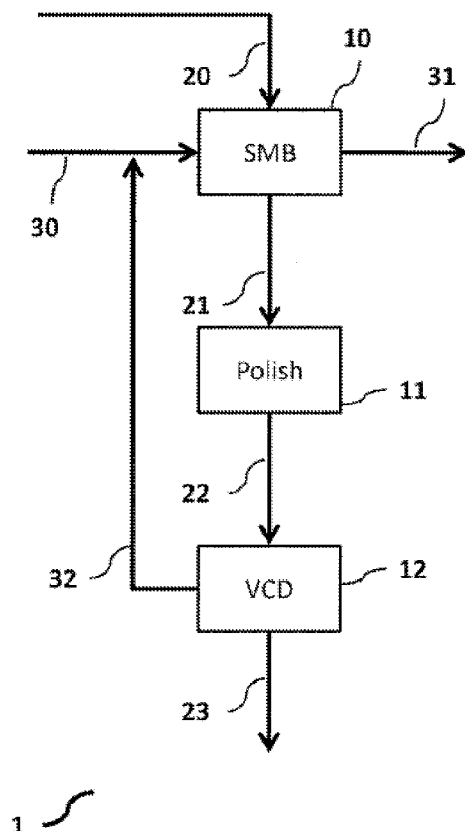


FIG 1



WO 2010/096587 A3



(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, CL, 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, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

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

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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

16 December 2010

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/024625**A. CLASSIFICATION OF SUBJECT MATTER*****B01D 15/08(2006.01)i, C10G 31/00(2006.01)i, C10L 1/02(2006.01)i***

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B01D 15/08; B01D 3/42; B01D 15/00; B01D 1/28

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: separation, low energy, efficient, simulated moving bed, SMB, solvent, eluent, solvent, concentration, vapor compression distillation, VCD, high purity

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5026482 A1 (SIRCAR; SHIVAJI) 25 June 1991 See abstract, columns 1~28, and claims 1~18	1-12
Y	US 4539076 A1 (SWAIN; R. L. BIBB) 03 September 1985 See abstract, columns 1~10, and claims 1~23	1-12
A	KR 10-0852322 B1 (Samsung Total Ltd.) 14 August 2008 See abstract, pages 1~8, and claims 1~3	1-12



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

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"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

08 OCTOBER 2010 (08.10.2010)

Date of mailing of the international search report

11 OCTOBER 2010 (11.10.2010)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu,
Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

CHO Jun Bae

Telephone No. 82-42-481-8292



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2010/024625Patent document
cited in search reportPublication
datePatent family
member(s)Publication
date

US 5026482 A1

25.06.1991

EP 0422421 A1

17.04.1991

US 4539076 A1

03.09.1985

None

KR 10-0852322 B1

14.08.2008

None