

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
18 January 2024 (18.01.2024)



(10) International Publication Number
WO 2024/015543 A3

(51) International Patent Classification:

B01D 61/04 (2006.01) *B01D 63/00* (2006.01)
C02F 1/44 (2023.01) *B01D 69/12* (2006.01)
B01J 20/28 (2006.01)

(21) International Application Number:

PCT/US2023/027704

(22) International Filing Date:

14 July 2023 (14.07.2023)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/389,677 15 July 2022 (15.07.2022) US
63/411,079 28 September 2022 (28.09.2022) US
18/315,130 10 May 2023 (10.05.2023) US

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(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, BN, BR, BW, BY, BZ,
CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG,
KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY,
MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA,
NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO,
RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH,
TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS,
ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, CV,
GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST,
SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ,
RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ,
DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT,

(54) Title: LIQUID SEPARATION USING SOLUTE-PERMEABLE MEMBRANES AND RELATED SYSTEMS

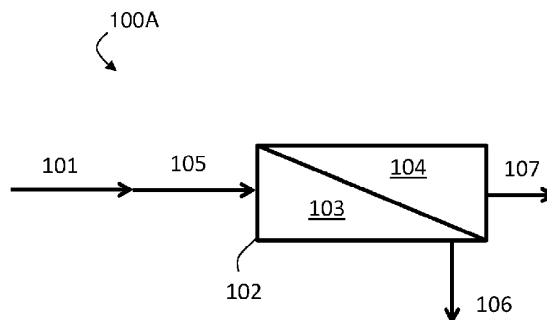


FIG. 1

(57) Abstract: Liquid solution separation (e.g., concentration and/or desalination) methods and related systems involving membrane separators having at least one-semipermeable membrane are provided. In some instances, at least some of the membrane separators permit a portion of solute in a retentate side input stream to pass through the semi-permeable membrane. In some instances, multiple membrane separators are employed, with the membrane separators having different solute permeabilities (e.g., due to varying pore size and/or molecular weight cutoffs). The methods and systems may be configured such that the ratio of mass flow and/or concentration of solute entering the retentate sides of the membrane separators are relatively high compared to the mass flow and/or concentration of solute exiting the retentate sides of the membrane separators. Such ratios may be relatively high for some or all membrane separators employed, which can in some instances reduce capital and/or operational expenditures for the liquid separation processes.

[Continued on next page]

LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE,
SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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:

29 February 2024 (29.02.2024)