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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
04 July 2019 (04.07.2019)

WIPO | PCT

(10) International Publication Number
WO 2019/133475 A1

(51) International Patent Classification:
G01N 30/88 (2006.01) *G01N 30/02* (2006.01)

(21) International Application Number:
PCT/US2018/067065

(22) International Filing Date:
21 December 2018 (21.12.2018)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/610,428 26 December 2017 (26.12.2017) 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, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, 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, 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, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,

(54) Title: SYSTEM AND METHOD FOR PROVIDING ON-LINE MEASUREMENT OF IMPURITIES IN LIQUID ETHYLENE OXIDE STREAMS

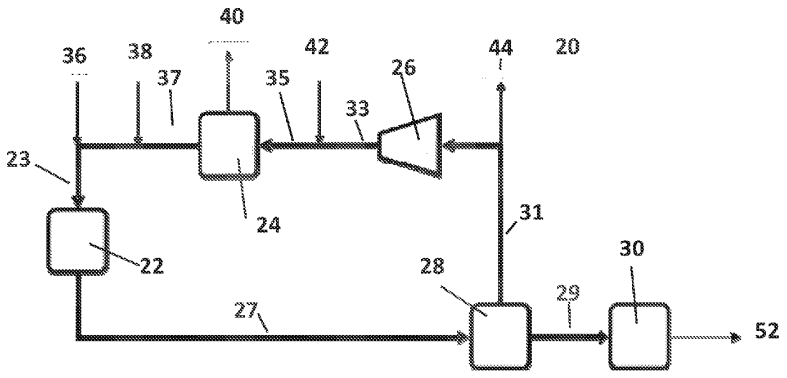

FIG. 1

(57) Abstract: Automated systems and methods for obtaining of the concentration of impurities in a liquid ethylene oxide product stream are shown and described. The systems and methods employ remote injection and flash vaporization of small volumes of liquid ethylene oxide into a carrier gas to minimize polymerization of the ethylene oxide and accumulation of polymerized ethylene oxide. Ethylene oxide peaks are diverted from the gas chromatograph effluent detector to stabilize baseline signal errors and avoid errors in the calculation of an impurity with an adjacent retention time peak. The systems and methods may be used for feedback, feedforward, dynamic matrix, and/or model-based predictive control of ethylene oxide purity. The systems and methods reduce lag times and errors associated with relying on laboratory analyses to make process adjustments.

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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, LU, LV, MC, 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))*