



(51) International Patent Classification:
C01B 3/32 (2006.01) *G01N 21/41* (2006.01)

(21) International Application Number:
PCT/US2024/026627

(22) International Filing Date:
26 April 2024 (26.04.2024)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/499,418 01 May 2023 (01.05.2023) US

(71) Applicant: **VIRENT, INC.** [US/US]; 3571 Anderson Street, Madison, Wisconsin 53704 (US).

(72) Inventors: **ANSON, Colin**; c/o Virent, Inc., 3571 Anderson Street, Madison, Wisconsin 53704 (US). **BLANK, Brian**; c/o Virent, Inc., 3571 Anderson Street, Madison, Wisconsin 53704 (US). **MCALOON, Rory**; c/o Virent,

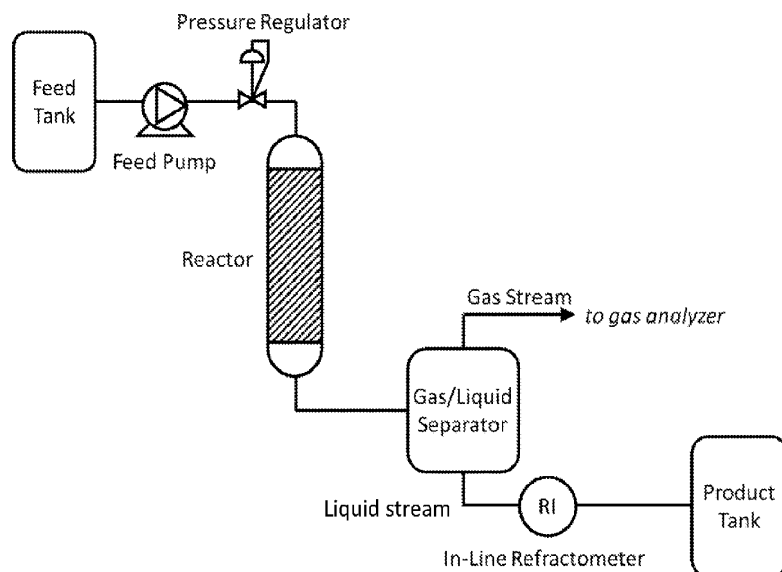
Inc., 3571 Anderson Street, Madison, Wisconsin 53704 (US). **WILKINSON, Ryan**; c/o Virent, Inc., 3571 Anderson Street, Madison, Wisconsin 53704 (US).

(74) Agent: **YAN, Wei** et al.; Quarles & Brady LLP, 300 N. LaSalle Street, Suite 4000, Chicago, Illinois 60654-3406 (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, 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.

(54) Title: USE OF IN-LINE REFRACTIVE INDEX IN CATALYTIC PROCESS

FIG. 1



(57) Abstract: The present disclosure provides reactor systems and methods that use in-line measurement of refractive index for monitoring and controlling a catalytic reaction for hydrogen production. An outcome of the catalytic reaction (e.g., total organic carbon level) can be determined using the refractive index data measured in-line from a product stream. Advantageously, the present reactor system can include a control unit for acquiring in-line refractive index data, determining the reaction outcome, and adjusting the catalyst and/or reaction conditions according to the determined outcome, so that progress of the catalytic reaction can be controlled automatically.

[Continued on next page]

(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, 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))*