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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
06 April 2023 (06.04.2023)

WIPO | PCT

(10) International Publication Number
WO 2023/056218 A1

(51) International Patent Classification:
C12P 5/02 (2006.01) *C12P 7/40* (2006.01)
C12P 7/62 (2006.01) *C12P 7/42* (2006.01)
C12P 7/16 (2006.01) *C12P 7/52* (2006.01)

(21) International Application Number:
PCT/US2022/076908

(22) International Filing Date:
23 September 2022 (23.09.2022)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/251,681 03 October 2021 (03.10.2021) US

(71) Applicant: **LANZATECH, INC.** [US/US]; 8045 Lamon Avenue, Suite 400, Skokie, Illinois 60077 (US).

(72) Inventors: **ROSIN, Richard Russell**; 8045 Lamon Avenue, Suite 400, Skokie, Illinois 60077 (US). **YU, Yen-Lu**; 8045 Lamon Avenue, Suite 400, Skokie, Illinois 60077 (US). **ROLLAG, Sean Alex**; 8045 Lamon Avenue, Suite 400, Skokie, Illinois 60077 (US). **SCHULZ, Taylor Craig**; 8045 Lamon Avenue, Suite 400, Skokie, Illinois 60077 (US). **CONRADO, Robert John**; 8045 Lamon Avenue, Suite 400, Skokie, Illinois 60077 (US).

(74) Agent: **MAAS, Maryann**; 8045 Lamon Avenue, Suite 400, Skokie, Illinois 60077 (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, 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, 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, GH, GM, KE, LR, LS, MW, MZ, NA, RW, 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, 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))*

(54) **Title:** GAS FERMENTATION CONVERSION OF CARBON DIOXIDE INTO PRODUCTS

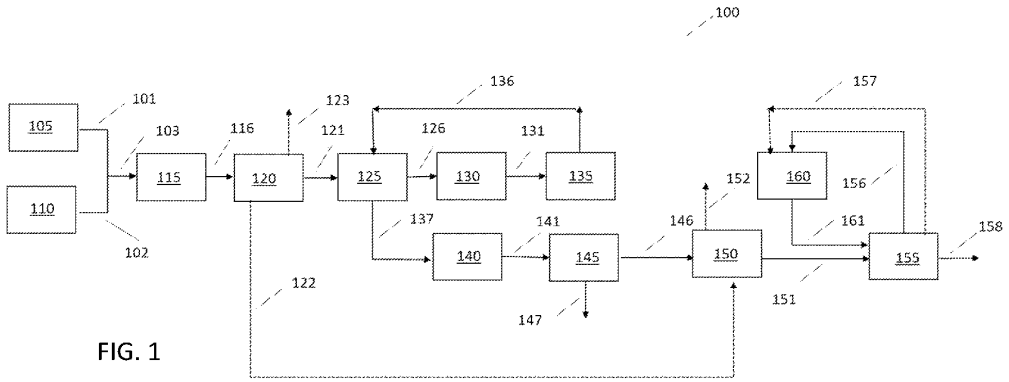


FIG. 1

(57) **Abstract:** An integrated process and system for employing low conversion rWGS to prepare a gas fermentation feed stream from a CO_2 source and a hydrogen source in order to produce at least one gas fermentation product. Low conversion rWGS reactors may (1) employ a wider selection of inorganic catalysts then rWGS reactors requiring high temperature operation, (2) allow for use of an electric heater instead of a fired heater to preheat feed stream to the low conversion rWGS reactor, and (3) extend rWGS catalyst life by reducing the amount of water produced in the rWGS reaction.

WO 2023/056218 A1