

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
25 November 2021 (25.11.2021)



(10) International Publication Number
WO 2021/236827 A1

(51) International Patent Classification:

C10G 29/04 (2006.01) C10B 57/08 (2006.01)
C10B 55/00 (2006.01) C10G 55/04 (2006.01)

(21) International Application Number:

PCT/US2021/033244

(22) International Filing Date:

19 May 2021 (19.05.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/027,052 19 May 2020 (19.05.2020) US

(71) Applicant: **ENLIGHTEN INNOVATIONS INC.**
[CA/CA]; Suite 201, 1100 1st Street SE, Calgary, Alberta
T2G 1B1 (CA).

(72) Inventor; and

(71) Applicant: **MAKOWSKY, Mykola** [US/US]; c/o Enlight-
en Innovations Inc., Suite 201, 1100 1st Street SE, Calgary,
Alberta T2G 1B1 (CA).

(72) Inventor: **ZENAITIS, Michael**; c/o Enlighten Innovations
Inc., Suite 201, 1100 1st Street SE, Calgary, Alberta T2G
1B1 (CA).

(74) Agent: **MEARA, Joseph** et al.; Foley & Lardner LLP, 3000
K Street, N.W. Suite 600, Washington, District of Columbia
20007-5109 (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, 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, IT, JO, JP, KE, KG, KH, KN,

(54) Title: PROCESSES FOR IMPROVED PERFORMANCE OF DOWNSTREAM OIL CONVERSION

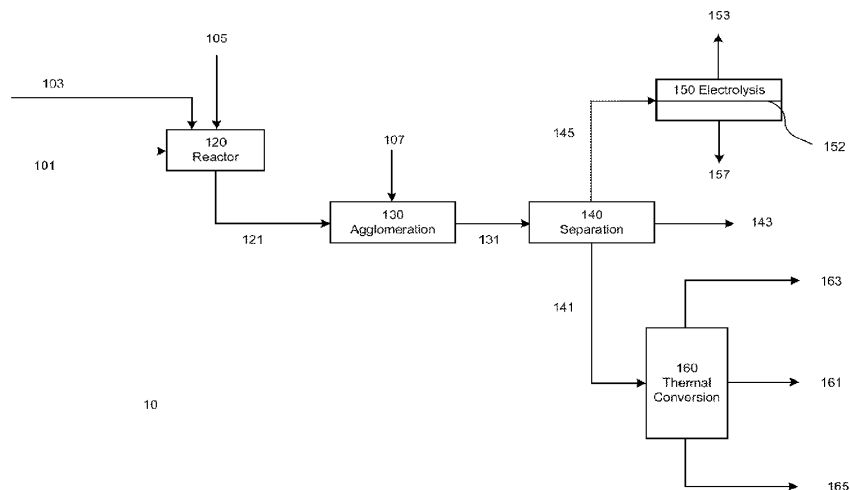


FIG. 1

(57) Abstract: The present technology provides processes for improving the performance of downstream oil conversion. Thus it provides, among others, processes for improving the yield of liquid hydrocarbons from a thermal conversion process. The processes include contacting a hydrocarbon feedstock with an effective amount of sodium metal and an effective amount of exogenous capping agent at a temperature of 250-500°C, to produce a mixture of sodium salts and a converted feedstock. The hydrocarbon feedstock may comprise hydrocarbons with a sulfur content of at least 0.5 wt%, an asphaltene content of at least 1 wt% and micro carbon residue content of at least 5 wt%. The converted feedstock may comprise hydrocarbons with a sulfur content less than that in the hydrocarbon feedstock, a micro carbon residue content less than that in the hydrocarbon feedstock and an asphaltene content less than that in the hydrocarbon feedstock. The process further comprises subjecting the converted feedstock to a thermal conversion process to produce a gaseous

[Continued on next page]

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))

product, a purified product and a residual product, wherein the proportion of purified product to residual product is greater than that produced by subjecting the hydrocarbon feedstock in the same thermal conversion process.