



(51) International Patent Classification:

C10B 53/07 (2006.01) C10G 31/09 (2006.01)
C10G 1/00 (2006.01)

(21) International Application Number:

PCT/US2021/028635

(22) International Filing Date:

22 April 2021 (22.04.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/014,004 22 April 2020 (22.04.2020) US

(71) Applicant: **CHEVRON U.S.A. INC.** [US/US]; 6001
Bollinger Canyon Road, San Ramon, CA 94583 (US).

(72) Inventor: **TIMKEN, Hye-kyung**; Chevron Corporation,
P.O. Box 6006, San Ramon, CA 94583 (US).

(74) Agent: **GESS, E., Joseph** et al.; Merchant & Gould, P.O.
Box 2903, Minneapolis, MN 55402 (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,
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.

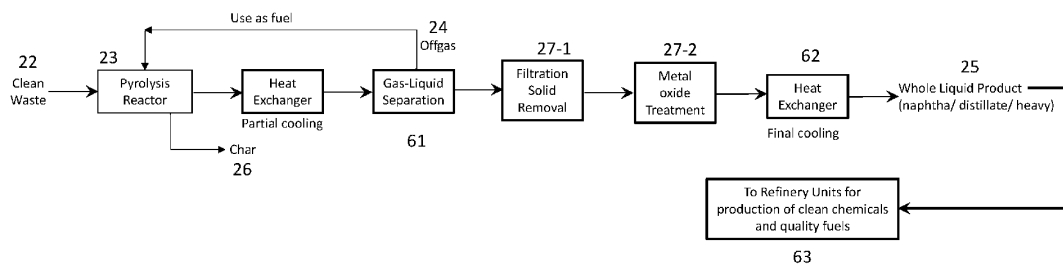
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ,
UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,
TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK,
EE, ES, FI, FR, GB, GR, HR, HU, 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: CIRCULAR ECONOMY FOR PLASTIC WASTE TO POLYETHYLENE VIA OIL REFINERY WITH FILTERING AND
METAL OXIDE TREATMENT OF PYROLYSIS OIL

Figure 2
Filtration and Metal Oxide Treatment at Pyrolysis Production Facility
for Waste Plastics Pyrolysis Oil for Refinery Unit Co-Feeding



(57) Abstract: Provided in one embodiment is a continuous process for converting waste plastic comprising polyethylene and/or polypropylene into recycle for polyethylene polymerization. The process comprises selecting waste plastics containing polyethylene, polypropylene, or a mixture thereof, and passing the waste plastics through a pyrolysis reactor to thermally crack at least a portion of the polyolefin waste and produce a pyrolyzed effluent. The pyrolyzed effluent is separated into offgas, a pyrolysis oil comprising a naphtha, diesel and heavy fractions, and char. The pyrolysis oil, or at least a fraction, is passed to a filtration/metal oxide treatment, with the treated product passed to a refinery FCC unit. A liquid petroleum gas C₃ olefin/paraffin mixture fraction is recovered from the FCC unit, as well as a C₄ olefin/paraffin mixture fraction. The liquid petroleum gas C₃ olefin/paraffin mixture fraction is passed to a steam cracker for ethylene production.

