

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
14 September 2023 (14.09.2023)



(10) International Publication Number
WO 2023/172869 A1

(51) International Patent Classification:
C10G 25/00 (2006.01)

TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS,
ZA, ZM, ZW.

(21) International Application Number:
PCT/US2023/063777

(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).

(22) International Filing Date:
06 March 2023 (06.03.2023)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
63/269,135 10 March 2022 (10.03.2022) US
17/664,177 19 May 2022 (19.05.2022) US

Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

Published:

- with international search report (Art. 21(3))

(71) Applicant: **EXXONMOBIL TECHNOLOGY AND ENGINEERING COMPANY** [US/US]; 1545 Route 22 East, P.O. Box 900, Annandale, New Jersey 08801-0900 (US).

(72) Inventors: **PAEK, Changyub**; c/o EXXONMOBIL TECHNOLOGY AND ENGINEERING COMPANY, 1545 Route 22 East, P.O. Box 900, Annandale, New Jersey 08801-0900 (US). **FALKOWSKI, Joseph M.**; c/o EXXONMOBIL TECHNOLOGY AND ENGINEERING COMPANY, 1545 Route 22 East, P.O. Box 900, Annandale, New Jersey 08801-0900 (US). **JOSHI, Yogesh V.**; c/o EXXONMOBIL TECHNOLOGY AND ENGINEERING COMPANY, 1545 Route 22 East, P.O. Box 900, Annandale, New Jersey 08801-0900 (US). **LASSO, Carmen C.**; c/o EXXONMOBIL TECHNOLOGY AND ENGINEERING COMPANY, 1545 Route 22 East, P.O. Box 900, Annandale, New Jersey 08801-0900 (US).

(74) Agent: **CARTER, Lawrence E.**; Shook, Hardy & Bacon LLP, 2555 Grand Blvd, Kansas City, Missouri 64108 (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, 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,

(54) Title: SELECTIVE SEPARATION OF NAPHTHENES FOR PRODUCTION OF ENHANCED VISCOSITY INDEX LUBE BASE STOCKS

(57) Abstract: This disclosure provides methods for separating multi-ring naphthenes from a hydrocarbon feedstock. The hydrocarbon feedstock includes at least normal paraffins, isoparaffins, 1-ring naphthenes attached with a paraffinic alkyl chain, and multi-ring naphthenes. The methods comprise passing the hydrocarbon feedstock and a solvent, at a temperature and pressure through a bed of an adsorbent comprising a metal-organic framework (MOF) adsorbent, to adsorb the multi-ring naphthenes from the hydrocarbon feedstock, thereby producing a base stock product that is depleted in multi-ring naphthenes. The metal-organic framework adsorbent is a porous crystalline material comprised of metal functionalities connected by organic linkers to form a repeating 2-D or 3-D lattice. The base stock product has a viscosity index (VI) greater than the viscosity index of the hydrocarbon feedstock.



WO 2023/172869 A1