



(51) International Patent Classification:

C07C 2/58 (2006.01) B01J 29/12 (2006.01)

C07C 9/16 (2006.01)

(21) International Application Number:

PCT/US2022/052903

(22) International Filing Date:

14 December 2022 (14.12.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

63/256,516 15 October 2021 (15.10.2021) US

(71) Applicant: EXELUS INC. [US/US]; 264 Passiac Avenue,
Fairfield, New Jersey 07004 (US).

(72) Inventors: **MUKHERJEE, Mitrajit**; 57 Lafayette Drive, Livingston, New Jersey 07039 (US). **VADHRI, Vamsi M.**; 101 Maplecrest Road, Edison, New Jersey 08820 (US). **WOJOKH, Zaver**; 20 Harrison Street, Little Falls, New Jersey 07424 (US). **JOSHI, Narendra**; 56 Western Avenue, Jersey City, New Jersey 07307 (US).

(74) Agent: **ROSENBERG, Frank**; 5737 Kanan Road, No. 190, Agoura Hills, California 91301 (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,

(54) Title: SOLID ACID CATALYZED PARAFFIN ALKYLATION WITH RARE EARTH-MODIFIED MOLECULAR SIEVE ADSORBENTS

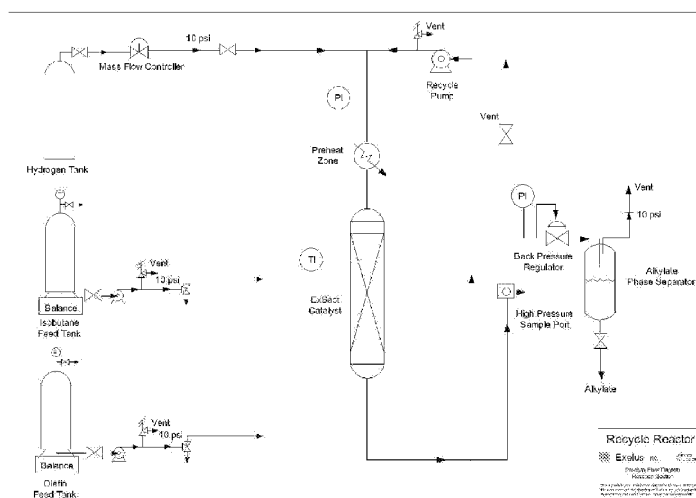


Fig. 1

(57) Abstract: This invention describes methods of alkylating isobutane which include a catalytic reaction system comprising a crystalline zeolite catalyst and a rare earth-modified molecular sieve adsorbent (RE-MSA). The crystalline zeolite catalyst comprises sodalite cages and supercages, a Si/Al molar ratio of 20 or less, less than 0.5 weight percent alkali metals; and up to 5 wt% of Pt, Pd and or Ni, and acid-site density (including both Lewis and Brønsted acid sites) of at least 100 mole/gm. The RE-modified molecular sieve adsorbent (Re-MSA) comprising sodalite cages and supercages, a Si/Al molar ratio of 20 or less, less than 1 wt% of alkali metals, RE (rare earth elements) in the range of 10 to 30 wt% and transition metals selected from groups 9-11 in the range from 2 wt% to 10 wt; and acid-site density of no more than 30 mole/gm. The invention also includes methods of making RE-MSA.

[Continued on next page]

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, CV, 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, 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:

- *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*
- *with information concerning request for restoration of the right of priority in respect of one or more priority claims (Rules 26bis.3 and 48.2(b)(vii))*