

(19) World Intellectual Property  
Organization  
International Bureau



WIPO | PCT



(10) International Publication Number

WO 2023/287606 A9

(43) International Publication Date  
19 January 2023 (19.01.2023)

(51) International Patent Classification:  
Not classified

(21) International Application Number:  
PCT/US2022/036093

(22) International Filing Date:  
10 October 2022 (10.10.2022)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
63/329,006 08 April 2022 (08.04.2022) US

(71) Applicant: **EXXONMOBIL CHEMICAL PATENTS INC.** [US/US]; 5200 Bayway Drive, Baytown, TX 77520 (US).

(72) Inventors: **MADUSKAR, Saurabh, S.**; 3 Hermann Museum Circle Drive, Apt. 4402, Houston, TX 77004 (US). **KUECHLER, Keith, H.**; 912 Applewood Drive, Friendswood, TX 77546 (US). **BAO, Xiaoying**; 4239 Albans, Houston, TX 77005 (US).

(74) Agent: **CHEN, Siwen** et al.; Exxonmobil Chemical Company, Law Department, P.O. Box 2149, Baytown, TX 77522-2149 (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,

(54) Title: METHOD AND SYSTEM FOR LIGHT OLEFIN GENERATION WITH HIGH YIELDS AND SELECTIVITY

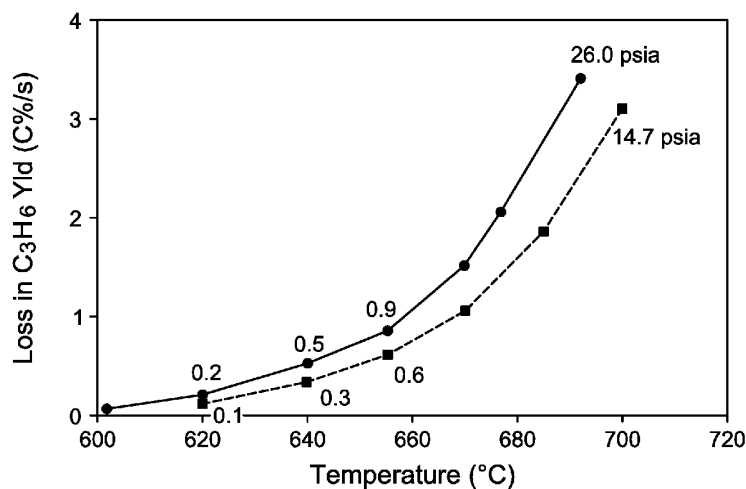
Loss in C<sub>3</sub>H<sub>6</sub> Yld at various T/Ps

FIG. 1

WO 2023/287606 A9

(57) **Abstract:** A method for forming an olefin, the method including: introducing a hydrocarbon feed stream into a reactor including a dehydrogenation catalyst; reacting the hydrocarbon feed stream with a dehydrogenation catalyst in the reactor to form a high temperature dehydrogenated product, the high temperature dehydrogenated product including at least a portion of the dehydrogenation catalyst; separating at least a portion of the dehydrogenation catalyst from the high temperature dehydrogenated product in a primary separation device and a secondary separation device downstream of and in fluid communication with the primary separation device; following the exit of high temperature dehydrogenation product from the secondary separation device, combining the high temperature dehydrogenation product with a quench stream to cool the high temperature dehydrogenation product and form an intermediate temperature dehydrogenation product, wherein the quench stream includes a hydrocarbon; and cooling the intermediate temperature dehydrogenation product to form a cooled dehydrogenation product.

[Continued on next page]

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, 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, 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).

**Published:**

- *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*
- *with information concerning one or more priority claims considered void (Rule 26bis.2(d))*

**(48) Date of publication of this corrected version:**

28 September 2023 (28.09.2023)

**(15) Information about Correction:**

see Notice of 28 September 2023 (28.09.2023)