

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

(19) World Intellectual Property  
Organization

International Bureau

(43) International Publication Date  
15 February 2024 (15.02.2024)



(10) International Publication Number  
**WO 2024/036052 A1**

(51) International Patent Classification:  
*C07F 17/00* (2006.01) *C08F 210/16* (2006.01)  
*C08F 4/659* (2006.01)

SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,  
GQ, GW, KM, ML, MR, NE, SN, TD, TG).

(21) International Application Number:  
PCT/US2023/071323

**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))

(22) International Filing Date:  
31 July 2023 (31.07.2023)

(25) Filing Language: English

**Published:**

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

(26) Publication Language: English

(30) Priority Data:  
63/370,829 09 August 2022 (09.08.2022) US

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

(72) Inventors: **LAMBIC, Nikola, S.**; 3663 Nasa Parkway #604, Seabrook, TX 77586 (US). **SMITH-KARAHALIS, Gregory, J.**; 3433 West Dallas Street, Apt. 1168, Houston, TX 77019 (US). **NGUYEN, An, N.m.**; 3830 Glenhill Drive, Pearland, TX 77584 (US).

(74) Agent: **WRKICH, Joseph, E.** et al.; Exxonmobil Technology and Engineering Company, 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, 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, MU, 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, 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,

(54) Title: METHODS FOR PREPARING DIPHENYLSILANE BRIDGED C1 SYMMETRIC CATALYSTS AND POLYMERS MADE THEREFROM

(57) Abstract: Di-aryl silane bridged metallocene catalysts, methods for making and propylene (co)polymers made therefrom. The resulting silane bridged metallocene catalysts are very active in polymerization of olefins, especially ethylene and propylene. The di-aryl silane bridged metallocene ccaann be synthesized by substituting a dichloro cyclopentadienyl fragment with indenyl lithium. Direct lithitation / substitution with aryl or alkyl lithium reagents provides a di-lithiated ligand that undergoes metalation with a Group IV metal precursor.



WO 2024/036052 A1