

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
05 April 2018 (05.04.2018)



(10) International Publication Number
WO 2018/063813 A1

- (51) **International Patent Classification:**
C08F 210/16 (2006.01) *C08F 4/64* (2006.01)
- (21) **International Application Number:**
PCT/US2017/051535
- (22) **International Filing Date:**
14 September 2017 (14.09.2017)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
62/402,210 30 September 2016 (30.09.2016) US
- (71) **Applicant:** DOW GLOBAL TECHNOLOGIES LLC
[US/US]; 2040 Dow Center, Midland, Michigan 48674 (US).
- (72) **Inventors:** KRASOVSKIY, Arkady L.; c/o Dow Global Technologies LLC, 2301 North Brazosport Boulevard, Freeport, Texas 77541 (US). SZUROMI, Endre; c/o Dow Global Technologies LLC, 2301 North Brazosport Boulevard, Freeport, Texas 77541 (US).
- (74) **Agent:** MCNEELY, Richard J. et al.; Dinsmore & Shohl LLP, Fifth Third Center, One South Main Street, Suite 1300, Dayton, Ohio 45402 (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, 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, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, 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:** THIUGUANIDINE GROUP IV TRANSITION METAL CATALYSTS AND POLYMERIZATION SYSTEMS

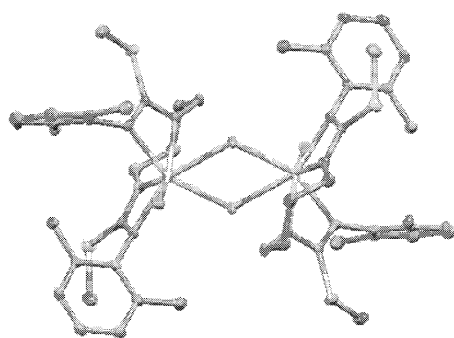
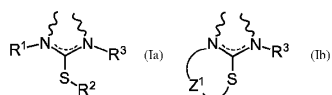


FIGURE 1

$\text{MQ}_a\text{X}_{4-a}$ (I)



(57) **Abstract:** Catalyst compositions and polymerization systems include at least one thioguanidine complex according to Formula (I): $\text{MQ}_a\text{X}_{4-a}$ (I) in which M is Ti, Zr, or Hf; a is 1 or 2; each group Q of the thioguanidine complex is a bidentate thioguanidine ligand bound to the metal center and having Formula (Ia) or Formula (Ib). In Formulas (Ia) and (Ib), each group R^1 , R^2 , and R^3 is independently chosen from alkyl groups or aryl groups; each group Z 1 is independently chosen from alkylene groups. If $a = 2$, groups R^3 of the two groups Q are optionally linked to each other through at least one covalent bond. Each X is covalently bonded or coordinated to the metal center and is independently chosen from alkyl groups or halides. The polymerization systems may be configured to copolymerize ethylene and α -olefins.