

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

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
10 February 2011 (10.02.2011)

(10) International Publication Number
WO 2011/016991 A3

PCT

(51) International Patent Classification:

C08F 4/659 (2006.01) **C07F 3/06** (2006.01)
C07F 3/02 (2006.01) **C07F 5/02** (2006.01)
C08F 10/00 (2006.01) **C07F 5/06** (2006.01)

(21) International Application Number:

PCT/US2010/042605

(22) International Filing Date:

20 July 2010 (20.07.2010)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/229,610 29 July 2009 (29.07.2009) US

(71) Applicant (for all designated States except US): **DOW GLOBAL TECHNOLOGIES INC.** [US/US]; 2040 Dow Center, Midland, MI 48674 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **ARRIOLA, Daniel** [US/US]; 4608 Arbor Drive, Midland, MI 48642 (US). **CLARK, Thomas** [US/US]; 906 Holyrood Street, Midland, MI 48640 (US). **FRAZIER, Kevin** [US/US]; 1105 Tanwood Court, Midland, MI 48642 (US). **KLAMO, Sara** [US/US]; 2428 Morning Dawn Dr., Midland, MI 48642 (US). **TIMMERS, Francis** [US/US]; 4605 Lund Drive, Midland, MI 48642 (US).

(74) Agent: **CARNAHAN, Jennifer**; 2030 Dow Center, Midland, MI 48674 (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, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, 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, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, 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, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

16 June 2011

(54) Title: DUAL- OR MULTI-HEADED CHAIN SHUTTTLING AGENTS AND THEIR USE FOR THE PREPARATION OF BLOCK COPOLYMERS

(57) Abstract: This disclosure relates to olefin polymerization catalysts and compositions, their manufacture, and the production of polyolefins using specific catalyst compositions, including the use of chain-shuttling agents in the olefin polymerization process. Specifically, this disclosure provides for dual-headed and multi-headed chain shuttling agents (CSAs or MSAs) and for their use in preparing blocky copolymers. By controlling the ratio of dual-headed and multi-headed CSA sites to mono-headed CSA sites, a blocky copolymer can be provided having properties such as a narrow molecular weight distribution and/or improved melt properties.



WO 2011/016991 A3