

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

(19) World Intellectual Property  
Organization

International Bureau

(43) International Publication Date  
05 November 2020 (05.11.2020)



(10) International Publication Number  
**WO 2020/223193 A1**

(51) International Patent Classification:  
*C08F 210/16* (2006.01)

(21) International Application Number:  
PCT/US2020/030200

(22) International Filing Date:  
28 April 2020 (28.04.2020)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
62/840,835 30 April 2019 (30.04.2019) US  
62/840,865 30 April 2019 (30.04.2019) US  
62/880,835 31 July 2019 (31.07.2019) US  
62/990,549 17 March 2020 (17.03.2020) US

(71) Applicant: **DOW GLOBAL TECHNOLOGIES LLC**  
[US/US]; 2211 H.H. Dow Way, Midland, Michigan 48674  
(US).

(72) Inventors: **ASKAR, Shadid**; 2301 North Brazosport  
Boulevard, Freeport, Texas 77541 (US). **MARTIN, Peter S.**; 13831 Round Oak Court, Houston, Texas 77059  
(US). **LIU, Bo**; 230 Abner Jackson Parkway, Lake Jack-  
son, Texas 77566 (US). **SZUL, John F.**; 1840 Union Car-  
bide Drive, South Charleston, West Virginia 25303 (US).  
**KUHLMAN, Roger L.**; 230 Abner Jackson Parkway, Lake  
Jackson, Texas 77566 (US). **KAPUR, Mridula Babli**; 230  
Abner Jackson Parkway, Lake Jackson, Texas 77566 (US).

(74) Agent: **PURCHASE, Claude F.**; 2211 H. H. Dow Way,  
Midland, Michigan 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, 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, 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, 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))



WO 2020/223193 A1

(54) Title: BIMODAL POLY(ETHYLENE-CO-1-ALKENE) COPOLYMER

(57) Abstract: A bimodal poly(ethylene-co-1-alkene) copolymer comprising a higher molecular weight poly(ethylene-co-1-alkene) copolymer component and a lower molecular weight poly(ethylene-co-1-alkene) copolymer component. The copolymer is characterized by a unique combination of features comprising, or reflected in, its density; molecular weight distributions; component weight fraction amount; and viscoelastic properties; and at least one of environmental stress-cracking resistance and resin swell. Additional inventive embodiments include a method of making the copolymer, a formulation comprising the copolymer and at least one additive that is different than the copolymer, a method of making a manufactured article from the copolymer or formulation; the manufactured article made thereby, and use of the manufactured article.