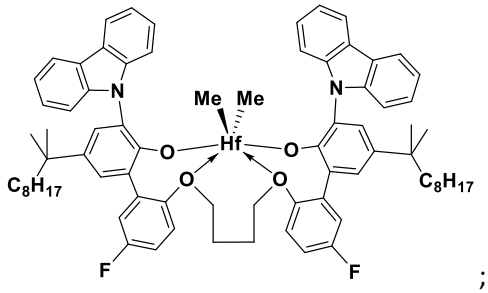
Claims

[Claim 1] A process comprising:

contacting ethylene and octene under polymerization conditions at a temperature greater than 125°C with a catalyst system comprising

(i) a first polymerization catalyst having the structure of catalyst 1

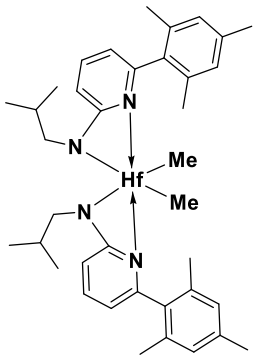
catalyst 1



;

(ii) a second polymerization catalyst having the structure of catalyst 2

catalyst 2



;

(iii) a first co-catalyst that is a mixture of methyldi(C_{14-18}alkyl)ammonium salts of tetrakis-(pentafluorophenyl)borate;

(iv) a second co-catalyst that is an iso-butyl, methyl, branched, cyclic and linear modified methyl aluminosiloxane (MMAO);

(v) a chain shuttling agent;

maintaining, during the contacting, an aluminum to hafnium molar ratio from 7.1 to 15.6; and

forming an ethylene/octene multi-block copolymer having a normalized OOO triad content greater than 0.25, wherein the ethylene/octene multi-block copolymer has hard segments and soft segments, the soft segments having a soft segment melting temperature (SS-Tm) from -30°C to 30°C, the ethylene/octene multi-block copolymer having a first TGIC peak temperature (T_{p1}) and a second TGIC peak temperature (T_{p2})

wherein T_{p2} fulfills Equation (A)

$T_{p2} \leq 0.0068 \times (SS\text{-}Tm)^2 + 0.07 \times (SS\text{-}Tm) + 73.2$.

[Claim 2] The process of claim 1 comprising contacting the ethylene and octene under polymerization conditions at a temperature from 130°C to 170°C.

[Claim 3] A composition comprising:

an ethylene/octene multi-block copolymer comprising hafnium and aluminum at an aluminum to hafnium molar ratio from 7.1 to 15.6; and

the ethylene/octene multi-block copolymer has a normalized OOO triad content greater than 0.25.

[Claim 4] The composition of claim 3 wherein the ethylene/octene multi-block copolymer comprises from 10 mol % to 30 mol % of octene.

[Claim 5] The composition of claim 4 wherein

the ethylene/octene multi-block copolymer comprises hard segments and soft segments, the soft segments having a soft segment melting temperature (SS-Tm) from -30°C to 30°C, the ethylene/octene multi-block copolymer having a first TGIC peak temperature (T_{p1}) and a second TGIC peak temperature (T_{p2})

wherein T_{p2} fulfills Equation (A)

$T_{p2} \leq 0.0068 \times (SS\text{-}Tm)^2 + 0.07 \times (SS\text{-}Tm) + 73.2$.

[Claim 6] The composition of claim 5 wherein the ethylene/octene multi-block copolymer has T_{p1} from 125°C to 150°C and a T_{p2} from 68°C to 90°C.

[Claim 7] The composition of claim 6 wherein the ethylene/octene multi-block copolymer has a glass transition temperature (Tg) from -70°C to -55°C.

[Claim 8] The composition of claim 7 wherein the ethylene/octene multi-block copolymer has a density from 0.855 to 0.890 grams per cubic centimeter (g/cc).

[Claim 9] The composition of claim 8 wherein the ethylene/octene multi-block copolymer has an unconfined yield strength (UYS) from 0 lb/ft^2 to less than 200 lb/ft^2 at 21°C after two months.

[Claim 10] The composition of any of claims 8-9 wherein the ethylene/octene multi-block copolymer has a funnel flow from greater than 150 g/s to 200 g/s after 6 weeks.

[Claim 11] The composition of any of claims 8-10 wherein the ethylene/octene multi-block copolymer has an unconfined yield strength (UYS) from 0 lb/ft^2 to less than 73 lb/ft^2 at 0°C after two months.