CLAIMS

We claim:

1. A polyethylene comprising ethylene derived units and within a range from 0.5 to 20 wt% of C3 to C12 α-olefin derived units by weight of the polyethylene; having

a density of less than 0.94 g/cm^3,

an I_2 value within a range from 0.5 to 20 g/10 min,

an I_{21} value within a range from 5 to 100 g/10 min,

an I_{21}/I_2 value within a range of 18 to 40,

a value for

Mw_1/Mw_2 of at least 0.9, wherein Mw_1/Mw_2 is a ratio of a weight average molecular weight (Mw_1) for a first half of a temperature rising elution (TREF) curve from a cross-section (CFC) analysis to a Mw_2 for a second half of the TREF curve, and

a value for Tw_1-Tw_2 within a range from -16 to -36°C, wherein Tw_1-Tw_2 is a difference of a weight average elution temperature (Tw_1) for the first half of the TREF curve to a Tw_2 for the second half of the TREF curve; and

formed by a process comprising combining a bridged bis-cyclopentadienyl Group 4 metal catalyst, an unbridged bis-cyclopentadienyl Group 4 metal catalyst, and an activator with ethylene and within a range from 0.1 to 5 wt% (relative to the weight of all monomers) of a C3 to C12 α-olefin at a temperature within a range from 60 to 100°C

2. The polyethylene of claim 1, wherein the Mw_1/Mw_2 value is within a range from 0.9 to 5.

3. The polyethylene of claim 1, having an M_{w1} value of greater than 150,000 g/mole.

4. The polyethylene of claim 1, having an M_{w2} value of less than 150,000 g/mole.

5. The polyethylene of claim 1, having a level of short-chain branching on the M_{w2} fractions that is greater than that for the M_{w1} fractions.

6. The polyethylene of claim 1, having a total number of internal unsaturations within a range from 0.1 per 1000 carbons to 0.8 per 1000 carbons.

7. The polyethylene of claim 1, having a total number of terminal unsaturations within a range from 0.001 per 1000 carbons to 0.4 per 1000 carbons.

8. The polyethylene of claim 1, having a % crystallinity by DSC of 40% or greater.

9. A film comprising the polyethylene of claim 1 having a Dart Drop value of at least 500 g/mil, and a Gloss (MD or TD) of at least 40%.

10. The film of claim 9, having an average thickness within a range from 10 µm to 100 µm.

11. The film of claim 9, having a Seal Initiation Temperature at 1N force (°C) within a range from 80°C to 115°C.

12. The film of claim 9, having a Maximum Hot Tack Force of greater than 10 N.

13. The film of claim 9, having a MD Tensile Strength within a range from 7,800 psi to 10,000 psi; and a TD Tensile Strength within a range from 6,500 psi to 8,500 psi.

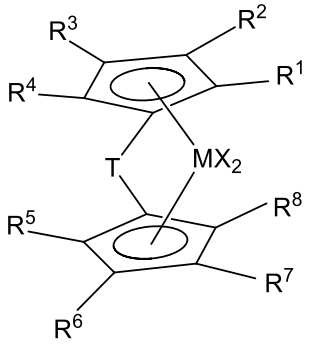
14. The film of claim 9, having an MD Elongation at Break within a range from 350 to 600%, and a TD Elongation at Break within a range from 450 to 800%.

15. The film of claim 9, having an MD Elmendorf Tear within a range from 100 to 300 g, and a TD Elmendorf Tear within a range from 350 to 650 g.

16. The film of claim 9, having a MD 1% Secant Flexural Modulus within a range from 25 to 50 kpsi, and a TD 1% Secant Flexural Modulus within a range from 20 to 70 kpsi.

17. The film of claim 9, wherein the polyethylene has a total number of internal unsaturations is within a range from 0.1 per 1000 carbons to 0.8 per 1000 carbons.

18. A process to form the polyethylene of claim 1 wherein the bridged bis-cyclopentadienyl Group 4 metal catalyst is selected from catalysts represented by the following formula:



where M is a Group 4 metal; and each R^1 to R^8 are independently selected from C1 to C20 alkoxides, or C1 to C20 substituted or unsubstituted alkyl groups; provided that at least one of R^1, R^2, R^3, R^4, R^6, R^7, R^8 is a linear C3 to C10 substituted or unsubstituted alkyl group, wherein any two of R^1 or R^2 and/or R^7 and R^8 can form an aromatic ring comprising 5 to 7 carbons;

T is a bridging group; and

each X is, independently, a univalent anionic ligand, or two X are joined and bound to the metal atom to form a metallocycle ring, or two X are joined to form a chelating ligand, a diene ligand, or an alkylidene ligand.

19. The process of claim 18, wherein the monomers, catalysts and activator are combined in a gas phase reactor.

20. The process of claim 18, wherein the bridged bis-cyclopentadienyl Group 4 metal catalyst is present within a range from 50 to 85 wt% by weight of the two catalysts, and the unbridged bis-cyclopentadienyl Group 4 metal catalyst is present within a range from 50 to 15 wt% by weight of the two catalysts.

21. The process of claim 18, wherein the catalysts and activator are supported on a solid support material.

22. The process of claim 18, wherein the process is a gas phase process carried out at a gas velocity of at least 2 ft/s.

23. The process of claim 18, wherein the bridged bis-cyclopentadienyl Group 4 metal catalyst is selected from structures wherein "T" is a di-C1 to C5 alkyl or di-phenyl substituted silyl group and each of R^1 to R^8 is independently a C1 to C5 alky.