CLAIMS:

What is claimed is:

1. An ethylene copolymer, comprising:

at least 60 wt% of ethylene derived units and 10-40 wt% of comonomer derived units from one or more C4 to C20 alpha olefins, wherein the copolymer has:

a density in the range of 0.850 g/cc to 0.915 g/cc;

MI in the range of 0.1 dg/min to 1000 dg/min;

MIR ($I_{21.6}$ / $I_{2.16}$) in the range of 18 to 100, and

at least two TREF peaks, wherein at least one TREF peak is a major fraction that accounts for at least 90 wt% of the copolymer and wherein at least one TREF peak is a minor fraction that accounts for less than 8 wt% of the copolymer and is found in the range of 60°C to 95°C.

2. The ethylene copolymer of claim 1, wherein the major fraction TREF peak is found in the range of 0°C to 80°C.

3. The ethylene copolymer of claim 1, wherein the copolymer is polymerized in a solution polymerization process with a plug flow reactor or CSTR and has a cement concentration (weight polymer / weight solvent) of 6% to 40%.

4. The ethylene copolymer of claim 1, wherein the copolymer has a MWD (Mw/Mn) of from 1.2 to 5.0.

5. The ethylene copolymer of claim 1, wherein the copolymer has a long branching index as measured from GPC-4D from 0.850 to 0.990.

6. The ethylene copolymer of claim 1, wherein the copolymer has no added metal stearates or siloxanes.

7. The ethylene copolymer of claim 1, wherein the copolymer has no added HDPE, LDPE or talc dusting agents.

8. A method for making a copolymer by solution polymerization comprising:

(a) feeding ethylene, at least one comonomer, and a solvent in controlled proportions to a conduit upstream of a solution polymerization reactor;

(b) adding a single metallocene catalyst and an activator to the conduit;

(c) polymerizing at least a portion of the ethylene and the at least one other monomer in the solution polymerization reactor to produce an ethylene pre-polymer having at least 5 wt% of the comonomer;

(d) feeding the ethylene pre-polymer to the solution polymerization reactor;

(e) feeding additional ethylene, comonomer, catalyst and activator in controlled proportions to the solution polymerization reactor and optionally additional solvent; and

(f) operating the solution polymerization reactor to produce an ethylene copolymer comprising:

at least 60 wt% of ethylene derived units and 10-40 wt% of comonomer derived units from one or more C4 to C20 alpha olefins;

a density in the range of 0.850 g/cc to 0.915 g/cc;

MI in the range of 0.1 dg/min to 1000 dg/min;

MIR ($I_{21.6}$ / $I_{2.16}$) in the range of 18 to 100, and

at least two TREF peaks, wherein at least one TREF peak is a major fraction that accounts for at least 90 wt% of the ethylene copolymer and wherein at least one TREF peak is a minor fraction that accounts for less than 8 wt% of the ethylene copolymer and is found in the range of 60°C to 95°C.

9. The method of claim 8, wherein 5-45 wt % of the total amount of catalyst and activator is added to the conduit upstream of the solution polymerization reactor.

10. The method of claim 8, wherein 5-45 wt % of the total amount of ethylene is added to the conduit upstream of the solution polymerization reactor.

11. The method of claim 8, wherein 5-45 wt % of the total amount of comonomer is added to the conduit upstream of the solution polymerization reactor.

12. A method for making a copolymer by solution polymerization comprising:

(a) feeding ethylene, at least one comonomer, and a solvent in controlled proportions to a solution polymerization reactor;

(b) adding a single metallocene catalyst and an activator to the solution polymerization reactor;

(c) polymerizing at least a portion of the ethylene and the at least one other monomer in the solution polymerization reactor to produce an ethylene copolymer having at least 5 wt% of the comonomer;

(d) flowing the ethylene pre-polymer from the solution polymerization reactor;

(e) feeding additional ethylene in controlled proportions to the ethylene copolymer within a conduit downstream of the solution polymerization reactor to provide an ethylene copolymer product comprising:

at least 60 wt% of ethylene derived units and 10-40 wt% of comonomer derived units from one or more C4 to C20 alpha olefins;

a density in the range of 0.850 g/cc to 0.915 g/cc;

MI in the range of 0.1 dg/min to 1000 dg/min;

MIR ($I_{21.6}$ / $I_{2.16}$) in the range of 18 to 100, and

at least two TREF peaks, wherein at least one TREF peak is a major fraction that accounts for at least 90 wt% of the ethylene copolymer product and wherein at least one TREF peak is a minor fraction that accounts for less than 8 wt% of the ethylene copolymer product and is found in the range of 60°C to 95°C.

13. The method of claim 12, wherein 5-45 wt % of the total amount of catalyst and activator is added to the conduit downstream of the solution polymerization reactor.

14. The method of claim 12, wherein 5-45 wt % of the total amount of ethylene is added to the conduit downstream of the solution polymerization reactor.

15. The method of claim 12, wherein 5-45 wt % of the total amount of comonomer is added to the conduit downstream of the solution polymerization reactor.