

CLAIMS

1. A bimodal polyethylene homopolymer composition consisting essentially of a higher molecular weight polyethylene homopolymer component (HMW component) and a lower molecular weight polyethylene homopolymer component (LMW component); wherein the composition has a density from 0.961 to 0.980 gram per cubic centimeter (g/cm^3); a melt index (I_2) from 0.2 to 2.0 gram per 10 minutes (g/10 min.); a gel permeation chromatography (GPC) resolved bimodality from $\text{Log}(M)$ 4.01 to $\text{Log}(M)$ 4.99; an amount of the HMW component from 30 to 70 weight percent (wt%) based on the combined weight of the HMW and LMW components; and a number-average molecular weight (M_n) from 3,000 to 4,990 grams per mole (g/mol).
2. The composition of claim 1 wherein the composition has a density from 0.961 to 0.974 g/cm^3 ; a melt index (I_2) from 0.25 to 1.6 g/10 min. ; a GPC resolved bimodality from $\text{Log}(M)$ 4.21 to $\text{Log}(M)$ 4.75; an amount of the HMW component from 30 to 60 wt% based on the combined weight of the HMW and LMW components; and an M_n from 3,060 to 4,790 g/mol .
3. The composition of claim 1 or 2 wherein the composition has any one of properties (i) to (iv): (i) a melt flow ratio (I_2/I_1) from 45 to 100; (ii) a weight-average molecular weight (M_w) from 101,000 to 180,000 g/mol ; (iii) a molecular weight distribution (M_w/M_n) from 21 to 59; and (iv) a z-average molecular weight (M_z) from 501,000 to 999,000 g/mol .
4. The composition of any one of claims 1 to 3 wherein the HMW component has any one of properties (i) to (iii): (i) an M_n from 45,000 to 99,000 g/mol ; (ii) an M_w from 160,000 to 390,000 g/mol ; and (iii) both (i) and (ii); or wherein the LMW component has any one of properties (iv) to (vi): (iv) an M_n from 1,500 to 2,400 g/mol ; (v) an M_w from 5,000 to 10,000 g/mol ; and (vi) both (iv) and (v).
5. A method of making the bimodal polyethylene homopolymer composition, the method consisting essentially of contacting ethylene with a bimodal catalyst system in the presence of molecular hydrogen (H_2) at a hydrogen-to-ethylene (H_2/C_2) molar ratio from 0.005 to 0.025 in a single gas phase polymerization reactor containing a floating bed of resin at a temperature of 90° to 105° C.; wherein the contacting of the ethylene with the bimodal catalyst system is performed in the absence of a ($\text{C}_3\text{-C}_{20}$)olefin comonomer; and wherein the bimodal catalyst system consists essentially of a substantially single site non-metallocene catalyst, optionally disposed on a support material, and a metallocene catalyst, optionally disposed on a support material; thereby concurrently making the HMW and LMW components so as to make the bimodal polyethylene homopolymer composition.
6. A formulation consisting essentially of the bimodal polyethylene homopolymer

composition and at least one additive.

7. A manufactured article consisting essentially of a shaped form of the formulation of claim 6.

8. A method of making a manufactured article, the method consisting essentially of shaping a melt of the formulation of claim 6 and then cooling the shaped melt so as to make a manufactured article consisting essentially of a shaped form of the formulation.

9. An extruded film made by extruding a melt of the formulation of claim 6 in a film extrusion process to give a solid film consisting essentially of the formulation restricted in one dimension.

10. A method of making an extruded film, the method consisting essentially of extruding a melt of the formulation of claim 6 in a film extrusion process to give a solid film consisting essentially of the formulation restricted in one dimension.

11. A method of protecting a moisture-sensitive and/or oxygen-sensitive material in need of such protection, the method comprising hermetically sealing the moisture-sensitive and/or oxygen-sensitive material inside a package consisting essentially of the extruded film of claim 9 to give a sealed package, thereby protecting the moisture-sensitive and/or oxygen-sensitive material from water and/or oxygen gas that is/are located outside the sealed package.

12. A sealed package consisting essentially of the extruded film of claim 9 and the moisture-sensitive and/or oxygen-sensitive material that is disposed inside the sealed package, which is hermetically sealed by the extruded film.