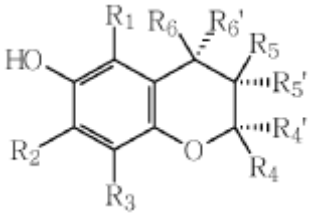
CLAIMS

1. A method of melt blending a polypropylene composition, comprising:
providing (A) a base-polypropylene having a melt flow rate ASTM D1238, condition L at 230°C and 2.16 kg load, of less than 15 g/10 min and a molecular weight distribution (Mw/Mn) of 6 to 16, and (B) at least one hindered phenol antioxidant and at least one phosphorous-type antioxidant, and (C) within the range from 5 ppm to 4000 ppm of an alkyl radical scavenger relative to the total weight of the components, wherein the alkyl radical scavenger is selected from 6-chromanol-containing compounds selected from the group consisting of compounds of formula:



wherein each of R_1, R_2, R_3 and R_6/$R_{6'}$, are independently selected from hydrogen and C_1 to C_{10} linear alkyls or branched alkyls; and
each of R_4 and R_5 and $R_{4'}$ and $R_{5'}$ are independently selected from hydrogen and C_1 to C_{30} linear or branched alkyls;
melt blending the base-polypropylene, antioxidants and alkyl radical scavenger in an extruder having a temperature controlled length from the feed zone to the die zone, wherein the initial melt temperature at the feed zone is less than 180°C, and the final melt temperature at the die zone of at least 210°C; and
isolating a melt blended polypropylene.

2. The method of claim 1, wherein the alkyl radical scavenger is present within the range from 20 ppm to 3000 ppm relative to the total weight of the components, and wherein the alkyl radical scavenger is formed into a solid by blending with at least one other ingredient.

3. The method of claim 1, wherein at least two of any ingredients selected from the primary antioxidant, secondary antioxidant, alkyl radical scavenger, a polymer, and acid scavengers are formed into a solid before melt blending, and wherein the hindered phenol and phosphorous-type antioxidants are independently present within a range from 500 ppm to 3000 ppm.

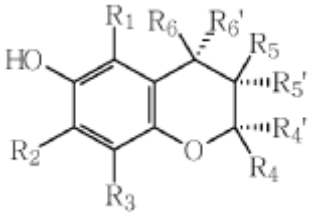
4. The method of claim 1, wherein the base-polypropylene is first melt blended with the hindered phenol antioxidant, phosphorous-type antioxidant, or both, to form a master batch, followed by melt blending with the alkyl radical scavenger.

5. The method of claim 1, wherein a screen pack is absent from the extruder, or if present, is at least as course as 80 mesh.

6. The method of claim 1, wherein the base-polypropylene has a Melt Strength of at least 15 cN at 190°C, wherein at 260°C there is less than a 20% drop in the Melt Strength of the melt blended polypropylene relative to the base-polypropylene, and wherein the properties of the melt blended polypropylene are within ±20 % of that measured property's original value prior to melt blending for the base-polypropylene.

7. The method of claim 1, wherein at least the base-polypropylene used to form the melt blended polypropylene is melt blended through an apparatus having a length, wherein there is a temperature change along such length from the entrance of the extruder to the exit of the extruder of at least 80°C, or wherein the melt blended polypropylene is foamed, thermoformed, injection molded, blow molded, extrusion coated, or melt/spun bonded to form articles.

8. A melt blended polypropylene comprising the reaction product of (A) a base-polypropylene having a MFR 230°C/2.16 kg of less than 15 g/10 min and a molecular weight distribution Mw/Mn of 6 to 16, with (B) at least one hindered phenol antioxidant, (C) at least one phosphorous-type antioxidant, (D) within a range from 5 ppm to 4000 ppm of an alkyl radical scavenger, wherein the alkyl radical scavenger is selected from 6-chromanol-containing compounds selected from the group consisting of compounds of formula:



wherein each of R_1, R_2, R_3 and R_6/$R_{6'}$, are independently selected from hydrogen and C_1 to C_{10} linear alkyls or branched alkyls; and

each of R_4 and R_5 and $R_{4'}$ and $R_{5'}$ are independently selected from hydrogen and C_1 to C_{30} linear or branched alkyls, and (E) an oxygenate, a carbon radical, or combinations thereof.

9. The melt blended polypropylene of claim 8, wherein the melt blended polypropylene has a Melt Strength of at least 15 cN at 190°C and wherein the melt blended polypropylene has a Mz/Mw value of greater than 2.8.

10. The melt blended polypropylene of claim 8, wherein the hindered phenol and phosphorous-type antioxidants are independently present within a range from 500 ppm to 3000 ppm.

11. An article made from the melt blended polypropylene of claim 8, wherein the melt blended polypropylene is foamed, thermoformed, injection molded, blow molded, extrusion coated, or melt/spun bonded.