POLYMERIC FORMULATION WITH DIRT PICK-UP RESISTANCE

BACKGROUND

[0001] Resistance to dirt is important in applications where the finished product is exposed to contamination. Sources of contamination include, for example, soil, air pollution, toxic gases, hydrolysis or fluids, and chemicals. Applications such as textile architecture, roofing membranes, geo-membranes, industrial tank liners, industrial containers, industrial packaging, automotive dashboards—are some examples of end-products exposed to contamination.

[0002] Resistance to dirt (or contamination) is measured quantitatively as dirt pick-up resistance (or DPUR). Conventionally, materials such as polyolefins, achieve DPUR by (i) applying a special coating thereto (coating based on acrylic, polyurethane, fluoro-silane, polyvinyl dichloride, UV curing inks), and/or (ii) surface modification techniques (gas phase fluorination, electron beam grafting), and/or (iii) the use of surface modifiers (polydimethylsiloxanes, nano-silica).

[0003] The art recognizes the need for materials that have DPUR without the need for a coating or a secondary production process.

SUMMARY

[0004] The present disclosure is directed to a polyolefin-based composition with improved DPUR achieved without the need for any of the described coatings or secondary production processes.

[0005] The present disclosure provides a composition. In an embodiment, the composition includes

A) an ethylene/acrylate interpolymer or an ethylene/acetate interpolymer;

B) an ethylene/α-olefin multi-block copolymer; and

C) a flame retardant.

[0005a] In one aspect, there is provided a composition comprising:

(A) from 5 wt% to 30 wt% of a grafted ethylene/acrylate interpolymer;

(B-1) from 15 wt% to 25 wt% of a first ethylene/α-olefin multi-block copolymer;

(B-2) from 10 wt% to 20 wt% of a second ethylene/α-olefin multi-block copolymer, the second ethylene/α-olefin multi-block copolymer different than the first ethylene/α-olefin multi-block copolymer;

(C) from 40 wt% to 55 wt% of a flame retardant; and

(D) from 1 wt% to 5 wt% of an additive package.

[0006] In an embodiment, the ethylene/acrylate interpolymer is a functionalized ethylene/acrylate interpolymer.

[0007] The present disclosure provides an article. The article contains the present composition.

[0007a] In another aspect, there is provided an article comprising the composition as defined herein.

[0008] In embodiment, the article is a roofing membrane. The roofing membrane includes at least one layer containing the present composition. The composition comprises

(A) from 5 wt% to 30 wt% of a grafted ethylene/acrylate interpolymer or an ethylene/acetate interpolymer;

(B-1) from 15 wt% to 25 wt% of a first ethylene/α-olefin multi-block copolymer;

(B-2) from 10 wt% to 20 wt% of a second ethylene/α-olefin multi-block copolymer, the second ethylene/α-olefin multi-block copolymer different than the first ethylene/α-olefin multi-block copolymer; and

(C) from 40 wt% to 55 wt% of a flame retardant.

[0008a] In another aspect, there is provided a roofing membrane comprising:

at least one layer containing a composition comprising

(A) from 5 wt% to 30 wt% of a grafted ethylene/acrylate interpolymer;

(B-1) from 15 wt% to 25 wt% of a first ethylene/α-olefin multi-block copolymer;

(B-2) from 10 wt% to 20 wt% of a second ethylene/α-olefin multi-block copolymer, the second ethylene/α-olefin multi-block copolymer different than the first ethylene/α-olefin multi-block copolymer;

(C) from 40 wt% to 55 wt% of a flame retardant; and

(D) from 1 wt% to 5 wt% of an additive package.

[0008b] In another aspect, there is provided a composition comprising;

(A) from 5 wt% to 30 wt% of an ethylene vinyl acetate copolymer;

(B-1) from 15 wt% to 25 wt% of a first ethylene/α-olefin multi-block copolymer;

(B-2) from 10 wt% to 20 wt% of a second ethylene/α-olefin multi-block copolymer, the second ethylene/α-olefin multi-block copolymer different than the first ethylene/α-olefin multi-block copolymer; and

(C) from 40 wt% to 55 wt% of a flame retardant; and

(D) from 1 wt% to 5 wt% of an additive package.

[0009] An advantage of the present disclosure is a composition with improved dirt pick-up resistance (DPUR).

[0010] An advantage of the present disclosure is an article with improved DPUR.

[0011] An advantage of the present disclosure is a roofing membrane with improved DPUR.

CLAIMS

1. A composition comprising:

(A) from 5 wt% to 30 wt% of a grafted ethylene/acrylate interpolymer;

(B-1) from 15 wt% to 25 wt% of a first ethylene/α-olefin multi-block copolymer;

(B-2) from 10 wt% to 20 wt% of a second ethylene/α-olefin multi-block copolymer, the second ethylene/α-olefin multi-block copolymer different than the first ethylene/α-olefin multi-block copolymer;

(C) from 40 wt% to 55 wt% of a flame retardant; and

(D) from 1 wt% to 5 wt% of an additive package.

2. The composition of claim 1 wherein the composition has a dirt pick-up resistance (non-UV exposed) from 3.0 to 5.5.

3. The composition of any of claims 1 and 2 wherein the composition has a dirt pick-up resistance (UV exposed) from 3.0 to 5.1.

4. The composition of claim 1 wherein the grafted ethylene-based acrylate interpolymer is a maleic anhydride-grafted-ethylene/acrylate copolymer.

5. An article comprising the composition of any of claims 1 to 4.

6. A roofing membrane comprising:

at least one layer containing a composition comprising

(A) from 5 wt% to 30 wt% of a grafted ethylene/acrylate interpolymer;

(B-1) from 15 wt% to 25 wt% of a first ethylene/α-olefin multi-block copolymer;

(B-2) from 10 wt% to 20 wt% of a second ethylene/α-olefin multi-block copolymer, the second ethylene/α-olefin multi-block copolymer different than the first ethylene/α-olefin multi-block copolymer;

(C) from 40 wt% to 55 wt% of a flame retardant; and

(D) from 1 wt% to 5 wt% of an additive package.

7. The roofing membrane of claim 6 wherein the composition has a dirt pick-up resistance (non-UV exposed) from 3.0 to 5.5.

8. The roofing membrane of any of claims 6-7 wherein the at least one layer is a top layer of the roofing membrane.

9. A composition comprising;

(A) from 5 wt% to 30 wt% of an ethylene vinyl acetate copolymer;

(B-1) from 15 wt% to 25 wt% of a first ethylene/α-olefin multi-block copolymer;

(B-2) from 10 wt% to 20 wt% of a second ethylene/α-olefin multi-block copolymer, the second ethylene/α-olefin multi-block copolymer different than the first ethylene/α-olefin multi-block copolymer;

(C) from 40 wt% to 55 wt% of a flame retardant; and

(D) from 1 wt% to 5 wt% of an additive package.

10. The composition of claim 9 wherein the composition has a dirt pick-up resistance (non-UV exposed) from 3.0 to 5.5.

11. An article comprising the composition of any of claims 9-10.