zero to 70 wt% tackifier, and (D) Optionally, from greater than zero to 40 wt% of at least one selected from the group of a wax and an oil.

[0004a] In one aspect, there is provided a hot melt adhesive composition, comprising:

(A) 20-95 wt% of a polymer component including an ethylene-based polymer and a propylene-based polymer, the ethylene-based polymer being present in an amount greater than 30 wt%, based on a total weight of the polymer component; and

(B) 1-60 wt% of a crystalline block composite comprising:

(1) a crystalline ethylene based polymer;

(2) a crystalline alpha-olefin based polymer derived from at least one of a C_{3-10} α-olefin; and

(3) a block copolymer comprising 10-90 wt% of a crystalline ethylene block comprising polymerized ethylene units in which a comonomer content is 10 mol% or less, and comprising 10-90 wt% of a crystalline alpha-olefin block comprising greater than 90 mol% units derived from at least one of a C_{3-10} α-olefin;

(C) from greater than zero to 70 wt% tackifier; and

(D) from greater than zero to 40 wt% of at least one selected from the group of a wax and an oil.

[0004b] In another aspect, there is provided a packaging adhesive comprising the hot melt adhesive composition as defined herein.

[0004c] In another aspect, there is provided a bookbinding adhesive comprising the hot melt adhesive composition as defined herein.

[0004d] In another aspect, there is provided an article comprising, a first substrate, a second substrate, and an adhesive layer between and in contact with the first substrate and the second substrate, the first substrate including a rigid material, the second substrate including a flexible material that has less resistance to deformation than the rigid material, and the adhesive layer including the hot melt adhesive composition as defined herein.

[0004e] In another aspect, there is provided an article comprising, a first substrate, a second substrate, and an adhesive layer between and in contact with the first substrate and the second substrate, the first substrate including a rigid material, the second substrate including a rigid material, and the adhesive layer including the hot melt adhesive composition as defined herein.

[0004f] In another aspect, there is provided an article comprising, a first substrate, a second substrate, and an adhesive layer between and in contact with the first substrate and the second substrate, the first substrate including a flexible material, the second substrate including a flexible material, and the adhesive layer including the hot melt adhesive composition as defined herein.

[0004g] In another aspect, there is provided an article comprising, a first substrate, a second substrate, and an adhesive layer between and in contact with the first substrate and the second substrate, the first substrate being wood, the second substrate being wood, and the adhesive layer including the hot melt adhesive composition as defined herein.

[0004h] In another aspect, there is provided an article comprising, a first substrate, a second substrate, and an adhesive layer between and in contact with the first substrate and the second substrate, the first substrate being non-woven fabric, and the adhesive layer including the hot melt adhesive composition as defined herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 is a set of six scanning electron microscope (SEM) images of the cross section of comparative examples including an ethylene-based polymer and propylene-based polymer blend in the absence of any crystalline block composite compatibilizer.

[0006] FIG. 2 is a set of six SEM images of the cross section of inventive examples having an ethylene-based polymer and propylene-based polymer blend that includes 5 wt% of a crystalline block composite compatibilizer.

[0007] FIG. 3 is a set of six SEM images of the cross section of inventive examples having an ethylene-based polymer and propylene-based polymer blend that includes 10 wt% of a crystalline block composite compatibilizer.

[0008] FIGS. 4A-4C is a set of three DSC melting and crystallization profiles of an ethylene-based polymer and propylene-based polymer blend that includes 0, 5, and 10 wt% of crystalline block composite compatibilizer, respectively.

DETAILED DESCRIPTION

[0009] Embodiments relate a hot melt adhesive composition that includes a crystalline block composite (CBC) and a blend of an ethylene-based polymer and a propylene-based polymer. The hot melt adhesive composition may include a tackifier. The hot melt adhesive composition may include at least one selected from the group of oil and wax (i.e., may include oil and/or wax). For example, embodiments relate to hot-melt adhesive compositions for book binding applications and/or packaging applications.

Definitions

[0010] All references to the Periodic Table of the Elements refer to the Periodic Table of the Elements published and copyrighted by CRC Press, Inc., 1990. Also, any references to a Group or Groups shall be to the Group or Groups reflected in this Periodic Table of the Elements using the IUPAC system for numbering groups. Unless stated to the contrary, implicit from the context, or customary in the art, all parts and percents are based on weight and all test methods are current as of the filing date of this disclosure. For purposes of United States patent practice, the contents of any referenced patent, patent application or publication are incorporated by reference in their entirety (or its equivalent US version is so incorporated by reference)

What is claimed is:

1. A hot melt adhesive composition, comprising:

(A) 20-95 wt% of a polymer component including an ethylene-based polymer and a propylene-based polymer, the ethylene-based polymer being present in an amount greater than 30 wt%, based on a total weight of the polymer component; and

(B) 1-60 wt% of a crystalline block composite comprising:

(1) a crystalline ethylene based polymer;

(2) a crystalline alpha-olefin based polymer derived from at least one of a C_{3-10} α-olefin; and

(3) a block copolymer comprising 10-90 wt% of a crystalline ethylene block comprising polymerized ethylene units in which a comonomer content is 10 mol% or less, and comprising 10-90 wt% of a crystalline alpha-olefin block comprising greater than 90 mol% units derived from at least one of a C_{3-10} α-olefin;

(C) from greater than zero to 70 wt% tackifier; and

(D) from greater than zero to 40 wt% of at least one selected from the group of a wax and an oil.

2. The hot melt adhesive composition as claimed in claim 1, wherein the crystalline alpha-olefin based polymer and the crystalline alpha-olefin block are derived from propylene.

3. The hot melt adhesive composition as claimed in claim 1, wherein the Crystalline Block Composite Index (CBCI) of the crystalline block composite is greater than 0.2 and less than 1.0.

4. The hot melt adhesive composition as claimed in claim 1, wherein the Crystalline Block Composite Index (CBCI) of the crystalline block composite is from 0.6 to 0.99.

5. The hot melt adhesive composition as claimed in claim 1, wherein the crystalline block composite is a polyethylene-isotactic polypropylene (PE-iPP) diblock polymer.

6. The hot melt adhesive composition as claimed in claim 1, wherein the ethylene-based polymer has a density from 0.850 g/cc to 0.900 g/cc and a melt index from 200 g/10 min to 3,000 g/10 min.

7. The hot melt adhesive composition as claimed in claim 6, wherein propylene-based polymer has a density from 0.870 g/cc to 0.910 g/cc and a melt flow rate from 1 g/10 min to 200 g/10 min, the density of the propylene-based polymer being higher than the density of the ethylene-based polymer.

8. The hot melt adhesive composition as claimed in claim 1, wherein the amount of the ethylene-based polymer is from 40 wt% to 60 wt%, based on the total weight of the polymer component.

9. The hot melt adhesive composition as claimed in claim 1, wherein:

a combined weight of polymer component and the crystalline block composite is from 30 wt% to 60%, based on a total weight of the hot melt adhesive composition;

the tackifier is present in an amount from 20 wt% to 40 wt%, based on the total weight of the hot melt adhesive composition; and

a wax is present in an amount from 15 wt% to 30 wt%, based on the total weight of the hot melt adhesive composition.

10. A packaging adhesive comprising the hot melt adhesive composition as claimed in claim 1.

11. A bookbinding adhesive comprising the hot melt adhesive composition as claimed in claim 1.

12. An article comprising, a first substrate, a second substrate, and an adhesive layer between and in contact with the first substrate and the second substrate, the first substrate including a rigid material, the second substrate including a flexible material that has less

resistance to deformation than the rigid material, and the adhesive layer including the hot melt adhesive composition as claimed in claim 1.

13. An article comprising, a first substrate, a second substrate, and an adhesive layer between and in contact with the first substrate and the second substrate, the first substrate including a rigid material, the second substrate including a rigid material, and the adhesive layer including the hot melt adhesive composition as claimed in claim 1.

14. An article comprising, a first substrate, a second substrate, and an adhesive layer between and in contact with the first substrate and the second substrate, the first substrate including a flexible material, the second substrate including a flexible material, and the adhesive layer including the hot melt adhesive composition as claimed in claim 1.

15. An article comprising, a first substrate, a second substrate, and an adhesive layer between and in contact with the first substrate and the second substrate, the first substrate being wood, the second substrate being wood, and the adhesive layer including the hot melt adhesive composition as claimed in claim 1.

16. An article comprising, a first substrate, a second substrate, and an adhesive layer between and in contact with the first substrate and the second substrate, the first substrate being non-woven fabric, and the adhesive layer including the hot melt adhesive composition as claimed in claim 1.