

CLAIMS:

1. A composition comprising:
a polymer; a resin; and an olefin wax.
2. The composition of claim 1, wherein the composition comprises:
from about 10 wt% to about 50 wt% of the polymer, based on the total weight of the composition; from about 20 wt% to about 70 wt% of the resin, based on the total weight of the composition; and from about 1 wt% to about 50 wt% of wax, based on the total weight of the composition.
3. The composition of claims 1 or 2, wherein the composition comprises:
from about 25 wt% to about 30 wt% of the polymer, based on the total weight of the composition; from about 35 wt% to about 50 wt% of the resin, based on the total weight of the composition; and from about 15 wt% to about 30 wt% of wax, based on the total weight of the composition.
4. The composition of any of claims 1 to 3, wherein the olefin wax is a linear alpha olefin.
5. The composition of any of claims 1 to 4, wherein the olefin wax has from about 20 carbon atoms to about 50 carbon atoms.
6. The composition of any of claims 1 to 5, wherein the olefin wax has an olefin content of about 10% or less, based on olefinic carbon atoms divided by total carbon atoms of the olefin wax as determined by ¹³C NMR.
7. The composition of any of claims 1 to 6, wherein the olefin wax has an olefin content of from about 2% to about 4%, based on olefinic carbon atoms divided by total carbon atoms of the olefin wax as determined by ¹³C NMR.
8. The composition of any of claims 1 to 7, wherein the olefin wax includes less than about 20 wt % (vinylidene + internal olefins), based on olefinic carbon atoms divided by total carbon atoms of the olefin wax as determined by ¹³C NMR.
9. The composition of any of claims 1 to 8, wherein the olefin wax is selected from the group consisting of (1) an olefin having from about 20 carbon atoms to about 24 carbon atoms, (2) an olefin having from about 26 carbon atoms to about 28 carbon atoms, (3) an olefin having from about 26 to about 28 carbon atoms, (4) an olefin having from having at least 30 carbon atoms, and (5) combination(s) thereof.
10. The composition of any of claims 1 to 9, wherein the olefin wax has one or more of the following properties: a congealing point of from about 45°C to about 65°C, according to ASTM D938; a penetration @25°C (0.1 mm, needle), according to ASTM D1321, of from about 15 to about 40; a density @80°C of from about 700 kg/m³ to about 900 kg/m³, according to ASTM

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D4052; a kinematic viscosity @100°C of from about 3 mm²/s to about 6 mm²/s, according to ASTM D445; or a drop melting point of from about 15°C to about 50°C according to ASTM D3954.

11. The composition of any of claims 1 to 10, wherein the olefin wax has each of the following properties: a congealing point of from about 55°C to about 60°C, according to ASTM D938; a penetration @25°C (0.1 mm, needle), according to ASTM D1321, of from about 15 to about 40, such as from about 20 to about 30, such as from about 22 to about 26; a density @80°C of from about 750 kg/m³ to about 800 kg/m³, according to ASTM D4052; a kinematic viscosity @100°C of from about 4 mm²/s to about 4.5 mm²/s, according to ASTM D445; and a drop melting point of from about 30°C to about 35°C according to ASTM D3954.

12. The composition of any of claims 1 to 11, further comprising an additional wax.

13. The composition of any of claims 1 to 12, wherein total wax (olefin wax + additional wax) includes greater than 30 mol% olefin wax having at least 20 carbon atoms, based on the total amount of wax in the composition.

14. The composition of any of claims 1 to 13, wherein total wax (olefin wax + additional wax) includes greater than 90 mol% olefin wax having at least 20 carbon atoms, based on the total amount of wax in the composition.

15. The composition of any of claims 1 to 14, wherein the additional wax has one or more of the following properties: a drop melting point (ASTM D3954) of from about 90°C to about 130 °C; penetration @25°C (needle, 0.1 mm)(ASTM D 1321) of from about 0.1 to about 10; penetration @65°C (needle, 0.1 mm)(ASTM D 1321) of from about 10 to about 40; or a molecular weight (Mw by gel permeation chromatography) of from about 700 g/mole to about 1,000 g/mole.

16. The composition of any of claims 1 to 15, wherein the additional wax has each of the following properties: a drop melting point (ASTM D3954) of from 110°C to about 115°C, penetration @25°C (needle, 0.1 mm)(ASTM D 1321) of from about 0.5 to about 1.5; penetration @65°C (needle, 0.1 mm)(ASTM D 1321) of from about 15 to about 25; and a molecular weight (Mw by gel permeation chromatography) of from about 800 g/mole to about 900 g/mole.

17. The composition of any of claims 1 to 15, wherein the additional wax has one or more of the following properties: a drop melting point (ASTM D3954) of from about 55°C to about 75°C; penetration @25°C (needle, 0.1 mm)(ASTM D 1321) of from about 8 to about 20; penetration @40°C (needle, 0.1 mm)(ASTM D 1321) of from about 20 to about 50; kinematic

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viscosity @100°C (ASTM D 445) of from about 1 cSt to about 10 cSt; or density @15°C (ASTM D 1298) of from about 700 kg/m³ to about 1,000 kg/m³.

18. The composition of any of claims 1 to 17, wherein the additional wax has each of the following properties: a drop melting point (ASTM D3954) of from about 55°C to about 75°C; penetration @25°C (needle, 0.1 mm)(ASTM D 1321) of from about 10 to about 15; penetration @40°C (needle, 0.1 mm)(ASTM D 1321) of from about 30 to about 40; kinematic viscosity @100°C (ASTM D 445) of from about 3 cSt to about 7 cSt; and density @15°C (ASTM D 1298) of from about 800 kg/m³ to about 900 kg/m³.

19. The composition of any of claims 1 to 18, wherein the resin has a softening point (Ring and Ball, as measured by ASTM E-28) of from about 100°C to about 130°C.

20. The composition of any of claims 1 to 19, wherein the resin has a softening point (Ring and Ball, as measured by ASTM E-28) of from about 10°C and about 70°C.

21. The composition of any of claims 1 to 20, wherein the resin is a coumarone-indene resin.

22. The composition of any of claims 1 to 21, wherein the resin is a terpene resin, a butadiene-styrene resin, a rosin, or a thermoplastic hydrocarbon resin, or a combination thereof.

23. The composition of any of claims 1 to 22, wherein the polymer is ethylene vinyl acetate, polyethylene, polypropylene, thermoplastic rubber, polyamide, polyurethane, or polyester, or a combination thereof.

24. The composition of any of claims 1 to 23, wherein the polymer is an ethylene vinyl acetate having a vinyl acetate content from about 12 wt% to about 32 wt%.

25. The composition of any of claims 1 to 24, wherein the ethylene vinyl acetate has one or more of the following properties: a density (ASTM D1505) of from about 0.92 g/cm³ to about 0.96 g/cm³; a melt index (190°C/2.16 kg) (ASTM D1238) of from about 100 g/10min to about 200 g/10min; a Vicat softening temperature (ASTM D1525) of from about 30°C to about 70°C; a tensile strength at break (ASTM D638) of from about 0.1 MPa to about 6 MPa; an elongation at break (ASTM D638) of from about 400% to about 700%; or a flexural modulus 1% secant (ASTM D790) of from about 10 MPa to about 30 MPa.

26. The composition of any of claims 1 to 25, wherein the ethylene vinyl acetate has each of the following properties: a density (ASTM D1505) of from about 0.94 g/cm³ to about 0.95 g/cm³; a melt index (190°C/2.16 kg) (ASTM D1238) of from about 140 g/10min to about 160 g/10min; a Vicat softening temperature (ASTM D1525) of from about 40°C to about 60°C; a tensile strength at break (ASTM D638) of from about 1.5 MPa to about 3 MPa; an elongation

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at break (ASTM D638) of from about 500% to about 600%; and a flexural modulus 1% secant (ASTM D790) of from about 15 MPa to about 25 MPa.

27. The composition of any of claims 1 to 26, further including an additional material selected from the group consisting of a plasticizer, a stabilizer, an antioxidant, an ultraviolet ray absorber, an anti-static agent, a dyes, a pigment, an inorganic filler, a fire-retardant, a lubricant, a reinforcing agent, a processing aid, a slip additive, an antiblock agent, a release agent and mixture(s) thereof.

28. The composition of any of claims 1 to 27, wherein the composition has one or more of the following properties: an elongation at break, measured according to method ISO 37, of greater than about 150%; a Brookfield viscosity @177°C of from about 500 cPs to about 2,000 cPs, according to ASTM D-3236; a fiber tear @25°C of from about 50% to about 100%; a fiber tear @4°C of from about 30% to about 100%; a fiber tear @-18°C of from about 30% to about 100%; or a set time of from about 2.5 seconds or less, as determined by auto set time machine.

29. The composition of any of claims 1 to 28, wherein the composition has each of the following properties: an elongation at break, measured according to method ISO 37, of greater than about 150%; a Brookfield viscosity @177°C of from about 500 cPs to about 1,200 cPs, according to ASTM D-3236; a fiber tear @25°C of from about 90% to about 100%, a fiber tear @4°C of from about 75% to about 90%, a fiber tear @-18°C of from about 70% to about 95%; and a set time of from about 1.25 seconds to about 2.25 seconds, as determined by auto set time machine.

30. The composition of any of claims 1 to 29, further comprising an additional wax selected from the group consisting of a paraffin wax, a microcrystalline wax, a high-density low molecular weight polyethylene wax, a by-product polyethylene wax, a Fischer-Tropsch wax, an oxidized Fischer-Tropsch wax, a functionalized wax and combinations thereof.

31. An article comprising the composition of any of claims 1 to 30.

32. The article of Claim 31, wherein the article is a carton, a container, a crate, a case, a corrugated case, a tray, furniture, a toy, a musical instrument, a window frame, a sill, a door, flooring, fencing, a tool, a ladder, a sporting good, a dog house, a gazebo, a deck, a picnic table or a combination thereof.

33. A method of producing a composition, comprising: mixing a polymer, a resin, and an olefin wax to form the composition.

34. The method of Claim 33, wherein mixing is performed by dry blending or extruding the polymer, the resin, and the olefin wax to form the composition.

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35. The method of Claims 33 or 34, wherein mixing is performed at a temperature of from about 130°C to about 210°C.

36. A method of producing an article comprising: applying a hot melt adhesive comprising an olefin wax to a first article to form an article having the hot melt adhesive disposed thereon; and applying a second article to the article having the hot melt adhesive disposed thereon.

37. The method of Claim 36, wherein the hot melt adhesive further comprises a polymer or a resin.