CLAIMS

What Is Claimed Is:

1. An adhesive composition comprising:

(a) an ethylene-based polymer comprising more than 50 wt.% of ethylene-derived units and in the range of 1 wt.% to 49 wt.% of units derived from a first comonomer, said ethylene-based polymer having a Brookfield viscosity of at least 250 mPa•sec measured by ASTM D-3236 at 190°C, a heat of fusion of less than about 250 J/g measured by ASTM D-3418-03, wherein the weight percent measurements are based on the weight of the ethylene-based polymer;

(b) a propylene-based polymer comprising more than 50 wt.% propylene-derived units and in the range of 1 wt.% to 49 wt.% of units derived from a second comonomer, said propylene-based polymer having a Brookfield viscosity in the range from 100 mPa•sec to 1500 mPa•sec measured by ASTM D-3236 at 190°C, a heat of fusion of at least 45 J/g measured by ASTM D-3418-03, wherein the weight percent measurements are based on the weight of the propylene-based polymer;

wherein said ethylene-based polymer and said propylene-based polymer each have a characteristic time (t_c) of at least 0.1 nanoseconds, said characteristic time (t_c) in units of nanoseconds is defined by Equation 1:

$$t_c = \frac{BV}{\text{Density} \times \text{Heat of Fusion}} \qquad \text{(Equation 1)}$$

wherein said BV is the Brookfield viscosity of said ethylene-based polymer or said propylene-based polymer measured by ASTM D-3236 at 190°C in units of mPa•sec, said Density is the density of said ethylene-based polymer or said propylene-based polymer measured by ASTM D-1505-10 at 23°C in units of g/cm^3, and said Heat of Fusion is the heat of fusion of said ethylene-based polymer or said propylene-based polymer measured by ASTM D-3418-03 in units of J/g.; and

wherein said first comonomer comprises propylene or octene and second comonomer comprises ethylene.

~~2. The adhesive composition of claim 1, wherein said first comonomer is selected from the group consisting of propylene, a C_4 to C_{20} alpha-olefin, and combinations thereof.~~

~~3. The adhesive composition of any preceding claim, wherein said first comonomer comprises propylene, butene or octene.~~

~~4.~~2. The adhesive composition of any preceding claim, wherein said Brookfield viscosity measured by ASTM D-3236 at 190°C of said ethylene-based polymer is from 250 to 50,000 mPa•sec.

~~5.~~3. The adhesive composition of any preceding claim, wherein said heat of fusion measured by ASTM D-3418-03 of said ethylene-based polymer is from 20 to 250 J/g.

~~6.~~4. The adhesive composition of any preceding claim, wherein said characteristic time (t_c) of said ethylene-based polymer is from 1 to 1000 nanoseconds.

~~7.~~5. The adhesive composition of any preceding claim, wherein said ethylene-based polymer has a ratio of a weight-average molecular weight (M_w) to a number-average molecular weight (M_n) in the range from 1 to 10.

~~8. The adhesive composition of claim 1, wherein said second comonomer is selected from the group consisting of ethylene, a C_4 to C_{20} alpha-olefin, and combinations thereof.~~

~~9. The adhesive composition of claim 8, wherein said second comonomer comprises ethylene.~~

~~10.~~6. The adhesive composition of ~~claims 8 to 9~~ claim 1, wherein said Brookfield viscosity measured by ASTM D-3236 at 190°C of said propylene-based polymer is from 100 to 1500 mPa•sec.

~~11.~~7. The adhesive composition of ~~claims 8 to 10~~ claim 6, wherein said heat of fusion measured by differential scanning calorimetry of said propylene-based polymer is from 45 to 75 J/g.

~~12.~~8. The adhesive composition of ~~claims 8 to 11~~ claim 7, wherein said characteristic time (t_c) of said propylene-based polymer is from 1 to 100 nanoseconds.

~~13.~~9. The adhesive composition of any preceding claim, wherein said first comonomer and said second comonomer are the same or different.

~~14.~~10. The adhesive composition of any preceding claim, further comprising one or more additives, said additives selected from the group consisting of a functionalized component, a tackifier component, a process oil component, a wax component, an antioxidant component, or a mixture thereof.

~~15.~~11. The adhesive composition of claim ~~14~~ 10, wherein said adhesive composition has one or more of the following properties:

(i) a Brookfield viscosity of 250 to 10,000 mPa•sec measured by ASTM D-3236 at 177°C;

(ii) an Average percent Fiber Tear greater than 99%, wherein Average percent Fiber Tear is defined by: Average percent Fiber Tear = (percent Fiber Tear at 25°C + percent Fiber Tear at 2°C + percent Fiber Tear at -18°C)/3;

(iii) an adhesion set time of less than 5 seconds;

(iv) a melting temperature (T_m) of 130°C or less measured by differential scanning calorimetry at second melt with a heating rate of 10°C/min;

(v) a calculated density of said adhesive composition at 23°C lower than about 0.9100 g/cm^3, wherein said calculated density is determined from the weight percent and the density of each component is said adhesive composition;

(vi) a heat of fusion (H_f) of said adhesive composition of about 19 J/g to about 45 J/g; and/or

(vii) a hot melt adhesive characteristic time (HMA t_c) from about 15 nanoseconds to about 100 nanoseconds, said HMA characteristic time (HMA t_c) defined by:

$$\text{HMA } t_c = \frac{\text{BV at 177°C}}{\text{Density} \times \text{Heat of Fusion}}$$

wherein said BV is the Brookfield viscosity of said adhesive composition measured by ASTM D-3236 at 177°C in units of mPa•sec, said Density is the calculated density

of said adhesive composition at 23°C in units of g/cm^3, and said Heat of Fusion is the heat of fusion of said adhesive composition measured by ASTM D-3418-03 in units of J/g.