[0017] Another advantage of exemplary embodiments is the achievement of cover and spacer material that is inherently hydrophilic.

[0018] Yet another advantage of exemplary embodiments is the achievement of a spacer material for forming the walls of the capillary which in turn provides enough hydrophilic character to the capillary that the need for a hydrophilic top sheet substrate can be eliminated or a non-hydrophilic top sheet substrate can be used.

[0019] Still another advantage of exemplary embodiments is the construction of a microfluidic device that provides uniform wetting and wicking, ease of manufacturing, improves and simplifies manufacturing, improves device reliability, and reduces cost of the final device.

[0020] Another advantage of exemplary embodiments is the construction of a lateral flow device that provides uniform wetting and wicking, ease of manufacturing, improves and simplifies manufacturing, improves device reliability, and reduces cost of the final device.

[0021] Yet another advantage achieved with the adhesives of exemplary embodiments is the ability to increase the available area within the fluid channel for electrodes, reagents, or components of the diagnostic test device.

[0021a] In one aspect, there is provided a composition comprising a hydrophobic polymer matrix and a surfactant, wherein the surfactant is miscible but not fully soluble in the polymer matrix, wherein the composition is a hydrophilic pressure sensitive or a hydrophilic heat activated adhesive and wherein the polymer matrix comprises methoxyethyl acrylate.

[0021b] In one aspect, there is provided a composition comprising a hydrophobic acrylic co-polymer matrix and a surfactant, wherein the surfactant is ethoxylated polydimethylsiloxane, the ethoxylated polydimethylsiloxane being miscible but not fully soluble in the acrylic co-polymer, wherein the relative weight percentages of acrylic co-polymer to ethoxylated polydimethylsiloxane on a solids basis is 95% by weight acrylic co-polymer and 5% by weight ethoxylated polydimethylsiloxane, wherein the composition is formulated as a hydrophilic pressure sensitive or a hydrophilic heat activated adhesive and wherein the acrylic co-polymer matrix is a co-polymer comprising methoxyethyl acrylate.

[0021c] In one aspect, there is provided a diagnostic device comprising a fluid flow path, wherein the composition as described herein forms a portion of the fluid flow path.

[0022] These and other features and advantages of the present invention will be apparent from the following more detailed description of exemplary embodiments that illustrate, by way of example, the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Figure 1 schematically illustrates a diagnostic device in accordance with an exemplary embodiment.

[0024] Figure 2 graphically illustrates peel strength versus contact angle for hydrophilic adhesives.

[0025] Figure 3 graphically illustrates capillary fill time and contact angle with respect to increasing surfactant loading.

CLAIMS

What is claimed is:

1. A composition comprising a hydrophobic polymer matrix and a surfactant, wherein the surfactant is miscible but not fully soluble in the polymer matrix, wherein the composition is a hydrophilic pressure sensitive or a hydrophilic heat activated adhesive.

2. The composition of claim 1, wherein the composition is a hydrophilic pressure sensitive adhesive.

3. The composition of claim 1, wherein the composition is a hydrophilic heat activated adhesive.

4. The composition of claim 1, wherein the polymer matrix comprises an acrylic polymer.

5. The composition of claim 4, wherein the polymer matrix comprises an acrylic copolymer.

6. The composition of claim 5, wherein the polymer matrix comprises methoxyethyl acrylate.

7. The composition of claim 1, wherein the surfactant is a non-ionic surfactant.

8. The composition of claim 7, wherein the surfactant is ethoxylated polydimethylsiloxane.

9. The composition of claim 1, wherein the surfactant to polymer matrix ratio on a solids weight basis is in the range of 1:99 to 10:90.

10. The composition of claim 9, wherein the surfactant is present in the range of 3% to 6% by weight, on a solids basis, of the polymer matrix.

11. A composition comprising a hydrophobic acrylic co-polymer matrix and a surfactant, wherein the surfactant is ethoxylated polydimethylsiloxane, the ethoxylated polydimethylsiloxane being miscible but not fully soluble in the acrylic co-polymer, wherein the relative weight percentages of acrylic co-polymer to ethoxylated polydimethylsiloxane on a solids basis is 95% by weight acrylic co-polymer and 5% by weight ethoxylated

polydimethylsiloxane, wherein the composition is formulated as a hydrophilic pressure sensitive or a hydrophilic heat activated adhesive.

12. The composition of claim 11, wherein the acrylic co-polymer matrix is a co-polymer of 50% methoxyethyl acrylate, 18.5% methyl acrylate, 18.5% ethyl acrylate, 10% butyl acrylate, and 3% HEA, all by weight.

13. The composition of claim 11, wherein the acrylic co-polymer matrix is a co-polymer of 53% methoxyethyl acrylate, 23% methyl methacrylate, 23% methyl acrylate, 1.2% acrylic acid, all by weight.

14. The composition of claim 11, wherein the acrylic co-polymer matrix is a co-polymer of 52% methoxyethyl acrylate, 18.5% methyl acrylate, 18.5% ethyl acrylate, 10% butyl acrylate, and 1% acrylic acid.

15. A tape comprising a layer of the composition of claim 1, wherein the tape exhibits surfactant replenishment at a surface of the layer.

16. The tape of claim 15, wherein the layer of the composition is supported on a carrier layer.

17. The tape of claim 16, further comprising a release liner on a side of the composition layer opposite the carrier layer.

18. The tape of claim 15, wherein the layer of the composition is a self-supporting hydrophilic heat activated adhesive film.

19. A diagnostic device comprising a fluid flow path, wherein the composition forms a portion of the fluid flow path.

20. The diagnostic device of claim 19, wherein the fluid flow path is an elongated channel formed by a base, a top cover, and a spacer defining opposite sides of the channel.

21. The diagnostic device of claim 20, wherein the spacer comprises the composition.

22. The diagnostic device of claim 20, wherein the top cover comprises the composition.

23. The diagnostic device of claim 19, wherein the device is a microfluidic or lateral flow device.

CLAIMS

What is claimed is:

1. A composition comprising a hydrophobic polymer matrix and a surfactant, wherein the surfactant is miscible but not fully soluble in the polymer matrix, wherein the composition is a hydrophilic pressure sensitive or a hydrophilic heat activated adhesive and wherein the polymer matrix comprises methoxyethyl acrylate.

2. The composition of claim 1, wherein the composition is a hydrophilic pressure sensitive adhesive.

3. The composition of claim 1, wherein the composition is a hydrophilic heat activated adhesive.

4. The composition of claim 1, wherein the surfactant is a non-ionic surfactant.

5. The composition of claim 4, wherein the surfactant is ethoxylated polydimethylsiloxane.

6. The composition of claim 1, wherein the surfactant to polymer matrix ratio on a solids weight basis is in the range of 1:99 to 10:90.

7. The composition of claim 6, wherein the surfactant is present in the range of 3% to 6% by weight, on a solids basis, of the polymer matrix.

8. A composition comprising a hydrophobic acrylic co-polymer matrix and a surfactant, wherein the surfactant is ethoxylated polydimethylsiloxane, the ethoxylated polydimethylsiloxane being miscible but not fully soluble in the acrylic co-polymer, wherein the relative weight percentages of acrylic co-polymer to ethoxylated polydimethylsiloxane on a solids basis is 95% by weight acrylic co-polymer and 5% by weight ethoxylated polydimethylsiloxane, wherein the composition is formulated as a hydrophilic pressure sensitive or a hydrophilic heat activated adhesive and wherein the acrylic co-polymer matrix is a co-polymer comprising methoxyethyl acrylate.

9. The composition of claim 8, wherein the acrylic co-polymer matrix is a co-polymer of 50% methoxyethyl acrylate, 18.5% methyl acrylate, 18.5% ethyl acrylate, 10% butyl acrylate, and 3% HEA, all by weight.

10. The composition of claim 8, wherein the acrylic co-polymer matrix is a co-polymer of 53% methoxyethyl acrylate, 23% methyl methacrylate, 23% methyl acrylate, 1.2% acrylic acid, all by weight.

11. The composition of claim 8, wherein the acrylic co-polymer matrix is a co-polymer of 52% methoxyethyl acrylate, 18.5% methyl acrylate, 18.5% ethyl acrylate, 10% butyl acrylate, and 1% acrylic acid.

12. A tape comprising a layer of the composition of claim 1, wherein the tape exhibits surfactant replenishment at a surface of the layer.

13. The tape of claim 12, wherein the layer of the composition is supported on a carrier layer.

14. The tape of claim 13, further comprising a release liner on a side of the composition layer opposite the carrier layer.

15. The tape of claim 12, wherein the layer of the composition is a self-supporting hydrophilic heat activated adhesive film.

16. A diagnostic device comprising a fluid flow path, wherein the composition of claim 1 forms a portion of the fluid flow path.

17. The diagnostic device of claim 16, wherein the fluid flow path is an elongated channel formed by a base, a top cover, and a spacer defining opposite sides of the channel.

18. The diagnostic device of claim 17, wherein the spacer comprises the composition.

19. The diagnostic device of claim 17, wherein the top cover comprises the composition.

20. The diagnostic device of claim 16, wherein the device is a microfluidic or lateral flow device.