CLAIMS

1. A process for making an absorbent composite, comprising:

applying super absorbent particles (SAP) to a nonwoven substrate, wherein the SAP is dry when applied to the nonwoven substrate;

after applying the SAP to the nonwoven substrate, applying microfibrillated cellulose (MFC) to the nonwoven substrate to form ~~MFC~~WC-coated SAP; and

placing a cover layer on top of the ~~MFC~~WC-coated SAP to form the absorbent composite wherein the cover layer comprises a tissue or a nonwoven fabric.

2. The process of claim 1, wherein applying the ~~MFC~~ WC comprises applying a slurry including the ~~MFC~~ WC and a solvent, and wherein the method further comprises, after placing the cover layer on top of the MFC-coated SAP to form the absorbent composite, drying the absorbent composite.

~~3. The process of claim 1, wherein the SAP is applied to the nonwoven substrate uniformly or non-uniformly.~~

~~4. The process of claim 1, wherein the SAP is applied to the nonwoven substrate in a pattern.~~

~~5~~3. The process of claim 2, further comprising, after applying the SAP to the nonwoven substrate and prior to applying the slurry to the nonwoven substrate, applying a wetting solution to the nonwoven substrate.

~~6~~4. The process of claim ~~5~~3, wherein the wetting solution comprises water, ethanol, or a mixture of water and ethanol.

~~7. The process of claim 1, wherein the SAP is applied to the nonwoven substrate using a particle scattering device.~~

~~8. The process of claim 1, further comprising:~~

~~carding of fibers to form a carded web;~~

~~placing the carded web on top of a nonwoven supporting sheet; and~~

~~mechanically joining the carded web with the nonwoven supporting sheet through hydro-entanglement to form the nonwoven substrate.~~

~~9. The process of claim 8, wherein the fibers are polyester fibers.~~

~~10. The process of claim 8, wherein carding the fibers comprises:~~

~~feeding the fibers into a carding machine; and~~

~~separating and distributing the fibers into the carded web, wherein binders, bonding agents, soluble bonding mediums, and wet strength agents are not used to form the carded web.~~

~~11. The process of claim 8, wherein the nonwoven supporting sheet comprises polypropylene spunbond.~~

~~12~~5. The process of claim 2, further comprising preparing the MFC slurry by combining the MFC with the solvent.

~~13~~6. The process of claim ~~12~~5, wherein the solvent comprises water and ethanol.

~~14~~7. The process of claim 2, further comprising, after applying the slurry and before placing the cover layer, withdrawing excess liquid from the nonwoven substrate.

~~15~~8. The process of claim ~~14~~7, wherein the excess liquid is withdrawn using a vacuum force.

~~16~~9. The process of claim 2, wherein drying the absorbent composite comprises using heat and suction units to collect and recover the solvent of the slurry.

10. The process of claim 2, wherein, upon drying of the absorbent composite, the WC serves to bind the cover layer with the nonwoven substrate through hydrogen bonding.

11. The process of claim 2, wherein, upon drying of the absorbent composite, the WC serves to bind the SAP with the cover layer and with the nonwoven substrate through hydrogen bonding.

12. The process of claim 1, wherein the SAP is applied to the nonwoven substrate non-uniformly.

13. The process of claim 1, wherein the SAP is applied to the nonwoven substrate in a pattern.

14. The process of claim 1, wherein the SAP is applied to the nonwoven substrate using a particle scattering device.

15. The process of claim 1, further comprising:

carding of fibers to form a carded web;

placing the carded web on top of a nonwoven supporting sheet; and

mechanically joining the carded web with the nonwoven supporting sheet through hydro-entanglement to form the nonwoven substrate.

16. The process of claim 15, wherein the fibers are polyester fibers.

17. The process of claim 15, wherein carding the fibers comprises:

feeding the fibers into a carding machine; and

separating and distributing the fibers into the carded web, wherein binders, bonding agents, soluble bonding mediums, and wet strength agents are not used to form the carded web.

18. The process of claim 15, wherein the nonwoven supporting sheet comprises polypropylene spunbond.

~~17~~19. The process of claim 1, further comprising treating a nonwoven substrate side of the absorbent composite with surfactant.

~~18~~20. The process of claim ~~17~~19, wherein the nonwoven substrate side of the absorbent composite is hydrophilic.

~~19~~21. The process of claim 1, further comprises softening the absorbent composite.

~~20~~22. An absorbent article comprising:

a multilayer absorbent core comprising:

a first absorbent composite, the first absorbent composite including a nonwoven substrate comprising a nonwoven support sheet hydro-entangled with a carded fiber web, a cover layer, and an absorbent layer positioned between the nonwoven substrate and the cover layer, the absorbent layer comprising super absorbent polymer particles coated with microfibrillated cellulose, wherein the first absorbent composite has an ~~MFC~~WC-coated SAP side and a nonwoven substrate side;

a second absorbent composite positioned adjacent the first absorbent composite, ~~wherein the nonwoven substrate side of~~ the second absorbent composite ~~is positioned adjacent the MFC-coated SAP side of the first absorbent composite; and~~

~~an acquisition distribution layer positioned adjacent the multilayer absorbent~~including a nonwoven substrate comprising a nonwoven support sheet hydro-entangled with a carded fiber web, a cover layer, and an absorbent layer positioned between the nonwoven substrate and the cover layer, the absorbent layer comprising super absorbent polymer particles coated with microfibrillated cellulose, wherein the second absorbent composite has an WC-coated SAP side and a nonwoven substrate side, wherein the nonwoven substrate side of the second absorbent composite is positioned adjacent the WC-coated SAP side of the first absorbent composite; and

an acquisition distribution layer positioned adjacent the multilayer absorbent.

~~21~~23. The absorbent article of claim ~~20~~22, wherein the acquisition distribution layer is positioned adjacent the ~~MFC~~WC-coated SAP side of the second absorbent composite or wherein the acquisition distribution layer is positioned adjacent the nonwoven substrate side of the first absorbent composite.

~~22~~24. The absorbent article of claim ~~20~~22, wherein the first and second absorbent composites vary in size and/or relative positioning within the absorbent article.

~~23~~25. The absorbent article of claim ~~20~~22, wherein the multilayer absorbent core is folded.

~~24~~26. The absorbent article of claim ~~20~~22, wherein the first absorbent composite is folded, and wherein the second absorbent composite is disposed above the folded, first absorbent composite.

~~25~~27. The absorbent article of claim ~~20~~22, wherein the first absorbent composite is wrapped around lateral edges of the second absorbent composite.

~~26~~28. The absorbent article of claim ~~20~~22, wherein the acquisition distribution layer is wrapped around lateral edges of the second absorbent composite.

~~27~~29. The absorbent article of claim ~~20~~22, further comprising:

a fluid-permeable topsheet; and

a fluid-impermeable backsheet;

wherein the multilayer absorbent core is disposed between the backsheet and the topsheet, and wherein the acquisition distribution layer is positioned between the multilayer absorbent core and the topsheet.

30. The absorbent article of claim 22, wherein the cover layer of the first absorbent composite comprises a tissue or a nonwoven fabric, and wherein the cover layer of the second absorbent composite comprises a tissue or a nonwoven fabric.

31. The absorbent article of claim 30, wherein, in each of the first and second absorbent composites, the microfibrillated cellulose binds the super absorbent polymer particles with the cover layer and with the nonwoven substrate through hydrogen bonding, and wherein the microfibrillated cellulose binds the cover layer with the nonwoven substrate through hydrogen bonding.