

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Haggquist	
Application No.: 11/801,647	Art Unit: 1772
Filed: 05/09/2007	Examiner: Greene, Jason M
Title: Active Particle-Enhanced Membrane and Method for Making and using the Same	
Attorney Docket No.: 6000.108.01US (TT-8)	

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

AFTER-FINAL AMENDMENT AND ARGUMENT

Dear Sir,

In response to the Office Action of July 3, 2013, please amend this application as follows:

**Amendments to the claims** are reflected in a list of claim which begins on page 2 of this response.

**Remarks** begin on page 16 of this response.

The following listing of claims replaces all prior versions and previously submitted listing of claims in this application:

1. (Currently amended) A water-proof breathable membrane comprising:
  - a substantially liquid-impermeable cured base material solution comprising a first thickness;
  - a plurality of active particles in contact with the substantially liquid-impermeable cured base material solution, wherein the plurality of active particles,
    - are capable of improving the transmission of vapor through the substantially liquid-impermeable cured base material solution, and
    - comprise a second thickness, wherein the first thickness is at least 2.5 times less than an order of magnitude larger than the second thickness;
  - at least one removable encapsulant in an amount effective to prevent at least a substantial portion of the plurality of active particles from being deactivated prior to removal of the removable encapsulant; wherein,
    - the at least one removable encapsulant is removable to reactivate at least a portion of the plurality of active particles to improve the transmission of vapor through the water-proof breathable membrane, and
    - the membrane comprises a moisture vapor transmission rate from about  $600\text{g/m}^2/\text{day}$  to about  $11000\text{g/m}^2/\text{day}$ .
2. (cancelled)

3. (Original) The membrane according to claim 1, wherein the membrane possesses anti-static properties due at least in part to the active particles.
4. (Original) The membrane according to claim 1, wherein the membrane possesses stealth properties due at least in part to the active particles.
5. (Original) The membrane according to claim 1, wherein the membrane possesses odor adsorbance properties due at least in part to the active particles.
6. (Original) The membrane according to claim 1, wherein the membrane possesses quick drying properties due at least in part to the active particles.
7. (Original) The membrane according to claim 1, wherein the base material solution is selected from the group consisting of: a polyurethane solution, a polyacrylic solution, 1,3 propanediol terephthalate solutions, and any suitable combination thereof.
8. (Original) The membrane according to claim 1, wherein the active particles comprise activated carbon.
9. (Original) The membrane according to claim 1, wherein the active particles comprise zeolites.

10. (Original) The membrane according to claim 1, wherein the active particles are selected from the group consisting of: antibacterial, antiviral, antimicrobial, antifungal particles, and any suitable combination thereof.

11. (Original) The membrane according to claim 1, wherein the active particles are selected from the group consisting of: activated carbon, aluminum oxide (activated alumina), silica gel, soda ash, aluminum trihydrate, baking soda, p-methoxy-2-ethoxyethyl ester cinnamic acid (cinoxate), zinc oxide, zeolites, titanium dioxide, molecular filter-type materials, and any suitable combination thereof.

12. (previously presented) The membrane according to claim 1, wherein the at least one removable encapsulant is selected from the group consisting of: water-soluble surfactants, surfactants, salts, photo-reactive materials, degradable materials, bio-degradable materials, ethoxylated acetylenic diols, starches, lubricants, glycols, corn starch, mineral spirits, organic solvents, paraffinic solvents, and any suitable combination thereof.

13. (previously presented) The membrane according to claim 1, wherein the active particles comprise about 0% to about 75% of the total weight of the membrane.

14. (previously presented) The membrane according to claim 1, wherein the active particles comprise about 30% to about 50% of the total weight of the membrane.

15. (previously presented) The membrane according to claim 1, wherein the active particles comprise about 0% to about 30% of the total weight of the membrane.
16. (previously presented) The membrane according to claim 1, wherein the active particles comprise about 0% to about 50% of the total weight of the membrane.
17. (previously presented) The membrane according to claim 1, wherein the membrane comprises a yarn or fabric.
18. (previously presented) The membrane according to claim 1, wherein the membrane comprises a plastic material.
19. (previously presented) The membrane according to claim 1, wherein the membrane comprises an article of clothing.
20. (previously presented) The membrane according to claim 1, wherein the membrane comprises a fabric.
21. (previously presented) The membrane according to claim 1, wherein the membrane comprises a coated fabric.
22. (Original) The membrane according to claim 1, wherein the membrane is coated on to ePTFE.

23. (previously presented) The membrane according to claim 1, wherein the membrane comprises a coated article of clothing.
24. (Original) The membrane according to claim 1, wherein the membrane comprises a non-woven membrane.
25. (previously presented) The membrane according to claim 1, wherein the membrane comprises a laminate.
26. (Original) The membrane according to claim 1, wherein the membrane is selected from the group consisting of bags, foam, plastic components, upholstery, carpeting, rugs, mats, sheets, towels, rugs, pet beds, mattress pads, mattresses, curtains, filters, shoes, insoles, diapers, shirts, pants, blouses, undergarments, protective suits, and any suitable combination thereof.
27. (Original) The membrane according to claim 1, wherein the removable encapsulant is a first removable encapsulant, and the membrane further comprises a second removable encapsulant.
28. (currently amended) A water-proof composition comprising:  
a liquid-impermeable breathable cured base material comprising a first thickness;  
a plurality of active particles in contact with the liquid-impermeable breathable cured base material, the plurality of active particles comprising a second thickness; and wherein,

the first thickness comprises a thickness at least 2.5 times ~~is less than an order of~~  
~~magnitude~~ larger than the second thickness,

the active particles improve the moisture vapor transport capacity of the  
composition, and

a moisture vapor transmission rate of the water-proof composition comprises  
from about 600g/m<sup>2</sup>/day to about 11000g/m<sup>2</sup>/day.

29. (previously presented) The composition of claim 28, wherein the active particles  
comprise about 0% to about 75% of the total weight of the composition.

30. (previously presented) The composition of claim 28, wherein the active particles  
comprise about 30% to about 50% of the total weight of the composition.

31. (previously presented) The composition of claim 28, wherein the active particles  
comprise about 0% to about 30% of the total weight of the composition.

32. (previously presented) The composition of claim 28, wherein the active particles  
comprise about 25% to about 75% of the total weight of the composition.

33. (previously presented) The composition of claim 28, wherein the active particles  
comprise about 0% to about 50% of the total weight of the composition.

34. (cancelled)

35. (Original) The composition of claim 28, wherein the composition possesses anti-static properties at least in part due to the active particles.

36. (Original) The composition of claim 28, wherein the composition possesses stealth properties at least in part due to the active particles.

37. (Original) The composition of claim 28, wherein the composition possesses odor adsorbance properties at least in part due to the active particles.

38. (Original) The composition of claim 28, wherein the composition possesses quick drying properties at least in part due to the active particles.

39. (Original) The composition of claim 28, wherein the active particles are selected from the group consisting of: activated carbon, aluminum oxide (activated alumina), silica gel, soda ash, aluminum trihydrate, baking soda, p-methoxy-2-ethoxyethyl ester cinnamic acid (cinoxate), zinc oxide, zeolites, titanium dioxide, molecular filter-type materials, and any suitable combination thereof.

40. (Original) The composition of claim 28 further comprising: at least one removable encapsulant in an amount effective to prevent at least a substantial portion of the active particles from being deactivated prior to removal of the removable encapsulant, and wherein the



removable encapsulant is removable to reactivate at least a portion of the active particles to improve the moisture vapor transport capacity of the composition.

41. (previously presented) The composition of claim 40, wherein the at least one removable encapsulant is selected from the group consisting of: water-soluble surfactants, surfactants, salts, polymer salts, polyvinyl alcohols, waxes, photo-reactive materials, degradable materials, bio-degradable materials, ethoxylated acetylenic diols, starches, lubricants, glycols, corn starch, mineral spirits, organic solvents, paraffinic solvents, and any suitable combination thereof.

42. (Withdrawn) A method for producing a breathable membrane, the method comprising:

- encapsulating a plurality of active particles with at least one removable encapsulant to produce encapsulated active particles;
- mixing the encapsulated particles with a base material solution to obtain a mixture solution; and
- converting the mixture solution into non-solution form to produce the breathable membrane, wherein breathable properties of the membrane are due at least in part to the mixing of the active particles.

43. (Withdrawn) The method of claim 42, wherein the base material solution further exhibits water-proof properties when converted into non-solution form.

44. (Withdrawn) The method of claim 42, wherein the membrane possesses anti-static properties due at least in part to the mixing of the active particles.

45. (Withdrawn) The method of claim 42, wherein the membrane possesses quick drying properties due at least in part to the mixing of the active particles.
46. (Withdrawn) The method of claim 42, wherein the membrane possesses odor adsorbance properties due at least in part to the mixing of the active particles.
47. (Withdrawn) The method of claim 42, wherein the membrane possesses stealth properties due at least in part to the mixing of the active particles.
48. (Withdrawn) The method of claim 42, wherein the encapsulating and the mixing are performed in a single step.
49. (Withdrawn) The method of claim 42, further comprising removing at least a portion of the encapsulant from the encapsulated active particles.
50. (Withdrawn) The method of claim 49, wherein the removing comprises dissolving the encapsulant.
51. (Withdrawn) The method of claim 49, wherein the removing comprises evaporating the encapsulant.

52. (Withdrawn) The method of claim 49, wherein the encapsulant deactivates the active particles and the removing comprises reactivating the active particles.
53. (Withdrawn) The method of claim 42, wherein the base material solution is selected from the group consisting of: a polyurethane solution, a polyacrylic solution, 1,3 propanediol terephthalate solutions, and any suitable combination thereof.
54. (Withdrawn) The method of claim 42, wherein the active particles comprise activated carbon.
55. (Withdrawn) The method of claim 42, wherein the active particles comprise zeolites.
56. (Withdrawn) The method of claim 42, wherein the active particles are selected from the group consisting of: antibacterial, antiviral, antimicrobial, antifungal particles, and any suitable combination thereof.
57. (Withdrawn) The method of claim 42, wherein the active particles are selected from the group consisting of: activated carbon, aluminum oxide (activated alumina), silica gel, soda ash, aluminum trihydrate, baking soda, p-methoxy-2-ethoxyethyl ester cinnamic acid (cinoxate), zinc oxide, zeolites, titanium dioxide, molecular filter-type materials, and any suitable combination thereof.

58. (Withdrawn) The method of claim 42, wherein the at least one removable encapsulant is selected from the group consisting of: water-soluble surfactants, surfactants, salts (*e.g.*, sodium chloride, calcium chloride), polymer salts, polyvinyl alcohols, waxes, photo-reactive materials, degradable materials, biodegradable materials, ethoxylated acetylenic diols, starches, lubricants, glycols, corn starch, mineral spirits, organic solvents, paraffinic solvents, and any suitable combination thereof.

59. (Withdrawn) The method of claim 42, wherein the active particles comprise about 0% to about 75% of the membrane.

60. (Withdrawn) The method of claim 42, wherein the active particles comprise about 30% to about 50% of the membrane.

61. (Withdrawn) The method of claim 42, wherein the active particles comprise about 0% to about 30% of the membrane.

62. (Withdrawn) The method of claim 42, wherein the encapsulating comprises:  
encapsulating the active particles with a first removable encapsulant; and  
encapsulating the active particles with a second removable encapsulant.

63. (currently amended) A water-proof composition comprising:  
a base material comprising a first thickness;

a plurality of active particles in contact with the base material, the plurality of active particles comprising a second thickness; and wherein,

the first thickness is at least 2.5 times ~~less than an order of magnitude~~ larger than the second thickness,

the active particles improve the vapor transport and anti-static properties of the composition, and

a moisture vapor transmission rate of the water-proof composition comprises from about 600g/m<sup>2</sup>/day to about 11000g/m<sup>2</sup>/day.

64. (Original) The composition of claim 63, wherein the active particles comprise activated carbon.

65. (Original) The composition of claim 63, wherein the active particles comprise zeolites.

66. (previously presented) The composition of claim 63, wherein the active particles comprise about 30% to about 50% of the total weight of the composition.

67. (previously presented) The composition of claim 63, wherein the active particles comprise about 0% to about 30% of the total weight of the composition.

68. (currently amended) A water-proof composition comprising:  
a base material comprising a first thickness;

a plurality of active particles in contact with the base material, the plurality of active particles comprising a second thickness; and wherein,

the first thickness comprises a thickness about 2.5 times ~~is less than an order of magnitude~~ larger than the second thickness,

the active particles improve the vapor transport and stealth properties of the composition, and

a moisture vapor transmission rate of the water-proof composition comprises from about 600g/m<sup>2</sup>/day to about 11000g/m<sup>2</sup>/day.

69. (Original) The composition of claim 68, wherein the active particles comprise activated carbon.

70. (Original) The composition of claim 68, wherein the active particles comprise zeolites.

71. (previously presented) The composition of claim 68, wherein the active particles comprise about 30% to about 50% of the total weight of the composition.

72. (previously presented) The composition of claim 68, wherein the active particles comprise about 0% to about 30% of the total weight of the composition.

73. (previously presented) The membrane of claim 1, wherein, the substantially liquid-impermeable cured base material solution, plurality of active particles, and at least one

removable encapsulant comprise a mixture, the mixture being adapted for application to a substrate prior to the substantially liquid-impermeable cured base material solution being cured.

74. (currently amended) The membrane of claim 1 wherein,

the first thickness comprises a thickness of about 1 mil;~~and~~

~~the second thickness comprises a thickness of about 10 microns.~~

75. (currently amended) The composition of claim 28 wherein,

the first thickness comprises a thickness of about 1 mil;~~and~~

~~the second thickness comprises a thickness of about 10 microns.~~

76. (currently amended) The composition of claim 63 wherein,

the first thickness comprises a thickness of about 1 mil;~~and~~

~~the second thickness comprises a thickness of about 10 microns.~~

77. (currently amended) The composition of claim 68 wherein,

the first thickness comprises a thickness of about 1 mil;~~and~~

~~the second thickness comprises a thickness of about 10 microns.~~

78. (previously presented) The membrane of claim 1 wherein, the first thickness is at least as large as the second thickness.

79. (previously presented) The composition of claim 28 wherein, the first thickness is at least as large as the second thickness.

80. (previously presented) The composition of claim 63 wherein, the first thickness is at least as large as the second thickness.

81. (previously presented) The composition of claim 68 wherein, the first thickness is at least as large as the second thickness.

82. (new) The composition of claim 1 wherein, the second thickness comprises a thickness of about 10 microns.

83. (new) The composition of claim 28 wherein, the second thickness comprises a thickness of about 10 microns.

84. (new) The composition of claim 63 wherein, the second thickness comprises a thickness of about 10 microns.

85. (new) The composition of claim 68 wherein, the second thickness comprises a thickness of about 10 microns.



## REMARKS

Claims 1, 3-33, 35-41, and 63-85 are pending. Claims 2 and 34 were previously cancelled. Claims 42-62 were previously withdrawn. Claims 1, 28, 63, 68, and 74-77 are amended herein in order to more particularly point out the scope of the claims. Applicant submits that all cancellations and amendments are made without prejudice to pursue additional claims in a subsequent application.

### Claim Rejections under 35 USC § 112

The Examiner has rejected claims 1, 3-33, 35-41, 63-73 and 78-81 under 35 USC 112(a) or 112 (pre-AIA), first paragraph, stating that “the specification, while being enabling for the first thickness being about 2.5 times the second thickness, does not reasonably provide enablement for the first thickness being up to an order of magnitude larger than the second thickness.” 35 USC 112(a) states that “[t]he specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.” As such, Applicant has modified independent claims 1, 28, 63, and 68 to state that “the first thickness is at least 2.5 times larger than the second thickness.” Since the Examiner agrees that “the specification [is] enabling for the first thickness being about 2.5 times the second thickness,” and that “the claims [are] directed to a specific thickness ratio of the first thickness being about 2.5 times the second thickness would likewise find support... and be allowable.” As such, Applicant submits that claims 1, 28, 63, and 68 are now in a condition for allowance and respectfully requests removal of the Section 112 rejection of these claims. Furthermore, since claims 3-27, 29-33, 35-41, 64-73, and 78-81

are dependent on these claims, Applicant submits that each of these claims are likewise in a condition for allowance.

Applicant has further modified claims 74-77, removing the claim feature that “the second thickness comprises a thickness of about 10 microns.” Applicant hereby incorporates the argument above with respect to claim 1 and submits since claims 74-77 are dependent on claim 1, each of these claims are likewise in a condition for allowance as the claims are dependent on claim 1.

Similarly, Applicant has added new claims 82-85 which include the claim feature of “the second thickness comprises a thickness of about 10 microns.” Such a claim feature was previously presented in claims 74-77, and as described above, has now been removed from these claims. Applicant hereby incorporates the argument above with respect to claim 1 and submits since claims 82-85 are dependent on claim 1, each of these claims are likewise in a condition for allowance as the claims are dependent on claim 1.

Applicants have made a diligent effort to place the claims in condition for allowance. Furthermore, failure of Applicants to respond to any specific rejection by the Examiner does not comprise an implicit acceptance of the Examiner’s rejection. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Shane Percival, Applicants' Attorney at 720-536-4900 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

/Shane Percival/

October 7, 2013

\_\_\_\_\_  
Date

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