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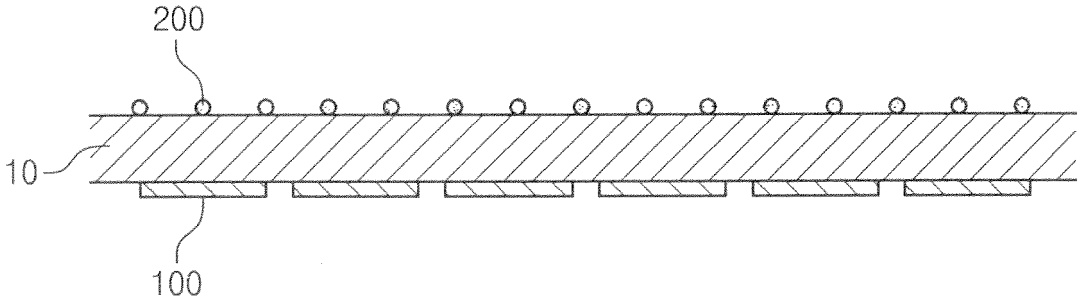
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(54) Textile material with high moisture transfer properties.

(57) Disclosed herein is a moisture transferable textile sheet of single layer. The moisture transferable textile sheet according to the present invention, hygroscopicity polymers are conformally coated on a top layer, and water-repellenting composition is partially coated on a bottom layer. Water in contact with the bottom layer is rapidly absorbed in the hygroscopicity polymers by a water-repellenting layer, so that water is transferred in one direction.

Fig. 1



EP 2 862 974 A1

Description

[Technical Field]

[0001] The present invention relates to a high moisture transferable textile sheet, and more particularly to a high moisture transferable textile sheet capable of keeping drying condition by rapidly transferring moisture in contact with a bottom layer of the sheet to be transferred in one direction.

[Background Art]

[0002] In recent years, there is a tendency toward increases in high-function and multifunction of materials as diversification, individuation tendency, and high-quality. In specifically, high-performance of synthetic fabrics has been developed in making up for weakness of natural fabrics as well as maximizing advantages of synthetic fabrics. Typical examples are sweat-absorbing and quick-drying fabrics, antistatic fabrics, fabrics having ultra-violet blocking function, and secondary fabrics thereof.

[0003] In the sweat-absorbing and quick-drying fabrics, gas-phase sweat is absorbed in materials and then evaporated to the outside. Thus, it is very important of absorbing content and anti-moisture speed in managing sweat. Also, in managing liquid-phase sweat, capillary phenomenon (make absorbing speed fast by minute pores and enlarge diffusion surface of water) by minute pores between fabrics is important factor.

[0004] Sweat-absorbing and quick-drying materials are taught in, e.g., Japanese Patent Laid-Open Publication No. 1991-213546 mentioned earlier. This patent discloses a textile material having parts of a high abundance density of fiber and parts of a low abundance density of fiber. In this patent, since moisture is transferred from bottom to top using only density contrast, there are functional limitations for sport clothing.

[0005] To overcome these limitations, sweat-absorbing and quick-drying fabrics by forming middle-transition layer or using density contrast of a top layer and a bottom layer. Korean Patent No. 0574056 discloses "A fabric having sweat absorption and quick drying property with double structure". Sweat-absorbing and quick-drying fabric with double structure comprises a surface layer contacting with the outside and a rear layer contacting with the skin. The surface layer is manufactured out of polyester or false-twisted yarn having nylon circular section structure. Mono denier of the surface layer is over 1 denier and less than 5 deniers. The rear layer is manufactured out of at least one selected from the group consisting of polyester, twisted yarn having nylon circular section structure, A.T.Y, and LT.Y. Mono denier of the rear layer is over 0.2 denier and less than 1 denier.

[0006] In the above-mentioned Korean Patent, moisture can be transferred, but it is not easy to manufacture the fabric because the fabric is formed with two layers having different texture density and kinds. Also, there is a disadvantage in making the fabric thin because the fabric is formed with two layers.

[Disclosure]

[Technical Problem]

[0007] The present invention has been made in an effort to solve the above problems, and it is an object of the present invention to provide a high moisture transferable textile sheet capable of keeping drying condition by rapidly transferring moisture in contact with a bottom layer of the sheet to be transferred in one direction.

[0008] It is another object of the present invention to provide a high moisture transferable textile sheet having a cooling film on a top layer of the sheet by water transition.

[0009] It is still another object of the present invention to provide a high moisture transferable textile sheet preventing moisture on a top layer of the sheet from being inflowing to a bottom layer of the sheet.

[Technical Solution]

[0010] Pursuant to embodiments of the present invention, a high moisture textile sheet comprises a water-repellenting layer formed by conformally coating high hygroscopicity polymers on a top layer of the textile sheet and partially coating water-repellenting composition on a bottom layer of the textile sheet.

[0011] Pursuant to embodiments of the present invention, a particle size of the high hygroscopicity polymers is ranged from 10 μm to 100 μm.

[0012] Pursuant to embodiments of the present invention, the high hygroscopicity polymers are coated mixed with a binder.

[0013] Pursuant to embodiments of the present invention, a gap not including the water-repellenting composition and having a size of 0.1 mm to 10 mm is formed on the water-repellenting layer.

[0014] Pursuant to embodiments of the present invention, the water-repellenting composition includes a water-repellenting agent and the binder.

[0015] Pursuant to embodiments of the present invention, the water-repellenting composition is one of fluorine-based water-repellenting agent, silicon-based water-repellenting agent, and acrylic-based agent.

[0016] Pursuant to embodiments of the present invention, the water-repellenting composition is coated to 60% to 95% of a surface area of the bottom layer.

[0017] Pursuant to embodiments of the present invention, the water-repellenting composition is coated in a shape of dot or stripe.

[Advantageous Effects]

[0018] According to the present invention, the high moisture transferable textile sheet is formed in a single structure but is capable of keeping drying condition by rapidly transferring moisture in one direction through processing the top and bottom layers thereof.

[0019] Further, the high moisture transferable textile sheet according to the present invention has excellent absorbing function and shows rapid drying speed to be suitable for various clothes for sports and bed clothes.

[Description of Drawings]

[0020]

FIG 1 is a cross-sectional view showing a high moisture transferable textile sheet according to the present invention.
FIG. 2 is a cross-sectional view showing acts of the high moisture transferable textile sheet according to the present invention.
FIG. 3 shows an embodiment of a water-repellenting layer of the high moisture transferable textile sheet according to the present invention.
FIG. 4 shows another embodiment of a water-repellenting layer of the high moisture transferable textile sheet according to the present invention.

<Brief explanation of essential parts of the drawings>

[0021] 100: Water-repellenting layer, 200: High hygroscopicity polymer

[Best Mode]

[0022] Embodiments of the present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the invention to those skilled in the art. Like numbers refer to like elements throughout.

[0023] As used herein, the terms "about", "substantially", etc. are intended to allow some leeway in mathematical exactness to account for tolerances that are acceptable in the trade and to prevent any unconscientious violator from unduly taking advantage of the disclosure in which exact or absolute numerical values are given so as to help understand the invention.

[0024] As utilized herein, the term "fabric" is intended to include articles produced by weaving or knitting, non-woven fabrics, fiber webs, and so forth.

[0025] FIG. 1 is a cross-sectional view showing a high moisture transferable textile sheet according to the present invention. FIG. 2 is a cross-sectional view showing acts of the high moisture transferable textile sheet according to the present invention. FIG. 3 shows an embodiment of a water-repellenting layer of the high moisture transferable textile sheet according to the present invention. FIG. 4 shows another embodiment of a water-repellenting layer of the high moisture transferable textile sheet according to the present invention.

[0026] As shown in FIGs. 1 and 2, the high moisture textile sheet comprises a water-repellenting layer 100 formed by conformally coating high hygroscopicity polymers 200 on a top layer of the textile sheet 10 and partially coating water-repellenting composition on a bottom layer of the textile sheet 10.

[0027] For processibility and moisture transition, a hydrophylizing process is preferably performed with respect to the textile sheet 10 before the high hygroscopicity polymers 200 and the water-repellenting layer are coated. The hydrophylizing process may be performed in a widely used way.

[0028] The high hygroscopicity polymers 200 is formed in a 3 dimensional network structure according to cross-linked

between polymeric chains or a single chain structure and shows absorbing phenomenon of fluid by attaching hydroplilic group. That is, water is absorbed in short time and emits it in a long time. Accordingly, the high hygroscopicity polymers 200 are mainly used in a field of hygienic articles like diapers or napkins, civil engineering, and architecture. Recently, they have been widely used as materials in agriculture and industry fields. For this reason, various kinds of high hygroscopicity polymers have been developed.

[0029] As the high hygroscopicity polymers of the present invention 200, all high hygroscopicity polymers being not harmful to body are applicable. Non-limiting examples are poly-acryl amide, poly-acrylic acid, poly-meta-acrylic acid, polyethylene oxide, polyvinyl alcohol, and as natural polymers, gelatin, polysaccharides, sodium carboxyl-methyl cellulose, and chitosan.

[0030] A particle size of the high hygroscopicity polymers 200 should be properly controlled for functions thereof and touch feeling of the textile sheet.

[0031] Therefore, if the particle size of the high hygroscopicity polymers 200 is less than 10 μm, their function may be declined. On the contrary, if the particle size of the high hygroscopicity polymers 200 exceeds 100 μm, touch feeling of the textile sheet may be bad. Preferably, the particle size of the high hygroscopicity polymers 200 is ranged from 10μm to 100μm.

[0032] The high hygroscopicity polymers 200 are mixed with a binder to be conformally coated by various coating ways. In this case, any kind of binders employed in fabrics is applicable. Also, the binder is preferably hydroplilic binder.

[0033] The hydroplilic binder is one of polyvinyl alcohol-based polymers, polyvinyl pyrrolidone-based polymers, cellulose based polymers, starch, polyethylene oxide-based polymers, acrylic-based polymers, polyester-based polymers, polyurethane-based polymers or polyethylene imine-based polymers, or a mixture thereof.

[0034] After the mixture of the high hygroscopicity polymers 200 and the binder is coated on the top layer of the textile sheet using spray, dipping, or printing, the high hygroscopicity polymers 200 may be fixed on the top layer of the textile sheet.

[0035] The water-repellenting layer 100 is formed of water-repellenting composition, which is a mixture of water-repellenting agent and a binder.

[0036] The water-repellenting agent is hydrophobic resin and is not limited. Fluorine-based water-repellenting agent, silicon-based water-repellenting agent, acrylic-based water-repellenting agent, polyethylene-based water-repellenting agent, polypropylene-based water-repellenting agent, polyamide-based water-repellenting agent, or polyester-based water-repellenting agent can be adopted. Fluorine-based water-repellenting agent, silicon-based water-repellenting agent, and acrylic-based water-repellenting agent with excellent processibility may be selectively adopted.

[0037] It is preferable that the water-repellenting composition is mixed with a binder for improving processibility.

[0038] As an example, the water-repellenting agent and the binder may be mixed in a weight ratio of 1:2 to 8. For enhancing processibility, solvent or thicker may be further included.

[0039] The binder mixed with the water-repellenting agent is one of acrylic-based binder, polyester-based binder or polyurethane-based binder, or a mixture thereof.

[0040] The water-repellenting layer 100 is formed by partially coating the water-repellenting composition on the bottom layer of the textile sheet in a fine thickness.

[0041] The water-repellenting layer 100 may be coated in various shapes such as a dot of FIG. 3 or stripe of FIG. 4. Also, the water-repellenting layer 100 may be formed in a standardized pattern like the dot or stripe and amorphous pattern.

[0042] The water-repellenting layer 100 is partially coated on bottom layer of the textile sheet, and thereby forming a gap in which the water-repellenting composition is not coated on the bottom layer of the textile sheet. The gap is positioned between the water-repellenting layers 100 and performs a function as a path where moisture pushed from the water-repellenting layer 100 is moved to the high hygroscopicity polymers 200 of the top layer of the textile sheet. In other words, as shown in FIG. 2, if the water-repellenting layer 100 coated with water-repellenting composition on the bottom layer of the textile sheet to minute thickness is in contact with moisture, the moisture is not absorbed in the water-repellenting layer 100 and pushed out to the gap. Such moisture in the gap where the water-repellenting layer 100 becomes absorbed in the high hygroscopicity polymers 200.

[0043] The volume of the high hygroscopicity polymers 200 absorbing the moisture is increased than when drying, so that they form a cooling film on the surface of the textile sheet.

[0044] The gap without the water-repellenting composition is a path in which moisture is moved. If the gap is too wide or narrow, moisture transition speed becomes down. Accordingly, it is preferable that the gap without the water-repellenting composition has a size of 0.1 mm to 10 mm.

[0045] The water-repellenting layer 100 pushes out moisture on the bottom layer of the textile sheet to transfer the textile sheet and high hygroscopicity polymers 200. For smoothly performing these functions, it is preferable that the water-repellenting layer 100 is coated to 60% to 95% of the surface area of the bottom layer of the textile sheet. If the water-repellenting composition is coated less than 60% or exceeding 95% of the surface area of the bottom layer, moisture transition function may be reduced.

[0046] The high moisture transferable textile sheet of the present invention rapidly transfers moisture like sweat gen-

erated from skin to the top layer of the textile sheet, thereby keeping dryness on the bottom layer thereof. That is, the absolute moisture content of the textile sheet is not decreased, and the moisture contained on a face in contact with skin is fast moved to the outside (diffusion to another layer or surrounding circumstance). As a result, moisture does not exist in the face in contact with skin, and existing moisture content is dramatically reduced.

[0047] Therefore, if the contained moisture content can be rapidly diffused to another layer assuming that moisture content contained in the textile sheet, users can feel dry and refresh. Accordingly, sweat-absorbing and quick-drying can be embodied irrespective of absolute evaporation and drying quantity of moisture.

[Mode for Invention]

[0048] Hereinafter, while this invention has been described in connection with what is presently considered to be the most practical and preferred embodiment, it is to be understood that the invention is not limited to the disclosed embodiment.

EXAMPLE

[0049] A high hygroscopicity polymer having a particle size of 70μm and a polyurethane-based binder were coated in weight ratio of 1:2 on one side of polyester fabric. A water-repellenting composition mixed with the polyurethane-based binder and silicon water-repellenting agent in weight ratio of 4:1 was coated on the other side of the fabric to form a water-repellenting layer

[0050] The water-repellenting layer was coated with water-repellenting composition as shown in FIG 3, and a gap without the water-repellenting composition in the water-repellenting layer was formed having a size of 0 2 mm to 08mm

EVALUATION EXPERIMENT

[0051] The moisture transition in one direction of a high moisture transferable textile sheet according to the present invention was measured by AATCC 195-2009 (moisture movement measuring test method) test method

[0052] Moisture movement was measured by dropping distilled water on one side of the textile sheet. In the high moisture transferable textile sheet manufactured by the above embodiment, moisture movement was measured by dropping distilled water on the other side of a water-repellenting layer

[0053] As a comparative example, polyester fabric without any processing was used

TABLE 1

Classification	WT_T (Sec.)	WT_B (Sec.)	AR_T (%/sec.)	AR_B (%/sec.)	MWR_T (mm)	MWR_B (mm)	SS_T (mm/sec.)	SS_B (mm/sec.)	R (%)	OMMC
Example	3.09	3.19	17.24	26.86	25	25	4.21	4.28	255.8	0.64
Comparative Example	3.41	3.41	94.06	52.44	25	25	4.93	4.93	-55.66	0.37

WT_T : Top wetting time(sec)
WT_B : Bottom wetting Time(sec)
AR_T : Top absorption rate(%/sec.)
AR_B : Bottom absorption rate(%/sec.)
MWR_T : Top max wetting radius(mm)
MWR_B : Bottom max wetting radius(mm)
SS_T : Top spreading speed(mm/sec)
SS_B : Bottom spreading speed(mm/sec)
R : One way transport capability(%)
OMMC : Overall moisture management capacity

[0054] As shown in table 1, moisture transition value (R value) in one direction was -55.66%, and it found that moisture was not transferred to a bottom layer and much more remained in a top layer. However, in the example of the high moisture transferable textile sheet, R value was 255.8%. Thus, it is found that most moisture of a water-repellenting layer was transferred to the bottom layer in which high hygroscopicity polymers was formed.

[0055] It represented that distilled water dropped on the water-repellenting layer was moved to a gap without a water-repellenting composition and absorbed in the high hygroscopicity polymers through the gap.

[0056] Although the present invention has been described herein with reference to the foregoing embodiments and the accompanying drawings, the scope of the present invention is defined by the claims that follow. Accordingly, those skilled in the art will appreciate that various substitutions, modifications and changes are possible, without departing from the spirit of the present invention as disclosed in the accompanying claims. It is to be understood that such substitutions, modifications and changes are within the scope of the present invention.

[0057] Particularly, it should, of course, be understood that the conductive fabric of the present invention can be used as a circuit board or a part of an electronic device although smart wear only has been mentioned throughout the specification.

Claims

1. A high moisture textile sheet comprising a water-repellenting layer formed by conformally coating high hygroscopicity polymers on a top layer of the textile sheet and partially coating water-repellenting composition on a bottom layer of the textile sheet.

2. The textile sheet according to claim 1, wherein a particle size of the high hygroscopicity polymers is ranged from 10 μm to 100 μm.

3. The textile sheet according to claim 1, wherein a gap not including the water-repellenting composition and having a size of 0.1 mm to 10 mm is formed on the water-repellenting layer.

4. The textile sheet according to claim 1, wherein the water-repellenting composition includes a water-repellenting agent and a binder.

5. The textile sheet according to claim 1, wherein the water-repellenting composition is coated to 60% to 95% of a surface area of the bottom layer.

6. The textile sheet according to claim 1, wherein the water-repellenting composition is coated in a shape of dot or stripe.

Fig. 1

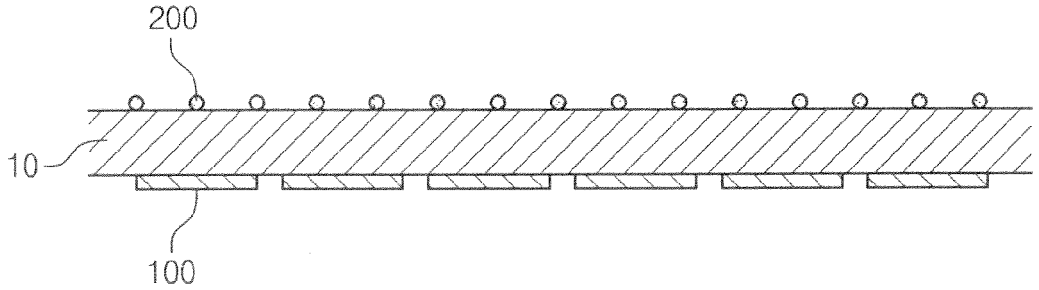


Fig. 2

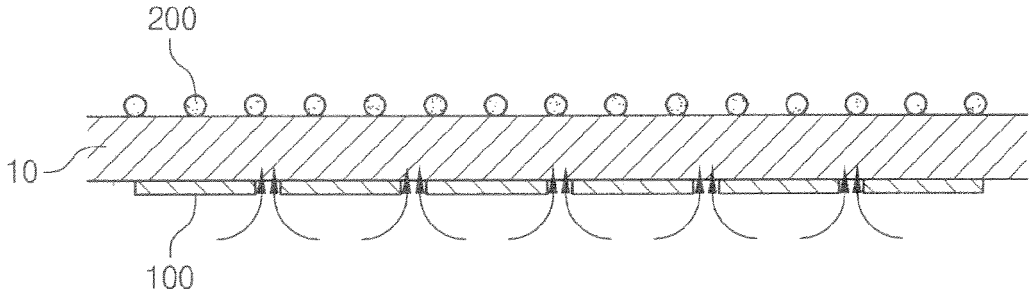


Fig. 3

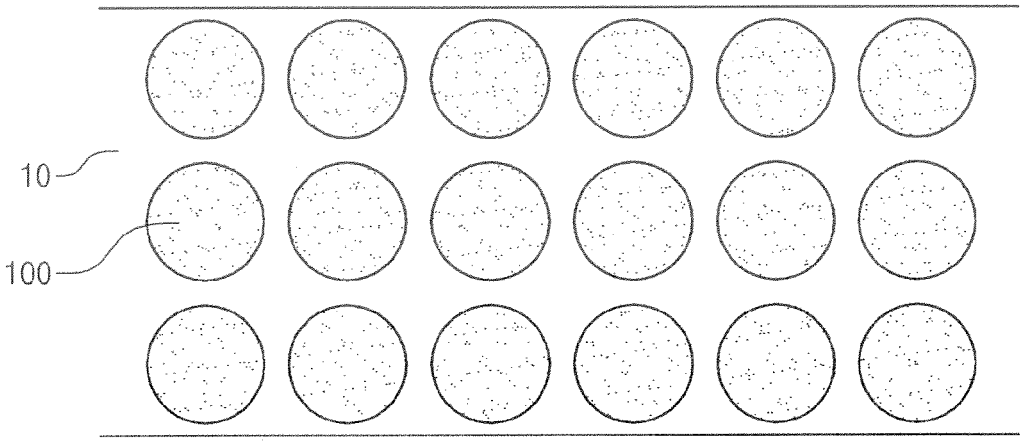
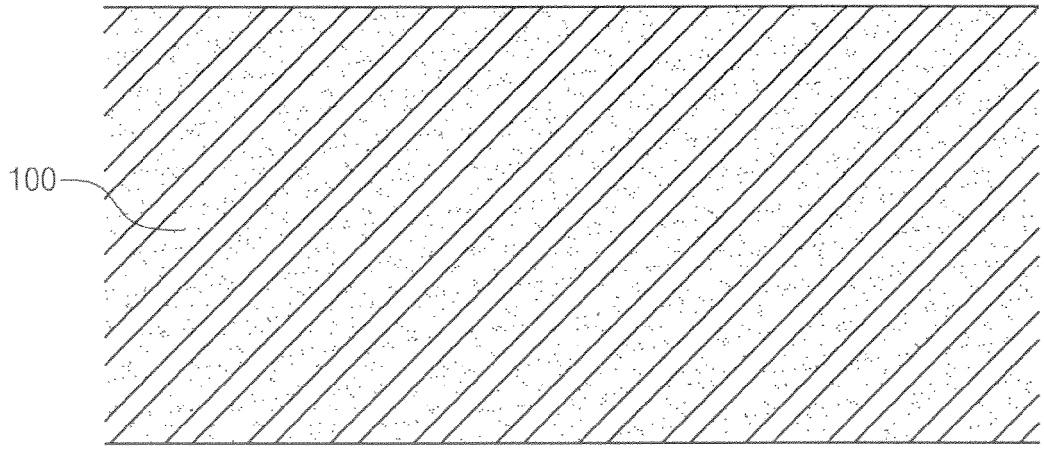


Fig. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 13 19 4744

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D06M
D06N
A41D
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 March 2015	Blas, Valérie

CATEGORY OF CITED DOCUMENTS

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