

Description

Title of Invention: A COSMETIC SHEET

Technical Field

[0001] The present invention is directed to a cosmetic sheet that is applied to the skin for diminishing the appearance of fine wrinkles and spots of the face.

Background Art

[0002] Japanese Laid-Open Publication No. 2008-179629 (Patent Literature 1) proposes a cosmetic sheet that is applied to the skin for diminishing the appearance of fine wrinkles and spots of the face.

[0003] This cosmetic sheet is obtained by mixing cosmetics into a solution comprising a high-molecular compound dissolved in water or a solvent, followed by electrospinning the resulting liquid.

[0004] However, a thus obtained cosmetic sheet is extremely thin, which makes it difficult to handle since it is difficult to hold the sheet by a hand and apply it evenly on the face.

[0005] Japanese Laid-Open Publication No. 2012-12339 (Patent Literature 2) discloses a makeup sheet-form cosmetics with a sheet consisting of nanofiber obtained by an electrospinning method.

[0006] This makeup sheet-form cosmetic is such that a sheet of nanofiber comprises a base material sheet on one of the surfaces thereof, and the sheet of nanofiber is peelable from the base material sheet.

[0007] Patent Literature 2 states that "when a laminated film can be peeled off from a nanofiber sheet, it is preferable to provide a peeling treatment, such as a silicone resin treatment or a corona discharge treatment, on the surface of the film that is opposite to the nanofiber sheet for improvement of detachability." When a nanofiber sheet is actually laminated on a base material, such as paper or non-woven fabric, the nanofiber sheet cannot be easily peeled off from the base material due to the high degree of adhesion of the nanofiber sheet to the base material. When an attempt is made to peel the nanofiber sheet off the base material, wrinkles of the nanofiber sheet will be made, which makes it impossible to apply the nanofiber sheet evenly to the face or the like.

Citation List

Patent Literature

[0008] [Patent Literature 1] Japanese Laid-Open Publication No. 2008-179629
[Patent Literature 2] Japanese Laid-Open Publication No. 2012-12339

Summary of Invention

Technical Problem

[0009] The present invention is intended to solve the conventional problems described

above. An objective of the present invention is to provide a cosmetic sheet, which allows for easy handling of a nanofiber sheet obtained by an electrospinning method, and which allows the nanofiber sheet to be easily transferred from a base material sheet to the skin.

Solution to Problem

[0010] In order to solve the problem described above, the present invention is characterized as follows.

(Item 1)

A cosmetic sheet comprising: a base material sheet; a peelable nanofiber sheet provided on a surface of the base material sheet; and a cover sheet provided on a surface of the nanofiber sheet, where hydrophilization treatment is performed on the base material sheet and the nanofiber sheet is formed by an electrospinning method.

(Item 2)

The cosmetic sheet according to Item 1, where hydrophilization treatment on the base material sheet is performed by treating the base material sheet with a hydrophilization treatment solution containing a hydrophilizing agent selected from the group consisting of an alkyl phosphate salt, a trialkylglycine derivative and a (poly) alkylpolyalkyleneamidedialkylglycine derivative.

(Item 3)

The cosmetic sheet according to Item 1 or 2, where the nanofiber sheet has a positive electric charge, and the base material sheet has a negative electric charge.

(Item 4)

The cosmetic sheet according to any of Items 1 to 3, where the base material sheet is a non-woven fabric.

(Item 5)

The cosmetic sheet according to Item 4, where the non-woven fabric consists of a high-molecular compound.

(Item 6)

The cosmetic sheet according to Item 5, where the high-molecular compound is polypropylene.

(Item 7)

The cosmetic sheet according to any of Items 1 to 6, where the base material sheet contains at least one type of cosmetics selected from the group consisting of a moisturizing cream, a skin cream, a whitening cream, a milky lotion, a skin lotion, a beauty essence and a beauty gel.

(Item 8)

A cosmetic laminated body comprising: a laminated-body base material sheet; an

adhesive layer laminated on a surface of the laminated-body base material sheet; and a cosmetic sheet laminated on a surface of the adhesive layer, where the cosmetic sheet comprises a base material sheet, a peelable nanofiber sheet provided on a surface of the base material sheet, and a cover sheet provided on a surface of the nanofiber sheet, where a part of the adhesive layer is exposed and the cover sheet is applied to the exposed adhesive layer, and where hydrophilization treatment is performed on the base material sheet and the nanofiber sheet is formed by an electrospinning method.

Advantageous Effects of the Invention

- [0011] According to the present invention, hydrophilization treatment is performed on the base material sheet and the nanofiber sheet is formed by an electrospinning method. Accordingly, when the base material sheet is held by a hand and the nanofiber sheet is applied to the skin, moisture on the skin surface works on the base material sheet and the nanofiber sheet, which causes the electric charge possessed by nanofiber sheet and the electric charge possessed by the base material sheet to disappear rapidly. As a result, the mutual attraction by static electricity is lost between the nanofiber sheet and the base material sheet, and nanofiber sheet is easily peeled off from the surface of the base material sheet, which allows the nanofiber sheet to be applied to the skin.
- [0012] Specifically, before the laminated body of the base material sheet and the nanofiber sheet is applied to the skin, the electric charge of the base material sheet is opposite from the electric charge of the nanofiber sheet. Thus, the nanofiber sheet and the base material sheet are attracted to each other by static electricity. However, when the laminated body is applied to the skin, the electric charge of the base material sheet and the nanofiber sheet rapidly disappears, which facilitates the nanofiber sheet to be peeled off from the base material sheet. The reason why the electric charge rapidly disappears is assumed to be due to the hydrophilization treatment performed on the base material sheet and the base material sheet is greatly influenced by the moisture of the skin surface.
- [0013] In particular, when an alkyl phosphate salt, a trialkylglycine derivative, and/or a (poly) alkylpolyalkyleneamidedialkylglycine derivative is used for the hydrophilization treatment, the hydrophilization treatment performed on the base material sheet ensures that the nanofiber is transferred from the surface of the base material sheet to the skin.
- [0014] In the cosmetic laminated body according to the present invention, a laminated-body base material sheet, an adhesive layer on the laminated-body base material sheet, and a cosmetic sheet of the above-mentioned configuration on the adhesive layer are laminated.
- [0015] When the nanofiber sheet is applied to the skin, the laminated-body base material sheet can be held by the fingers to apply the nanofiber sheet to the skin. Thus, the

fingers will not touch the nanofiber sheet, and such feature provides favorable handling characteristics.

[0016] When the base material sheet retains cosmetics such as cream, or when cosmetics are applied on the skin and then the nanofiber sheet is applied on the skin, the nanofiber sheet retains the cosmetics and allows the skin to absorb the cosmetics gradually. This produces a superior beauty effect, and further, this prevents cosmetics from being dried. Accordingly, even if a cream of low viscosity is applied, it becomes possible to prevent the cream from being dried, and it becomes possible to apply the cream to the skin uniformly.

[0017] Specifically, a traditional disadvantage of a cream with low viscosity is that it is difficult to handle since the cream will drip when applied to the skin. However, when the cosmetic sheet according to the present invention is used, cosmetics such as a cream is retained by the nanofiber sheet. Thus, it will not be necessary to make viscosity of cosmetics high.

[0018] Furthermore, by applying the cosmetic sheet to the skin, the moisture in the keratin of the skin is prevented from evaporated. Thus, it is assumed that an above average amount of moisture remains in the stratum corneum.

[0019] Furthermore, the beauty effect can be enhanced by the synergetic effect of the cosmetic sheet and the beauty essence. The reason of the beauty effect is assumed that the sheet helps the ingredients of the beauty essence to be infiltrated deep inside the stratum corneum, which recovers elasticity of the skin, and as a result, the sulcus cutis portion, which forms fine texture, is tightened and the fine texture is improved.

[0020] As such, color unevenness, such as spots, freckles and shadows under the eyes, are concealed and reduced by transferring and applying the nanofiber sheet onto the skin. The nanofiber sheet applied to the skin has high adhesiveness to the skin. Thus, for example, even if the nanofiber sheet is kept on the skin all day, the strength of adhesion of the nanofiber sheet to the skin will not diminish. Even if the nanofiber sheet is kept on the skin for a prolonged period of time, the nanofiber sheet can simply be removed by pinching and peeling it off with fingers.

Brief Description of Drawings

[0021] [Fig. 1] Fig. 1 is a cross sectional view of a cosmetic sheet according to one example of the present invention.

[Fig. 2] Fig. 2 is a planar view of a cosmetic sheet shown in Fig. 1.

[Fig. 3] Fig. 3 is a diagrammatic explanatory view of a manufacturing device for a cosmetic sheet shown in Fig. 1.

[Fig. 4] Fig. 4 is a cross sectional view of a cosmetic laminated body according to the present invention.

[Fig. 5] Fig. 5 is an explanatory view showing a manufacturing method for a cosmetic laminated body shown in Fig. 4.

[Fig. 6] Fig. 6 is a planar view of a laminated-body base material sheet shown in Fig. 5.

[Fig. 7] Fig. 7 is an explanatory view showing a state where a cosmetic sheet is applied to the skin.

[Fig. 8] Fig. 8 is an explanatory view of a state where a nanofiber sheet of a cosmetic sheet is applied to the skin.

[Fig. 9] Fig. 9 is a view showing a typical replica image.

[Fig. 10] Fig. 10 is a graph showing transitions in the number of ridges of fine texture in a case where only a beauty essence is used and in a case where a beauty essence and a cosmetic sheet according to the present invention are used together.

[Fig. 11] Fig. 11 is a graph showing moisture in the skin in a case where only a beauty essence is used, and in a case where a beauty essence and a cosmetic sheet according to the present invention are used together.

[Fig. 12] Fig. 12 is a graph showing transitions in the number of ridges of fine texture in a case where only a beauty essence is used, and a case where a beauty essence and a cosmetic sheet according to the present invention are used together.

Description of Embodiments

[0022] Hereinafter, embodiments according to the present invention will be described with reference to accompanying figures.

[0023] As shown in Fig. 1 and Fig. 2, a cosmetic sheet 1 comprises: a base material sheet 2; a nanofiber sheet 4 peelable from a surface of the base material sheet 2; and a cover sheet 6 provided on a surface of the nanofiber sheet 4.

[0024] The cosmetic sheet 1 shown in Fig. 2 has a slightly curved shape so it can be applied to the region the face below the eyes.

(Base Material Sheet)

For the base material sheet 2, a sheet which consists of, for example, polyolefin such as high density polyethylene, medium density polyethylene, low density polyethylene or polypropylene, polyester, polyvinylidene chloride, nylon, chitosan, starch, polyvinyl alcohol, or polyvinyl acetate, or a copolymer or a variant thereof may be used.

[0025] In particular, mentioned are polyolefin fiber such as polyethylene (PE) or polypropylene (PP), polyester fiber such as polyethylene terephthalate (PET), polytrimethylen terephthalate (PTT) or polyethylene naphthalate (PEN), polyamide fiber such as nylon, rayon fiber, non-woven fabric consisting of other synthetic fiber, and non-woven fabric manufactured with cotton, silk, linen or pulp (cellulose) fiber mixed therewith.

- [0026] Among these types of non-woven fabric, the non-woven fabric preferably consists of rayon fiber, polyolefin fiber, or polyester fiber. The base material sheet is preferably non-woven fabric consisting of polypropylene or rayon, and is most preferably non-woven fabric consisting of polypropylene or rayon on which thermal treatment (spun bond) is performed.
- [0027] Hydrophilization treatment is performed on the base material sheet 2. As used herein, the hydrophilization treatment refers to a treatment to a base material sheet with a hydrophilizing agent so that the electric charge possessed by the base material sheet rapidly disappears when the cosmetic sheet according to the present invention is applied to the skin.
- [0028] Specifically, the degree of hydrophilicity of the base material sheet when measured in accordance with the measurement method in the "degree of hydrophilicity of non-woven fabric" to be described below is preferably 5 to 200, more preferably, 8 to 150, still more preferably 10 to 100, and most preferably 12 to 80.
- [0029] The method for the hydrophilization treatment includes, for example, a method for immersing a base material sheet into a solution containing a hydrophilizing agent and drying the base material sheet, a method for spraying the solution on the base material sheet and drying the base material sheet, and the like.
- [0030] The hydrophilizing agent that may be used includes an anionic surfactant such as aliphatic sulfonate and higher alcohol sulfate ester salts; a cationic surfactant such as quaternary ammonium salt; a nonionic surfactant such as polyethylene glycol fatty acid ester, polyglycerin fatty acid ester and sorbitan fatty acid ester; and a silicone surfactant such as polyoxyalkylene-modified silicone.
- [0031] Specifically, the base material sheet 2 may be immersed in a treatment solution containing a hydrophilization agent such as alkyl phosphate salt, trialkyl glycine derivative or a (poly) alkylpolyalkyleneamidedialkylglycine derivative, or the treatment solution may be sprayed on the base material sheet 2, and thereafter, the treatment solution may be dried.
- [0032] The treatment solution is preferably in a form of an aqueous solution. That is, the treatment solution is preferably a solution that does not contain any organic solvent. This eliminates the risk of explosion during treatment.
- [0033] The treatment solution may contain a publicly known pigment, surfactant, and antifoam agent other than the above-mentioned hydrophilizing agent.

(Nanofiber Sheet)

The nanofiber sheet as used herein refers to a fiber structure consisting of nanofiber obtained by an electrospinning method. The nanofiber refers to ultrafine fiber of a submicron or nanometer order. The nanofiber obtained by an electrospinning method normally has a length of 100 micrometer or longer, and a fiber diameter ranging from

30 to 2000 nm (and in particular, 50 to 800 nm). The thickness of the sheet is typically from 5 to 30 microns.

- [0034] The high-molecular compound used for the nanofiber sheet includes, without limitation, acrylic based polymers such as polyvinyl alcohol, polystyrene, polycarbonate, polyacrylic acid, polymethyl acrylate, or polybutyl acrylate/isopropyl acrylamide / polyethylene glycol dimethacrylate copolymer; polyvinyl chloride, polyethylene terephthalate, cellulose, nylon 66, nylon 46, polyamide, polyurethane, polyvinyl alcohol, polylactic acid, polycaprolactone, polyethylene glycol, polylactate glycol, polyethylene-vinyl acetate, polyethylene-vinyl alcohol, polyvinyl acetate, polyethylene oxide, protein such as collagen; pullulan, hyaluronic acid, poly-gamma-glutamic acid, modified cornstarch, polysaccharides such as beta-glucan and glucooligosaccharide; polyethylene-vinyl alcohol /polylactate polymer blend, polymethylmethacrylate/acrylonitrile polymer blend, polyaniline /polyethylene oxide polymer blend, collagen /polyethylene oxide polymer blend, silk/polyethylene oxide polymer blend, and polyaniline /polystyrene polymer blend.
- [0035] In consideration of the compatibility to the skin, a variety of polysaccharides are particularly preferable, including polyvinyl acetate (PVAc), polyacrylic acid (PAA), polyvinyl alcohol (PVA), polyethylene oxide (PEO), protein such as collagen, pullulan, hyaluronic acid, poly-gamma-glutamic acid, modified cornstarch, beta-glucan, and glucooligosaccharide.
- [0036] The nanofiber sheet can be manufactured by using an electrospinning method, where nanofiber is spun and accumulated on the surface of a base material sheet.
- [0037] Fig. 3 shows an outline of a device 30 for carrying out an electrospinning method. The device 30 comprises a syringe 31, a high voltage supply 32, and a conductive collector 33. The syringe 31 comprises a cylinder 31a, a piston 31b, and a large number of capillaries 31c.
- [0038] A high-molecular solution containing the above-mentioned high-molecular compound, which is a raw material of the nanofiber, is filled in the cylinder 31a. The positive electrode of the high voltage supply 32 is electrically connected with the high-molecular solution in the syringe 31. The negative electrode of the high voltage supply 32 is grounded. The conductive collector 33 is, for example, a metallic plate, is grounded.
- [0039] In a state where voltage is applied between the syringe 31 and the conductive collector 33, the piston 31b of the syringe 31 is gradually pushed to allow the high-molecular solution out of the tip of the capillary 31c. The solvent in the expelled high-molecular solution volatilizes, and while a solute, or a high-molecular compound solidifies, it extends and deforms due to potential difference to form a nanofiber, which is attracted to the conductive collector 33.

[0040] The base material sheet 2 is arranged on the surface of the conductive collector 33, so that the nanofiber is accumulated on the surface of the base material sheet 2.

[0041] When the nanofiber is spun on the base material sheet 2 using an electrospinning method to form a nanofiber sheet 4, the nanofiber sheet 4 has a positive electric charge and the base material sheet 2 has a negative electric charge in general.

[0042] The nanofiber sheet may contain other ingredients in addition to the high-molecular compound. Such ingredients include, for example, a color pigment, a cross-linking agent, an aromatic agent, a surfactant, an antistatic agent and the like.

(Cover Sheet)

For the cover sheet, a sheet may be used that is the same as the above-mentioned base material sheet.

[0043] Preferably, included are polyolefin fiber such as polyethylene (PE) or polypropylene (PP), polyester fiber such as polyethylene terephthalate (PET), polytrimethylen terephthalate (PTT) or polyethylene naphthalate (PEN), polyamide fiber such as nylon, rayon fiber, non-woven fabric consisting of other synthetic fiber, and non-woven fabric manufactured with cotton, silk, linen or pulp (cellulose) fiber mixed therewith.

[0044] Among these types of non-woven fabric, the non-woven fabric preferably consists of rayon fiber, polyolefin fiber, or polyester fiber. The cover sheet is particularly preferably non-woven fabric consisting of polypropylene or rayon, and non-woven fabric consisting of polypropylene or rayon on which thermal treatment (spun bond) is performed.

(Cosmetic Sheet)

The cosmetic sheet 1 according to the present invention comprises a base material sheet 2, a nanofiber sheet 4 accumulated on the base material sheet 2, and a cover sheet 6 covering the nanofiber sheet. However, the cosmetic sheet 1 may also have a structure in which other sheets are further laminated.

[0045] The nanofiber sheet 4 and/or base material sheet 2 of the cosmetic sheet 1 according to the present invention can retain cosmetics and the like.

[0046] Such cosmetics include cosmetics in general used for skin care, such as a moisturizing cream, a skin cream, a whitening cream, a milky lotion, a skin lotion, a beauty essence and a beauty gel. Ingredients used for cosmetics may be used either alone or in combination, including a moisturizing agent, a whitening ingredient, a spot removing ingredient, a wrinkle preventing ingredient, vitamins, an anti-inflammatory ingredient, a blood flow promoting ingredient, a moisturizing ingredient, an oil, metallic fine particles and the like.

[0047] The cosmetics are retained by the nanofiber sheet and/or base material sheet. When a cosmetic sheet is applied to the skin, the cosmetics therein are gradually released to the skin side.

(Cosmetic Laminated Body)

Next, a cosmetic laminated body according to the present invention will be described hereinafter.

[0048] As shown in Fig. 4, a cosmetic laminated body 10 comprises a laminated-body base material sheet 8, an adhesive layer 9 provided on the laminated-body base material sheet 8, and a cosmetic sheet 1 laminated on the adhesive layer 9 and having the above-mentioned configuration.

[0049] For the laminated-body base material sheet 8, conventionally and publicly known resin sheets can be used. For example, it is possible to use polyolefin resin such as polyethylene, polypropylene, polymethylpentene and polybutadiene; polycarbonate, polystyrene, acrylonitrile, polyvinyl chloride, polyvinyl alcohol, saponified ethylene-vinyl acetate copolymer, polyamide, polyamide imide; acrylic resin with acrylic acid ester or methacrylic acid ester as a main ingredient; polyester, polyacetal, polyurethane, silicone, a stretched or unstretched film or a laminated body thereof formed of a cellulose derivative of acetyl-, di- or tri-cellulose and the like. In particular, a sheet of polyethylene terephthalate (PET) is preferable.

[0050] A conventionally and publicly known pressure sensitive adhesive can be applied on a laminated-body base material sheet 8 to form the adhesive layer 9.

[0051] For such an adhesive, an acrylic resin or rubber adhesive can be used. The main agent thereof includes, for example, poly(metha)acrylic ester, chlorinated rubber, natural rubber, synthetic rubber, regenerated rubber and the like.

[0052] The cosmetic laminated body can be manufactured as will be described below.

[0053] As shown in Fig. 5(A), an adhesive is applied to a laminated-body base material sheet 8 to form an adhesive layer 9.

[0054] At this point, an unapplied portion 16, where no adhesive layer 9 is formed, is formed at both ends of the laminated-body base material sheet 8 as shown in Fig. 6.

[0055] Nanofiber is spun on the surface of non-woven fabric as the base material sheet 2 using an electrospinning method, and a nanofiber sheet 4 is formed. Here, since a hydrophilization treatment is performed in advance on the non-woven fabric, the nanofiber sheet 4 is in such a state where it can be peeled off from the non-woven fabric 2. A protection sheet 7 is coated on the nanofiber sheet 4.

[0056] For the protection sheet 7, the same sheet that is used for the above-mentioned cover sheet 6 can be used. In particular, the sheet is preferably non-woven fabric consisting of rayon fiber, polyolefin fiber and polyester fiber. Particularly preferably, the cover sheet is non-woven fabric consisting of polypropylene and rayon, and non-woven fabric consisting of polypropylene and rayon on which thermal treatment (spun bond) is performed.

[0057] Next, as shown in Fig. 5(B), a laminated-body base material sheet 8 with an adhesive

layer 9, a non-woven fabric 2, a nanofiber sheet 4 and a protection sheet 7 are laminated, and both ends of this laminated body 10 are cut by cutting blades 12, 12 from the top (surface side).

[0058] Here, the blade edge of the cutting blade 12 is configured not to pass the adhesive layer 9, and is configured to cut the protection sheet 7, nanofiber sheet 4, and non-woven fabric 2.

[0059] After the cutting, the protection sheet 7, nanofiber sheet 4 and non-woven fabric 2 on the external side from the cut portion of the laminated body 10 are removed. By the removal, adhesive layer 9 is exposed to the surface side at both ends of the laminated body. At the same time, the protection sheet 7 is removed from the center portion of the laminated body 10 by a peeling device.

[0060] Next, as shown in Fig. 5(C), a cover sheet 6 is coated on the laminated body 10 in such a manner to cover the surface of the laminated body 10, and both ends of the cover sheet 6 are adhered to the adhesive layer 9.

[0061] As such, the cosmetic laminated body is formed.

[0062] Both ends of the thus obtained cosmetic laminated body comprise an unapplied portion 16 in which the adhesive layer is not formed. The cover sheet 6 can be easily peeled off from this portion, which provides favorable handling characteristics. In addition, since the cover sheet 6 covers the surface of the nanofiber sheet 4, the nanofiber sheet 4 can be protected from a stain or the like.

[0063] When the cosmetic laminated body is used, cosmetics, such as a beauty essence, are applied to a predetermined region of the face. Next, the cover sheet 6 is removed from an end portion where no adhesive is applied, and the outermost laminated-body base material sheet 8 is held by the hand to press the nanofiber sheet 4 against the region of the skin S where the cosmetics are applied. As a result, only the nanofiber sheet 4 can be applied to the skin S.

[0064] The cosmetic sheet 1 may be applied to the skin after cosmetics, such as a cream, are applied to the skin. Alternatively, the cosmetic sheet may be applied to skin, and then the cosmetics may be applied to the sheet.

Examples

[0065] Hereinafter, while the present invention will be specifically described with reference to Examples, the present invention will not be limited to the Examples below.

(Example 1)

(Manufacturing of Cosmetic Sheet)

(1) Preparation of an aqueous solution of a high-molecular compound

A high-molecular compound, completely saponified polyvinyl alcohol (manufactured by Kuraray Co., Ltd; degree of saponification: 99% or more) was used, which was

dissolved in water to prepare an aqueous solution of a 15 % concentration.

(2) Hydrophilization treatment of non-woven fabric

A polypropylene non-woven fabric (manufactured by Shinwa Corp.) to be a base material sheet was immersed in an aqueous solution containing a hydrophilizing agent (alkyl phosphate salt, manufactured by Takemoto Oil&Fat Co., Ltd.), followed by drying to obtain a hydrophilization treated non-woven fabric. The degree of hydrophilicity was 65 for the hydrophilization treated non-woven fabric.

(3) Implementation of electrospinning method

By using the thus obtained high-molecular solution, a nanofiber sheet was spun on the surface of the non-woven fabric by the device shown in Fig. 3.

[0066] The conditions were as follows for manufacturing the nanofiber:

- applied voltage: 27 kV
- distance between capillary and collector: 185 mm
- discharge amount of aqueous solution: 1 ml/hr
- environment: 28 degree Celsius, 36 % RH

The thickness of the thus obtained nanofiber sheet was 10 micrometers.

[0067] The diameter of the nanofiber was 200 nm.

[0068] As such, a cosmetic sheet with a nanofiber sheet laminated on a non-woven fabric was obtained.

(Evaluation)

By using the cosmetic sheet obtained in Example 1, the following were evaluated:

(A) the moisture content of the skin when a beauty essence was applied to the skin followed by subsequent application of the cosmetic sheet to the skin; and (B) the transition of fine texture on the skin when a beauty essence was applied to the skin followed by subsequent application of the cosmetic sheet to the skin. -

[0069] The methods for evaluation were as follows for the evaluations (A) and (B).

(Evaluation Method)

(A) Moisture content of the skin

Females of 31 years old to 38 years old (seven (7) females) were used as test subjects.

[0070] After a beauty essence is applied to the skin of the face, a nanofiber sheet was applied thereon. After letting the nanofiber sheet stand for 6 hours, the sheet was gradually peeled off from the skin.

[0071] The moisture content of the skin was measured at the time immediately after the peeling of the sheet, 2 hours after the peeling of the sheet, 4 hours after the peeling of the sheet, and 6 hours after the peeling of the sheet.

[0072] For the moisture content of the skin, the moisture content of the keratin was measured using a Tewameter TM-300. The test subjects were kept in an experiment

room of constant temperature and humidity, at the temperature of 25 degree Celsius and the relative humidity of 30 %, for 30 minutes so that the transmission amount of moisture on the surface of the skin would be constant, and the Tewameter was pressed against the region of the face to be measured.

[0073] As a control, an evaluation was made for a case where a beauty essence was applied to the skin of the face and no nanofiber sheet was applied. The details are as follows.

[0074] The beauty essence was applied to the skin of the face, and the beauty essence was left to stand for 6 hours. The moisture content of the skin was measured 6 hours past the application of the beauty essence, 2 hours thereafter, 4 hours thereafter, and 6 hours thereafter in a similar manner as described above. The amount of the beauty essence applied was the same as when the nanofiber sheet was used.

(B) Transition of fine texture on the skin

Females aging from 31 years old to 38 years old (7 females) were used as the test subjects.

[0075] By an operation similar to the one described above, a beauty essence was applied to the skin of the face, and then a nanofiber sheet was applied thereon. After letting the nanofiber sheet stand for 6 hours, the sheet was gradually peeled off from the skin.

[0076] The fine texture of the skin for each subject was evaluated at the time immediately after the sheet was peeled off, 2 hours after the sheet was peeled off, 4 hours after the sheet was peeled off, and 6 hours after the sheet was peeled off.

[0077] A replica method was used for the evaluation of fine texture. Specifically, an evaluation was made by creating a replica image of the skin, using ABS-01-W, a reflection replica creating kit by Asahibiomed Corp.

[0078] As a control, a case was evaluated where a beauty essence was applied to the skin and no nanofiber sheet was applied. The details are as follows.

[0079] After a beauty essence was applied to the skin of the face, it was left to stand for 6 hours. The fine texture of the skin was measured at 6 hours past the application of the beauty essence, 2 hours thereafter, 4 hours thereafter, and 6 hours thereafter. The amount of the beauty essence applied was the same as in the case when the nanofiber sheet was used.

(Degree of hydrophilicity of non-woven fabric)

The degree of hydrophilicity of the non-woven fabric was measured using the device described in the "water repellency test method" described in the paper pulp test method No.68 (2000).

[0080] Specifically, a strip-shaped test piece of 10 cm x 30 cm in width and length, which was cut so that the longitudinal direction of the test piece would be in the longitudinal direction of the non-woven fabric, was attached to a test-piece attachment device with a 45 degree inclination. A burette, whose cock opening was adjusted to supply 10 g

distillated water per 30 seconds, was once dried. Then the burette was fixed such that the tip of the burette is arranged 5 mm above in a vertical direction from the uppermost part of the test piece attached to the device with the inclination. About 60 g of distillated water was put in the burette from the above. The time (seconds) was measured from the moment when the liquid started to drop from the tip of the burette towards the non-woven fabric test piece until the moment when the test piece was no longer able to retain the liquid and the liquid started to escape from the bottom of the test piece, which was defined as the degree of hydrophilicity of the non-woven fabric. A higher numerical value is considered as a higher degree of hydrophilicity.

(Test result)

It was found that the moisturizing effect was advantageously high and the fine texture would be improved when the beauty essence was applied to the skin followed by subsequent application of the nanofiber sheet to the skin.

[0081] The details are as follows.

(1) Definition of lifting effect

A lifting effect generally refers to an effect of reducing the depth of the wrinkles, hence lifting up the skin.

[0082] However, when cosmetics (beauty essence) are used, this means that the skin will be changed at the region on which the cosmetics are applied. Thus, it does not mean that any action will work on a region other than the region on which the cosmetics are applied. In the case of using the cosmetic sheet according to the present invention, the up-lift effect similarly means that a beauty effect is observed such as allowing the skin on which the sheet is applied to be lifted up so that wrinkles become shallower, and the like.

(2) Instant up-lift effect

An instant up-lift effect refers to a change in the skin and a beauty effect obtained within 24 hours after the application of cosmetics or application of the sheet.

(3) Method for observing instant up-lift effect

For the case where a beauty essence was used alone, and for the case where the cosmetic sheet according to the present invention and a beauty essence were used together, replica images were collected for the skin prior to the application of the beauty essence and the cosmetic sheet, and 6 hours after the application of the beauty essence and the cosmetic sheet, when the sheet was peeled off, in accordance with the elapse of the time. Analyses were made based on the images and some parameters (such as a number of ridges of the fine texture) obtained.

[0083] Fig. 9 shows a representative replica image. Fig. 10 shows the transition in the number of ridges of fine texture in the case where only the beauty essence was used and in the case where the beauty essence and the sheet were used together.

[0084] There were evenly distributed fine texture on the skin and there was a certain number of the ridges of fine texture before the beauty essence was applied (or before the sheet was applied). When a replica image of the solo application of the beauty essence was compared with a replica image of the co-application with the cosmetic sheet according to the present invention (co-application of the sheet and the beauty essence, the same shall apply hereinafter) immediately after the sheet was peeled off 6 hours after the application, the number of ridges of fine texture was reduced to 1/7th of the number of ridges of fine texture that were present before the application of the sheet, and it was even visible to the naked eye that the ridges of fine texture were almost gone.

This result is considered to be as follows. The application of the cosmetic sheet according to the present invention caused the skin at the application site to be lifted up, which stretched the skin and which caused most of the fine texture to disappear.

[0085] It is assumed that this effect is initiated immediately after the application of the cosmetic sheet and the effect lasts while the cosmetic sheet is being applied.

[0086] With the beauty essence alone, the number of ridges of fine texture is reduced to 1/2 of the number prior to the application. Thus, while the beauty essence also has an up-lift effect, it is understood that the co-application of the sheet and the beauty essence has a better up-lift effect.

(4) Beauty effect caused by up-lift effect

While it was confirmed that the skin is lifted up by the beauty essence alone or together with the sheet, it is understood that the change at the site of the skin is such that the fine texture of the skin is improved rapidly with the co-application of the sheet.

[0087] 4 hours after the sheet was peeled off, the number of ridges of fine texture became the same as prior to the application, and 6 hours after the sheet was peeled off, the number of ridges of fine texture increased compared to prior to the application.

(5) Fig. 11 shows the transition of the moisture in the skin in accordance with the passage of time from immediately after the sheet was peeled off.

[0088] In the case of the beauty essence alone, 95 % of the moisture content of the skin was retained up to 12 hours after the application of the beauty essence. In the case of the co-application of the sheet, 100 % or even more of the moisture content of the skin was retained.

[0089] The reason is assumed that the application of the sheet to the skin prevented the moisture in the keratin of the skin from being evaporated, and an above average amount of moisture was retained in the stratum corneum.

[0090] While it is possible that the prevention of the moisture in the stratum corneum would cause the stratum corneum to be soaked, which would damage the skin, no damage to the skin was observed when evaluating the state of the fine texture using the replica method.

- [0091] As clear from the replica images, a better beauty effect is observed on the fine texture with the co-application of the sheet compared to using the beauty essence alone.
- [0092] This is also clear from the fact that the replica images showed that the fine texture of the skin was improved as the time passed, however, the number of ridges of fine texture per 1 mm increased 6 hours after the passage of time compared to prior to the application.
- [0093] The reason for improvement in skin fine texture is thought to be due to the synergetic effect of the sheet with the beauty essence.
- [0094] The primary factor is the recovery of the skin elasticity.
- [0095] It is assumed that the sheet helps the ingredients of the beauty essence to be infiltrated deep inside the stratum corneum, which recovers the skin's elasticity, and as a result, the sulcus cutis portion, which forms fine texture, is tightened and the skin fine texture is improved. (That is, the distance between sulcus cutis become narrower, and cristae cutis become uniform size) Since this result is not observed from the effect by the beauty essence alone, it is considered to be due to the co-application effect of the sheet.
- [0096] Fig. 12 shows a graph of the transition of average values of the number of ridges of fine texture per 1 mm in the case of the beauty essence alone and in the case of the co-application with the sheet, obtained from the replica images, where the graph compares the transition between the beauty essence alone and the co-application with the sheet.
- [0097] In view of the change in the fine texture from the replica images and Fig. 12, suppose that the number of ridges of fine texture prior to the application is defined to be 100 %, the application of the beauty essence alone, and with the sheet decreased the number of ridges of fine texture by 40 and 50 %, respectively. However, the number of ridges of fine texture gradually returned to original after the peeling off of the sheet (after the application). While the number of ridges of fine texture returned to the original value observed prior to the application of the beauty essence alone, the number of ridges of fine texture increased 6 hours after the co-application with the sheet compared to that prior to the application. Accordingly, it is understood that the co-application with the sheet has a better effect of improving the skin fine texture.

Industrial Applicability

- [0098] The present invention provides a cosmetic sheet for diminishing the appearance of fine bumpiness of the skin, such as fine texture of the face, for improving moisture retaining property, and for improving the skin texture.

Reference Signs List

- [0099] 1 cosmetic sheet
2 base material sheet

- 4 nanofiber sheet
- 6 cover sheet
- 8 laminated-body base material sheet
- 9 adhesive layer
- 10 cosmetic laminated body

Claims

- [Claim 1] A cosmetic sheet comprising:
a base material sheet;
a peelable nanofiber sheet provided on a surface of the base material sheet; and
a cover sheet provided on a surface of the nanofiber sheet,
wherein hydrophilization treatment is performed on the base material sheet and the nanofiber sheet is formed by an electrospinning method.
- [Claim 2] The cosmetic sheet according to claim 1, wherein hydrophilization treatment on the base material sheet is performed by treating the base material sheet with a hydrophilization treatment solution containing a hydrophilizing agent selected from the group consisting of an alkyl phosphate salt, a trialkylglycine derivative and a (poly) alkylpolyalkyleneamidedialkylglycine derivative.
- [Claim 3] The cosmetic sheet according to claim 1 or 2, wherein the nanofiber sheet has a positive electric charge, and the base material sheet has a negative electric charge.
- [Claim 4] The cosmetic sheet according to any of claims 1 to 3, wherein the base material sheet is a non-woven fabric.
- [Claim 5] The cosmetic sheet according to claim 4, wherein the non-woven fabric consists of a high-molecular compound.
- [Claim 6] The cosmetic sheet according to claim 5, wherein the high-molecular compound is polypropylene.
- [Claim 7] The cosmetic sheet according to any of claims 1 to 6, wherein the base material sheet contains at least one type of cosmetics selected from the group consisting of a moisturizing cream, a skin cream, a whitening cream, a milky lotion, a skin lotion, a beauty essence and a beauty gel.
- [Claim 8] A cosmetic laminated body comprising:
a laminated-body base material sheet;
an adhesive layer laminated on a surface of the laminated-body base material sheet; and
a cosmetic sheet laminated on a surface of the adhesive layer,
wherein the cosmetic sheet comprises a base material sheet, a peelable nanofiber sheet provided on a surface of the base material sheet, and a cover sheet provided on a surface of the nanofiber sheet,
wherein a part of the adhesive layer is exposed and the cover sheet is applied to the exposed adhesive layer, and

wherein hydrophilization treatment is performed on the base material sheet and the nanofiber sheet is formed by an electrospinning method.