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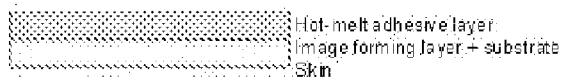
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(54) Title: LAYERED STRUCTURE FOR COSMETIC USE

[Fig. 1]

A



B



(57) Abstract: The present invention provides a layered structure for cosmetic or dermo-cosmetic use, a method for making the same and a method of concealing flaws in the skin by attaching the layered structure to the skin. The layered structure includes a substrate to be attached to the skin, the substrate being made from a flexible material so that the layered structure can follow deformation of the skin, an image forming layer bearing coloring materials thereon, a hot-melt adhesive layer on the side of the image forming layer bearing the coloring materials, a water-soluble first adhesive layer on the side of the hot-melt adhesive layer opposite to the image forming layer, a water permeable protection layer on the side of the first adhesive layer opposite to the hot-melt adhesive layer, and particles in the hot-melt adhesive layer or first adhesive layer, the particles being partially embedded in the hot-melt adhesive layer or first adhesive layer. When using the layered structure, the particles and the side of the hot-melt adhesive layer from which the particles protrude are exposed, creating a matte appearance that reduces the visibility of the layered structure.



Description

Title of Invention: LAYERED STRUCTURE FOR COSMETIC USE

Technical Field

[0001] The present invention relates to a layered structure for cosmetic use, a method for making the same and a method for naturally concealing a flaw in the skin by attaching the layered structure to the skin.

Background Art

[0002] There is a need to conceal flaws in the skin for aesthetic and medical purposes. Although one might contemplate laying an adhesive plaster over a flaw to conceal it, adhesive plasters are highly visible and do not have the appearance a user would normally desire.

[0003] While efforts have been made to come up with adhesive substances that conceal flaws in the skin, none has been able to conceal flaws without bringing attention to the adhesive substance itself. For example, U.S. Patent No. 5,942,065 discloses a skin adhesive decal. According to the patent, the skin adhesive decal is a combination of a multi-color flexographically printed design on a very thin, flexible, extensible, uniform layer of water resistant material covering a water soluble release layer carried by porous decal paper and a uniform deposit of adhesive covering the design, adapted to hold the design against the skin and protect it from being disrupted. The problem in the above-described decal is that, when used to conceal a flaw in the skin, the decal is very visible, the concealing effects of the decal are not sufficient and wrinkles tend to form on the decal after repeated movement of the skin.

[0004] U.S. Patent No. 3,898,357 discloses a decal assembly for decorating fingernails. According to the patent, the decal assembly comprises a carrier strip, a series of five spread-apart, graduated, generally ovoid decals consisting essentially of a thin non-self-supporting flexible clear film, a central design formed integrally on said clear film, each decal adapted to cover substantially the surface of a finger or toe nail, said decals being on said carrier strip, a water activated adhesive means on the back of each of the decals temporarily holding the decals on the carrier and adapted to be released therefrom and transferred adherently to a nail by a water-activated adhesive and an aqueous solvent-resistant cellulose adhesive clear layer on top of each decal. The problem in this decal is that, when used to conceal a flaw in the skin, the decal is very visible, the concealing effects of the decal are not sufficient and it tends not to smoothly follow deformation of the skin and thus wrinkles form on the decal after repeated movement of the skin.

[0005] PCT/JP2009/000373 discloses a layered structure for covering flaws in the skin. According to the application, the layered structure comprises a substrate and an image forming layer. The layered structure is capable of following deformation of the skin to which the layered structure is attached, and the image forming layer allows the color of the layered structure to blend in with the color of the skin surrounding the area to which the layered structure is attached. The problem in this layered structure is that, while wrinkles are not easily formed by repeated movement of the skin, the layered structure does not provide an appearance sufficiently similar to that of the skin. Specifically, the surface of the layered structure is unnaturally shiny and thus draws attention to the layered structure when it is used on the skin.

Citation List

Patent Literature

[0006] U.S. Patent No. 5,942,065
U.S. Patent No. 3,898,357
PCT/JP2009/000373

Disclosure of Invention

[0007] In view of the fact that none of the inventions and products currently available fully satisfies the requirements of natural concealment of flaws in the skin from both aesthetic and medical points of view, the inventors of the present invention have invented a layered structure, a method for making the layered structure and a method for naturally concealing a flaw in the skin that address the above problems.

Problems to be Solved by the Invention

[0008] Conventional inventions and products have not been able to conceal flaws in the skin without bringing attention to the inventions or products themselves. While one invention (PCT/JP2009/000373), with its skin matching color and reduced wrinkle formation after repeated movement of the skin, has come close to naturally concealing flaws in the skin, the invention has not been successful in providing a matte appearance that is sufficiently similar to that of the skin. In other words, the object of the present invention is to provide a layered structure for cosmetic use that conceals a flaw in the skin, prevents wrinkles from forming with repeated movement of the skin, has a natural color matching the color of the skin and further provides an appearance closely resembling that of the skin, a method for making the layered structure and a method for naturally concealing a flaw in the skin by attaching the layered structure to the skin.

Means for Solving the Problems

[0009] The present invention provides a layered structure comprising:
- a substrate to be attached to the skin, the substrate being made from a flexible material so as to enable the substrate to follow the deformation of the skin to which the

substrate is to be attached;

- an image forming layer bearing coloring materials thereon;
- a hot-melt adhesive layer on the image forming layer on the side bearing the coloring materials;
- a first adhesive layer on a side of the hot-melt adhesive layer opposite to the image forming layer, said first adhesive layer being water soluble;
- a water permeable protection layer on a side of said first adhesive layer opposite to the hot-melt adhesive layer; and
- particles in the hot-melt adhesive layer or the first adhesive layer.

[0010] When the particles are in the hot-melt adhesive layer, the particles are partially embedded in the hot-melt adhesive layer on the side facing the first adhesive layer; and when the particles are in the first adhesive layer, the particles are partially embedded in the first adhesive layer on the side facing the hot-melt adhesive layer. When the layered structure is in use, the particles remain attached to the hot-melt adhesive layer and protrude from the side of the hot-melt adhesive layer opposite to the coloring materials.

[0011] The present invention also provides a method of concealing a flaw in the skin, the method comprising the steps of:

- obtaining color image data of an area of the skin having the flaw to be concealed;
- retouching the color image data by removing the flaw from the color image;
- printing with coloring materials a retouched color image of the skin on the image forming layer of a layered structure comprising:
 - a substrate to be attached to the skin, the substrate being made from a flexible material so as to enable the substrate to follow the deformation of the skin to which the substrate is to be attached;
 - an image forming layer bearing coloring materials thereon;
 - a hot-melt adhesive layer on the image forming layer on the side bearing the coloring materials;
 - a first adhesive layer on a side of the hot-melt adhesive layer opposite to the image forming layer, said first adhesive layer being water soluble;
 - a water permeable protection layer on a side of said first adhesive layer opposite to the hot-melt adhesive layer; and
 - particles in the hot-melt adhesive layer or the first adhesive layer, wherein: when the particles are in the hot-melt adhesive layer, said particles are partially embedded in the hot-melt adhesive layer on the side facing the first adhesive layer, and when the particles are in the first adhesive layer, said particles are partially embedded in the first adhesive layer on the side facing the hot-melt adhesive layer;

the particles remaining attached to the hot-melt adhesive layer and protruding from

the side of the hot-melt adhesive layer opposite to the coloring materials when the layered structure is in use.

- attaching the printed layered structure to the skin, so as to cover at least the flaw to be concealed;
- moistening the water-permeable protection layer; and
- stripping the water-permeable protection layer and removing at least a part of the first adhesive layer, thereby exposing the hot-melt adhesive layer and the particles protruding from the exposed surface thereof.

Effects of the Invention

[0012] According to the present invention, a flaw in the skin can be sufficiently and naturally concealed. The present invention can closely follow the movement of the skin and can provide a natural color and appearance to the concealed area, thereby avoiding drawing attention to the concealed area.

[0013] Further, by including a hydrating agent, an anti-inflammatory agent, a UV protection agent, an anti-wrinkle ingredient, an anti-oxidant or a healing agent in the layered structure of the present invention, the present invention can also improve the condition of the skin, providing moisturizing, anti-inflammatory, anti-aging and whitening effects etc. for cosmetic, dermatological, dermo-cosmetic or medical purposes.

Description of Embodiments

[0014] In the present specification, unless otherwise specified, the term "cosmetic use" includes uses for so-called cosmetic, dermatological or dermo-cosmetic purposes as well as aesthetic purposes, and post-surgery treatments wherein the layered structure is attached to or set over the skin or the nails. The term "dermo-cosmetic" is used to include any area which may belong to either cosmetics or dermatology or any marginal area between cosmetics and dermatology. In the present specification, the term "skin" is used to mean skin, mucosa and nails unless otherwise specified or unless it is clear from the context that mucosa and nails are excluded. Moreover, in the present specification, an "uneven" surface shall refer to a surface that has been processed such that irregularities are added to the surface. Any commonly used processes for introducing irregularities may be used, and an example may be, though not limited to, embossing. Conversely, an "even" surface shall refer to a surface that has not been subjected to such a process.

[0015] According to an aspect of the present invention, the inventors propose a layered structure for cosmetic or dermo-cosmetic use, comprising:

- a substrate to be attached to the skin, the substrate being made from a flexible material so as to enable the substrate to follow the deformation of the skin to which the substrate is to be attached;

- an image forming layer bearing coloring materials thereon;
- a hot-melt adhesive layer on the image forming layer on the side bearing the coloring materials;
- a first adhesive layer on a side of the hot-melt adhesive layer opposite to the image forming layer, said first adhesive layer being water soluble;
- a water permeable protection layer on a side of said first adhesive layer opposite to the hot-melt adhesive layer; and
- particles in the hot-melt adhesive layer or the first adhesive layer.

[0016] The flexible material used for the substrate to be attached to the skin preferably comprises an organic resin and an elastomer, for example, a polyurethane, a polyolefin, a polysilicone, or a copolymer made of these monomers, or a polyacrylate, a polyisoprene, a polychloroprene, more preferably a polyurethane resin, or a synthetic rubber. The substrate to be attached to the skin provides flexibility while avoiding formation of wrinkles when the skin to which the layered structure is attached is deformed, for example, by facial expressions or bending and extension of the arm. A layer of polyurethane elastomer having a glass transition temperature of 0 degree Celcius or lower is preferred. The flexibility of the above-described flexible materials may be adjusted as desired by adding one or more of a plasticizer, a stiffener, a hardener and a curative agent. The substrate may have a thickness between approximately 2 micrometers and approximately 30 micrometers, preferably between approximately 2 micrometers and approximately 10 micrometers. The substrate may be attached to the skin by various means such as a glue, an adhesive, an agglutinant, or other bonding materials on the side to skin. In the case of using an adhesive for the substrate, the thickness is preferably less than 30 micrometers.

[0017] Any coloring materials may be used as long as they are compatible with the image forming layer and the method to be used in laying the coloring materials on the image forming layer. For example, an ink containing coloring materials made of or containing one or more of an organic dye, an organic pigment or colorant, lake color or lake pigment, an inorganic pigment, carbon black, natural colorant and a pearl pigment in a solution or an emulsion form may be employed. However, the coloring materials are not limited to the above-described examples. The coloring materials may be optionally formed on top of a layer of white coloring materials. Any type of white coloring materials may be used as long as they are compatible with the coloring materials, the image forming layer and the method to be used in laying the materials on the image forming layer.

[0018] The image forming layer supports coloring materials laid thereon. The image forming layer preferably comprises or is composed of a styrene resin, an epoxy resin or an acrylic resin. To increase adhesiveness, the image forming layer may further

comprises a urethane resin, a polyester resin, or an olefin resin that has flexibility and high adhesiveness. The image forming layer may contain or may be made of any other material as long as the material is suitable for bearing the coloring materials and for cosmetic or dermo-cosmetic use. Among these resins, acrylic resins are preferred for their high suitability for printing. The image forming layer preferably has strength and hardness as well as thermal resistance necessary to endure the printing process and to retain the coloring materials in position.

[0019] The thickness of the image forming layer is preferably between approximately 0.1 and approximately 5.0 micrometers, more preferably between approximately 0.5 and approximately 3.0 micrometers. These ranges of thicknesses are preferred for easy handling of the layer and the layered structure during manufacture and for clear reproduction of desired colors and patterns. The image forming layer may have, as an additional layer, a hardening protection layer (also referred to as a back-up layer in the present application) comprising or consisting of a thermoplastic resin or a UV curable resin to improve resistance and hardness of the image forming layer. The image forming layer and its optional protection layer may contain one or more of a film forming additive, a layer stabilizer, a leveling agent, or an anti-foam agent as desired.

[0020] The hot-melt adhesive layer is set on the image forming layer to cover the coloring materials on the image forming layer. The hot-melt material may be made of or contains at least a thermoplastic resin. The thermoplastic resin may be, for example, a polyurethane elastomer, a urethane resin, an ethylene vinyl acetate copolymer, an ethylene ethyl acrylate copolymer, an acrylic resin, a polyvinyl acetate, a petroleum-based resin, a hydrocarbon resin, polybutadiene, polystyrene, a rosin resin, a terpene resin, a polyamide resin, a vinyl chloride/vinyl acetate copolymer, a styrene resin, or a polyester resin. A wax may also be used for the hot-melt adhesive layer, in particular at a low concentration, for improving handling and softness of the layer. The wax may be, for example, carnauba wax, candelilla wax, paraffin wax, microcrystalline wax, alpha-olefin maleic anhydride copolymer wax, Fischer-Tropsch wax, montan wax or petrolatum. The thickness of the hot-melt adhesive layer is preferably between approximately 0.1 micrometer and approximately 10 micrometers, and more preferably between approximately 1 micrometer and approximately 5 micrometers. A polyurethane elastomer, an ethylene vinyl acetate copolymer, ethylene ethyl acrylate, a urethane resin or a polyester resin is preferably used for achieving a better fit on the coloring materials or the image forming layer. The hot-melt adhesive layer remains on the coloring materials and the image forming layer during use of the layered structure.

[0021] The first adhesive layer which is water soluble lowers its bonding force when it is wet so that the water permeable protection layer may be removed easily therefrom. The first adhesive layer which is water soluble preferably contains or is made of one or

more materials selected from dextrin, polyvinyl alcohols, polyvinyl pyrrolidones, pullulan, water soluble cellulose derivatives such as hydroxypropyl cellulose, hydroxypropyl methylcellulose (HPMC), hydroxyethyl cellulose and hydroxymethyl cellulose, polyacrylic amides, polyvinyl methyl ethers, poly(meth)acrylic acids containing polymers, etherized starches and starches. Among these substances, dextrin, pullulan and water-soluble cellulose derivatives are the more preferred choices, and it is particularly preferable that the first adhesive layer be made of dextrin. Dextrin may be, but is not limited to, white dextrin, branched dextrin, cluster dextrin or reduced dextrin. The dextrin used in the present invention may be a commercially available product, such as L-SPD (Showa Sangyo Co., Ltd.), Red Ball Dextrin (Nippon Starch Chemical Co., Ltd.), Amycol (Nippon Starch Chemical Co., Ltd.), Dextrin (San-Ei Gen F.F.I., Inc.), Dextrin (Junsei Chemical Co., Ltd.), Pinedex (Matsutani Chemical Industry Co., Ltd.). Moreover, pullulan may be, for example, Pullulan (Hayashibara), and hydroxypropyl methylcellulose may be, for example, Metrose SE-06 (Shin-Etsu Chemical Co., Ltd.). Further, the first adhesive layer may contain PEG, a high polymer absorbent, or a porous particle to improve its water retention. The thickness of the first adhesive layer which is water soluble is preferably between approximately 1 micrometer and approximately 30 micrometers, and more preferably between approximately 5 micrometers and approximately 20 micrometers.

[0022] The water permeable protection layer protects the layers underneath and may be removed easily when the first adhesive layer is wet and its bonding force is lowered. The water permeable protection layer is preferably made from a material which does not dissolve in water and is permeable to water or moisture so that the water or moisture can reach the first adhesive layer. The water permeable protection layer may be made from or contain a layer of paper, resin-coated paper or a perforated or porous resin material. For example, PPC paper, bond paper or Japanese paper may be used as the water permeable protection layer, though the water permeable protection layer is not limited thereto. The thickness of the water permeable protection layer is preferably between approximately 50 and approximately 300 g/m².

[0023] The particles in the hot-melt adhesive layer or the first adhesive layer may be made of or contains a material usually used in cosmetics, in particular polyurethane, silica, an acrylic resin such as poly(methyl methacrylate) (PMMA), a fluorine resin, melamine resin, silicone resin, talc, kaolin, magnesium carbonate, potassium carbonate, titanium oxide or starch etc. The particles are preferably made of polyurethane, silica or PMMA. When the particles are in the hot-melt layer, they are partially embedded in the hot-melt adhesive layer, protrude from the side of the hot-melt adhesive layer facing the first adhesive layer. When the particles are in the first adhesive layer, they are partially embedded in the first adhesive layer, protruding from

the side of the adhesive layer facing the hot-melt adhesive layer. In the case of the particles being in the first adhesive layer, the particles fuse to the hot-melt adhesive layer when the first adhesive layer and hot-melt adhesive layer are adhered together by applying heat and pressure during the preparation of the layered structure. During use of the layered structure, the particles remain attached to the hot-melt adhesive layer whether or not they were originally present in the hot-melt adhesive layer or the first adhesive layer and protrude from the side of the hot-melt adhesive layer opposite to the coloring materials. The presence of these protruding particles produces a matte and natural appearance of the layered structure during use.

[0024] The amount of particles in the hot-melt adhesive layer or the first adhesive layer is preferably between approximately 10% and approximately 50% by weight with respect to the hot-melt adhesive layer, and more preferably between approximately 10% and approximately 40% by weight with respect to the hot-melt adhesive layer. The amount of particles is preferably within these ranges, because the hot-melt adhesive layer may separate easily from the image forming layer when there are too many particles, and the desired matte appearance may not be achieved when there are too few particles. Moreover, in order to optimize the matte and natural appearance of the layered structure during use, the particles are preferably spherical. The average diameter of the particle is preferably within a range of approximately 0.5 to 20 micrometers, and is more preferably within a range of 1 to 15 micrometers. The size of the particles does not need to be exactly the same, though it is preferred that the particles in the hot-melt adhesive layer or the first adhesive layer be approximately of the same size. Since the particles are on the outermost surface of the layered structure during use of the layered structure, it is preferred that the particles have high transparency, though depending on the desired effects, the particles may be made of translucent or opaque materials.

[0025] In addition to the particles protruding from the surface of the hot-melt adhesive layer opposite to the coloring materials, the surface from which the particles protrude may optionally be made uneven. For example, the surface from which the particles protrude may be subjected to a process for adding irregularities. Any commonly used process may be used to create the uneven surface, and an example of this process for adding irregularities may be, but is not limited to, embossing. By adding irregularities to the surface from which the particles protrude, the resulting uneven surface, together with the particles protruding therefrom, achieves an even more matte appearance when the layered structure is in use. Additionally, by adding irregularities to the surface, the contacting area of the exposed surface of the layered structure during use can be reduced, resulting in a smaller friction force as compared to an even surface when touched, and thus the layered structure may feel more comfortable and skin-like to the touch. Moreover, the increased irregularities on the surface may help cosmetics such as

a liquid foundation, powder foundation or concealer to adhere to the layered structure during use, and may reduce the shininess often caused by the thin film of oil produced by liquid foundations. The roughness (due to the irregularities) of the uneven surface may be measured by any method commonly used for measuring roughness. An example of such a method may be, but is not limited to, the Fourier-Transform method. The roughness may be at least 3 micrometers, and is preferably 3 to 30 micrometers. When the roughness is below 3 micrometers, the contacting area of the surface is not sufficiently reduced, so the layered structure would not be comfortable to the touch, cosmetics would not adhere to the layered structure properly, and the shininess caused by the thin film of oil due to liquid foundations would not be sufficiently reduced. Naturally, it is not desirable to have a roughness so high that the exposed surface of the layered structure feels coarse during use, and those skilled in the art would be able to determine this upper limit of the roughness as appropriate.

[0026] When the particles are added to the first adhesive layer, they may be directly added to a coating solution of the first adhesive layer containing water soluble high polymers which, when dried, has a thickness lower than the diameter of the particles. Alternatively, a coating solution of the first adhesive layer containing the particles may be applied to a dried thin first adhesive layer not containing the particles such that the particles are partially embedded in the first adhesive layer on the side facing the hot-melt adhesive layer. Alternatively, hollow particles may be added to the coating solution of the first adhesive layer so that the particles float to the surface of the first adhesive layer facing the hot-melt layer. All of the above processes result in the particles being partially embedded in the first adhesive layer on the side facing the hot-melt adhesive layer. Alternatively, the particles may be added to the hot-melt adhesive layer in a manner similar to the processes described above, though when the particles are added to the hot-melt adhesive layer, the result is the particles being partially embedded in the hot-melt adhesive layer on the side facing the first adhesive layer. The first adhesive layer which is water soluble and the hot-melt adhesive layer may be laminated onto the water permeable protection layer by applying layers of respective coating solutions by known coating methods such as gravure coating, offset coating, bar coating and die coating, followed by drying of the layers. When the first adhesive layer and the hot-melt adhesive layer are subjected to pressure and heat, the two adhesive layers adhere to each other and the particles, if in the first adhesive layer, fuse to the hot-melt adhesive layer. Naturally, if the particles are in the hot-melt adhesive layer, they remain attached to the hot-melt adhesive layer and become sandwiched between the first adhesive layer and the hot-melt adhesive layer. Since the first adhesive layer is water soluble, when the layered structure is used, the first adhesive layer is at least partially removed along with the water permeable protection layer

while the particles remain attached to the surface of the hot-melt adhesive layer. The particles, which protrude from the exposed surface of the hot-melt adhesive layer, can create a matte and natural appearance of the layered structure during use, helping the layered structure to blend in with the skin surrounding the area to which the layered structure is attached.

[0027] According to the aspect of the invention described above, flaws in the skin can be effectively concealed and the layered structure can achieve an appearance closely resembling that of the surrounding skin, making the layered structure barely visible. The flaw in the skin may be a scar, blotch, freckle, fleck, spot, bruise, birth mark or any discoloration visible in the skin. The layered structure according to the present invention is not limited to the above-described aspect and may contain one or more layers containing one or more active ingredients such as hydrating agents, anti-inflammatory agents, anti-oxidants, anti-wrinkle ingredients, UV protection agents and healing agents which, when released from the layered structure and absorbed by the skin, achieve cosmetic, dermatological or dermo-cosmetic effects. For the active ingredient to achieve its optimal effects, the ingredient is preferably added to the substrate or an adhesive layer that is in proximity to or in contact with the skin to which the layered structure is attached.

[0028] The layered structure for a cosmetic may further comprise a peelable protection layer set on a side of the layered structure to which the water permeable protection layer is not attached and a second adhesive layer laid between the substrate and the peelable protection layer so as to be made in contact with the skin when the layered structure is in use. The second adhesive layer may be an acrylic adhesive layer made of a copolymer containing at least one monomer unit selected from the group of alkyl ester acrylate and alkyl ester methacrylate that have an alkyl group of 8 to 12 carbons at a proportion of at least 70 % by weight. The thickness of the second adhesive layer is preferably between approximately 1 and 15 micrometers, preferably between approximately 1 and 12 micrometers, more preferably between approximately 1 and 8 micrometers and most preferably between approximately 1 and 6 micrometers. The total thickness of the second adhesive layer and the substrate is preferably less than 30 micrometers and is more preferably between approximately 2 and 20 micrometers. For the peelable protection film, substances commonly called separate paper, released paper or release liners in the field of adhesive tapes may be used. For example, the peelable protection film may be a polyethylene terephthalate film with a silicone treated surface or a laminate of paper and polyethylene with a silicone treated surface. The second adhesive layer and the peelable protection film are not limited to the above examples.

[0029] The layered structure may further comprise a back-up layer attached to the image

forming layer, on a side opposite to a side bearing the coloring materials. The back-up layer may be made of an opaque, translucent or transparent material compatible with the method to be employed for laying color materials on the image forming layer. Examples of such materials are paper and synthetic resin materials. The back-up layer may provide strength and rigidity to the image forming layer during the process whereat the coloring materials are laid on the image forming layer and after the process.

[0030] The layered structure according to the present invention may further comprise a third adhesive layer between the image forming layer and the substrate to be attached to skin. The first adhesive layer which is water soluble requires a smaller force to separate as compared with the third adhesive layer when the first adhesive layer is moistened so that the water permeable protection layer is easily removed without separating the third adhesive layer. It is preferred that the third adhesive layer is mainly made of or contains an acrylic resin, an epoxy resin, a ketone resin or a cellulose-based resin. Among these resins, acrylic resins are particularly preferred. A polyester resin, a urethane resin or a vinyl chloride-vinyl acetate copolymer resin may also be added. The thickness of the third adhesive layer is preferably between approximately 0.05 to 20 micrometers, and more preferably between approximately 0.1 to 5 micrometers.

[0031] It is also an objective of the present invention to provide a method of making a layered structure for cosmetic or dermo-cosmetic use, the layered structure comprising a peelable protection layer; a second adhesive layer; a substrate; a third adhesive layer; an image forming layer bearing coloring materials thereon; a hot-melt adhesive layer; a first adhesive layer which is water soluble; particles in the hot-melt adhesive layer or the first adhesive layer, the particles being partially embedded in the hot-melt adhesive layer on the side facing the first adhesive layer when they are in the hot-melt adhesive layer, and the particles being embedded in the first adhesive layer on the side facing the hot-melt adhesive layer when they are in the first adhesive layer; and a water permeable protection layer; the method comprising the steps of:

- setting the coloring materials on the image forming layer supported on a support layer via the third adhesive layer;
- preparing the water permeable protection layer with the first adhesive layer which is water soluble and the hot-melt adhesive layer set thereon in this order, with the particles in the hot-melt adhesive layer or the first adhesive layer;
- adhering the hot-melt adhesive layer to the image forming layer by applying pressure and heat, whereby the particles, if in the first adhesive layer, fuse to the hot-melt adhesive layer, and if in the hot-melt adhesive layer, remain attached to the hot-melt adhesive layer and become sandwiched between the hot-melt adhesive layer and the first adhesive layer;

- removing the support layer; and
- adhering the third adhesive layer to the substrate set on the peelable protection layer via the second adhesive layer.

[0032] The coloring materials (and the white coloring materials) may be set on the image forming layer by thermal transfer, ink jet printing, gravure printing, offset printing, silk screen printing, reverse roll coating using a gravure plate or any other conventional method.

[0033] The present invention also provides a method of concealing a flaw in the skin, the method comprising the steps of:

- obtaining color image data of an area of the skin, the area of the skin having a flaw to be concealed;
- retouching the color image data by removing the flaw from the color image;
- printing with the coloring material a retouched color image of the skin on the image forming layer of a layered structure comprising:
 - a substrate to be attached to the skin, the substrate being made from a flexible material so as to enable the substrate to follow the deformation of the skin to which the substrate is to be attached;
 - an image forming layer bearing coloring materials thereon;
 - a hot-melt adhesive layer on the image forming layer on the side bearing the coloring materials;
 - a first adhesive layer on the side of the hot-melt adhesive layer opposite to the image forming layer;
 - a water permeable protection layer on the side of the first adhesive layer opposite to the hot-melt adhesive layer; and
 - particles in the hot-melt adhesive layer or the first adhesive layer, wherein when the particles are in the hot-melt adhesive layer, they are partially embedded in the hot-melt adhesive layer on the side facing the first adhesive layer, and when the particles are in the first adhesive layer, they are partially embedded on the side facing the hot-melt adhesive layer;

the particles remaining attached to the hot-melt adhesive layer and protruding from the side of the hot-melt adhesive layer opposite to the coloring materials when the layered structure is in use;

- attaching the printed layered structure to the skin, so as to cover at least the flaw to be concealed;
- moistening the water-permeable protection layer; and
- stripping the water-permeable protection layer and removing at least a part of the first adhesive layer, thereby exposing the hot-melt adhesive layer and the particles protruding from the exposed surface thereof.

- [0034] The color image data of skin may be obtained by using a digital camera. The color image data of an area including the flaw to be concealed is preferably obtained. The removal of the flaw from the color image may be performed by deleting the data corresponding to the flaw and replacing the data with that of the area in the vicinity of the flaw.
- [0035] The above method may further comprise the steps of:
- obtaining color image data of the retouched color image and the skin in the vicinity of the retouched color image;
 - modifying the retouched color image data so that the modified color image appears no different from the skin in the vicinity of the retouched color image; and
 - printing the modified color image of the skin on the image forming layer with coloring materials.
- [0036] When laying the retouched color image on the skin, the color image may be attached to the skin or simply set on the skin for image data capture. The retouched color image data may be modified to cancel the differences in color between the retouched color image and the skin in the area other than the flaw. The modification may be performed in a manner such that the average in the color space of the retouched color image data and the modified retouched color image data correspond to, or no different from, the image data of the skin in the area other than the flaw. The color space may be one of CIE, generic color models such as RGB encoding, the Munsell color system, or the Natural color system. "No different" in this context means that the difference is not substantial, or is negligible or small, for practical cosmetic or medical purposes.

Brief Description of Drawings

- [0037] Fig. 1A is a simplified diagram showing a conventional layered structure during use. Fig. 1B is a simplified diagram showing an embodiment of the layered structure according to the present invention during use.
- Fig. 2 is a graph showing the gloss values of the conventional layered structure and layered structures according to embodiments of the present invention.
- Fig. 3A shows SEM (scanning electron microscope) photographs of the surface of the conventional hot-melt adhesive layer. Fig. 3B shows SEM photographs of the surface of a hot-melt adhesive layer according to an embodiment of the present invention. The photographs were taken at three magnifications (top: x100; middle: x500; bottom: x2000).

Modes for Carrying out the Invention

- [0038] Embodiments of the present invention will be described herebelow. It should be noted that the embodiments and descriptions thereof are provided solely to assist in understanding the present invention and should not be construed as limiting the present

invention in any way to the embodiments described below.

[0039] Fig. 1A shows a simplified diagram of a conventional layered structure and Fig. 1B shows a simplified diagram of a layered structure according to an embodiment of the present invention when used on the skin. The hot-melt adhesive layer of the conventional layered structure is not modified in any way, whereas the hot-melt adhesive layer according to the present invention has spherical particles protruding from the surface of the hot-melt adhesive layer on the side opposite to the image forming layer and substrate, which is the outermost surface of the layered structure when attached to the skin.

[0040] To produce a layered structure as shown in Fig. 1B, a four-layered structure composed of a second peelable protection layer, a third adhesive layer (a back-up layer may be added), an image forming layer and coloring materials (a layer of white coloring materials may be provided between the image forming layer and coloring materials) is prepared. Any film can be used as the second peelable protection layer. However, when considering the durability and cost, a PET film with a thickness between approximately 2.5 and 200 micrometers is preferred. It is preferred that the third adhesive layer be mainly made of or contain an acrylic resin, an epoxy resin, a ketone resin or a cellulose-based resin. Among these resins, acrylic resins are particularly preferred. To control the peelability of the third adhesive layer from the second peelable protection layer and the strength of the third adhesive layer, a polyester resin, a urethane resin or a vinyl chloride-vinyl acetate copolymer resin may also be added. The thickness of the third adhesive layer is preferably between 0.05 to 20 micrometers, and more preferably between 0.1 to 5 micrometers. The image forming layer on the third adhesive layer is preferably made of a styrene resin, epoxy resin or an acrylic resin. If necessary, a urethane resin, polyester resin, olefin resin, or an acrylic resin that has flexibility and high adhesiveness may be added to increase the adhesiveness of the image forming layer. Among these materials, acrylic resins, which are suitable for printing, are preferred.

[0041] Various fillers may also be added to reduce blocking or tuck between the layers. The fillers may be made of or contain at least a fluorine based resin, melamine resin, silicone, talc, kaolin, magnesium carbonate, potassium carbonate, titanium oxide, silica or starch. When considering the image receiving capability and heat sensitivity of the image forming layer, the thickness of the image forming layer is preferably between approximately 0.1 and approximately 5.0 micrometers, and more preferably between approximately 0.5 and approximately 3.0 micrometers. Additionally, to increase the rigidity of the final product, a back-up layer made of a heat curable resin or a UV curable resin may be placed between the second peelable protection layer and the image forming layer. A layer composed of coloring materials and various binders is

printed onto the image forming layer. Any conventional coloring materials may be used. Examples of the binders include vinyl chloride-vinyl acetate copolymer resin, acrylic resins, epoxy resins, urethane resins and polyester resins. The thickness of the layer of coloring materials is preferably 0.1 to 20 micrometers. A layer composed of white coloring materials and various binders, such as vinyl chloride-vinyl acetate copolymer resin, an acrylic resin, an epoxy resin, urethane resin and polyester resin, may be further printed on the image forming layer beneath the layer of coloring materials. The thickness of the white coloring layer is preferably approximately 1 to 30 micrometers to ensure coverage. The coloring materials and white coloring materials may be applied to the image forming layer by various printing methods. To match the color of the final layered structure with the color of the skin to which the structure is to be attached, thermal transfer or ink jet printing is preferred as these printing methods allow the skin color to be scanned and digitized so that the same color can be printed onto the image forming layer. However, any other printing methods that would lower the cost of producing the layered structure can be used. In that case, image forming layers pre-printed with several different colors would need to be prepared.

[0042] A three-layered structure composed of a water permeable protection layer, a first adhesive layer which is water soluble and a hot-melt adhesive layer, with particles in the hot-melt adhesive layer or the first adhesive layer, is prepared. Any water permeable material may be used as the water permeable protection layer. An example of such a material may be, but is not limited to, PPC paper, bond paper or Japanese paper. The thickness of the water permeable protection layer is preferably approximately 50 to 300 g/m². For the first adhesive layer, various water soluble high polymers may be used. Dextrin, pullulan and water soluble cellulose derivatives are the preferred choices and it is particularly preferred that the first adhesive layer be made of dextrin. The hot-melt adhesive layer may be made of or contain at least a thermoplastic resin. From the aspect of adhesiveness, a polyurethane elastomer is preferably used. A wax may be optionally added to the hot-melt adhesive layer for improving handling and softness of the layer. The particles are preferably made of polyurethane, silica or PMMA and are added to the first adhesive layer such that the particles are partially embedded in the surface of the first adhesive layer facing the hot-melt adhesive layer. Alternatively, the particles may be added to the hot-melt adhesive layer such that the particles are partially embedded in the surface of the hot-melt adhesive layer facing the first adhesive layer.

[0043] The above four-layered and three-layered structures are fused together by applying heat and pressure so that the hot-melt adhesive layer is fused to the image forming layer, covering the coloring materials, and the particles in the first adhesive layer are fused to the hot-melt adhesive layer. If the particles are in the hot-melt adhesive layer,

they remain attached to the hot-melt adhesive layer and become sandwiched between the hot-melt adhesive layer and the first adhesive layer. The amount of particles fused to the hot-melt adhesive layer, which determines the matte appearance of the layered structure during use, can be controlled by adjusting the pressure and heat applied during this process.

- [0044] A four-layered structure composed of a carrier layer, a substrate to be attached to the skin, a second adhesive layer and a peelable protection film is prepared. The carrier layer is preferably formed from a film made of a thermoplastic resin such as polyurethane, polyethylene, polypropylene, an ionomer, polyamide, polyvinyl chloride, polyvinylidene chloride, an ethylene vinyl acetate copolymer, a thermoplastic polyester, or polytetrafluoroethylene. The film is preferably laminated onto a piece of paper, and it is preferred that the carrier layer be thicker or more rigid than the substrate. The substrate may be a layer of polyurethane elastomer with a glass transition temperature of 0 degree Celcius or lower. The peelable protection film may be a released paper, separate paper or release liner commonly used in the field of adhesive tapes. The second peelable protection layer is removed from the above-described seven-layered structure, and the carrier layer is removed from the four-layered structure. The now three-layered structure is then applied to the now six-layered structure such that the third adhesive layer is set on the substrate to be attached to the skin.
- [0045] A hydrating agent, an anti-inflammatory agent, a UV protection agent, an anti-wrinkle ingredient, an anti-oxidant, a healing agent, or a combination of two or more of these substances may be added to the substrate to be attached to the skin. Alternatively, one or more of these substances may be added to the third adhesive layer. By including one or more of these substances in the layered structure, the layered structure may provide cosmetic, dermatological or dermo-cosmetic effects.
- [0046] When using the layered structure, the protection film is removed from the above-described layered structure including the coloring materials so that the second adhesive layer is exposed and the layered structure can be attached to the skin.
- [0047] The water permeable protection layer is moistened so that the water or moisture permeates through the water permeable protection layer and reaches the first adhesive layer which is water soluble. At least a part of the water permeable protection layer is removed from the layered structure with the water permeable protection layer so that the coloring materials are visible from the outside, and the hot-melt adhesive layer, with particles protruding therefrom, is exposed. A portion of the first adhesive layer may or may not remain on the hot-melt adhesive layer after the removal of the water permeable protection layer. The amount and balance of the coloring materials are determined so that the layered structure conceals the flaw and appears similar to the skin

around the layered structure. The amount and balance of the particles protruding from the hot-melt adhesive layer can create a natural matte appearance that further helps the layered structure appear similar to the skin surrounding the layered structure.

[0048] After the layered structure has been attached to the skin, water may be applied to the exposed surface of the hot-melt adhesive layer. Cosmetics may then be applied to the surface of the hot-melt adhesive layer, making the layered structure even less visible.

Examples

[0049] Herebelow, the present invention shall be explained in further detail with examples and comparative examples; however, the present invention is not limited thereto.

[0050] Examples 1 to 5 and Comparative Example 1 were prepared as follows.

(Preparation of a four-layered structure including an image forming layer)

A coating solution for a third adhesive layer and a coating solution for an image forming layer as described below were applied by gravure coating in said order to a piece of PET film (second peelable protection layer) having a thickness of 6 micrometers. The layers were dried to produce an image forming layer that can be thermal transfer printed. A concealing layer of a white coloring material with a thickness of 10 micrometers containing acrylic binders was formed on the image forming layer. A layer of skin-colored materials (e.g. L: 60.52, a: 14.25, b: 21.30) having a thickness of 3 micrometers was then formed on the layer of white coloring material to produce a four-layered structure for Example 1. The same four-layered structures were prepared for Examples 2 to 5 and Comparative Example 1.

[0051] Coating solution for the third adhesive layer (coated so as to achieve 1.5 g/m² when dried):

Acrylic resin 9.9 parts

Polyester resin 0.1 part

Toluene 45.0 parts

MEK (methyl ethyl ketone) 45.0 parts

[0052] Coating solution for the image forming layer (coated so as to achieve 0.5 g/m² when dried):

Acrylic resin 9.0 parts

Polyester resin 1.0 part

Toluene 45.0 parts

MEK (methyl ethyl ketone) 45.0 parts

[0053] (Preparation of a three-layered structure including a hot-melt adhesive layer)

An aqueous dextrin solution was applied by bar coating to a piece of PPC paper commonly used for photocopying such that the dextrin solution forms a layer of water soluble first adhesive layer of 6.0 g/m² when dried. A coating solution for a hot-melt adhesive layer containing 30 parts by weight (30% by weight) of transparent spherical

particles of a cross-linked polyurethane having an average diameter of 7 micrometers (Taimicck Beads UCN-8070CM, manufactured by Dainichiseika Color & Chemicals Mfg. Co., Ltd.) and 100 parts by weight of a urethane resin binder was coated on the first adhesive layer such that the hot-melt adhesive layer would have a thickness of 4 micrometers when dried (3 micrometers of the particles would be in the water-soluble first adhesive layer) to produce a three-layered structure for Example 4. Similar three-layered structures were prepared for Examples 1 to 3, with the differences that silica particles having an average diameter of 5 micrometers were used for Example 1, PMMA particles having an average diameter of 6 micrometers were used for Example 2, and the amount of the polyurethane particles was 10 % by weight for Example 3. For Example 5, the particles were added to the first adhesive layer. Specifically, a thin layer of the aqueous solution for the first adhesive layer was applied to the paper and dried. Then a second layer of the aqueous solution for the first adhesive layer containing polyurethane particles at 30% by weight was applied to the dried thin first adhesive layer. The coating solution for the hot-melt adhesive layer, not containing any particles, was then coated on the first adhesive layer containing the partially embedded particles. The surfaces of the hot-melt adhesive layers for Examples 3 to 5 were embossed. For Comparative Example 1, the three-layered structure did not contain any particles in the hot-melt adhesive layer or the first adhesive layer.

[0054] (Preparation of a four-layered structure including a substrate)

An organic solvent solution for a second adhesive layer containing an acrylic adhesive (a copolymer of 2-ethylhexyl ester acrylate/vinyl acetate/acrylate at 85/11/4 % by weight) was applied by bar coating to one side of a peelable protection film (released paper) so as to form a layer having a thickness of 5 micrometers when dried. The solution was then dried to form the second adhesive layer.

[0055] A piece of fine paper with an embossed polypropylene surface was used as a carrier layer, onto which a solution for a substrate layer containing a polyether type polyurethane elastomer (Elastollan (registered trademark) ET880 (glass transition temperature: 145 degrees Celcius) from BASF Japan Ltd.) was applied by bar coating so as to form a layer having a thickness of 5 micrometers when dried. The solution was then dried to form the substrate layer.

[0056] In order to evaluate the swellability of the film produced from the above polyurethane elastomer, a layer having a thickness of 75 micrometers and a size of 100 mm x 100 mm was prepared using the polyurethane elastomer in a manner similar to the preparation of the substrate layer described above. After soaking the layer in water for 24 hours, the degree of swelling was assessed to be 5%.

The substrate layer disclosed above was attached to the second adhesive layer so as to produce a four-layered structure composed of a carrier layer, substrate, second

adhesive layer, peelable protection film for Examples 1 to 5 and Comparative Example 1.

[0057] (Preparation of a final layered structure)

A final layered structure was produced from the above structures by following the following steps.

Step 1: The surface of the coloring material layer of the four-layered structure was set on the surface of the hot-melt adhesive layer of the three-layered structure. A heated roller was then applied to fuse the structures to produce a seven-layered structure.

Step 2: The carrier layer of the four-layered structure including the substrate was removed.

Step 3: The second peelable protection layer of the seven-layered structure from Step 1 was removed.

Step 4: The exposed surface of the third adhesive layer of the now six-layered structure from Step 3 was set on the exposed surface of the substrate of the layered structure from Step 2. The structures were then fused by applying pressure and heat so as to produce a final layered structure that is to be attached to the skin.

The above steps were performed to produce final layered structures for Examples 1 to 5 and Comparative Example 1.

[0058] (Evaluation of layered structures)

The peelable protection films of the final layered structures were removed, and the final layered structures were applied to BioSkin skin replicas that simulate the skin of females in their 20s (manufactured by Beaulax Co., Ltd.), water was applied to the layered structures to remove the water permeable protection layers and at least a part of the first adhesive layers, and the layered structures were evaluated for their appearance and glossiness. The appearance was visually assessed to determine whether the layered structures appeared shiny or matte and whether the color of the layered structures appeared similar to that of the replicas. Shininess, or glossiness (gloss value), was measured at an incident/detective angle of 60 degrees using Konica Minolta GM-268. The results are summarized in Table 1 below, and the gloss values of the layered structures are presented in the graph of Fig. 2. The outermost surface of the layered structures was examined by scanning electron microscopy (SEM). The photographs of Comparative Example 1 (conventional layered structure) and Example 4 (a representative embodiment of the present invention) are shown in Fig. 3A and 3B respectively. The top panels of Fig. 3 are photographs taken at a magnification of x100, the middle panels are photographs taken at a magnification of x500 and the bottom panels are photographs taken at a magnification of x2000.

[0059] Table 1

	Particle	Amount of Particle	Emboss	Appearance	Color	Gloss Value
Comp. Ex. 1	No particle	0%	No	Very Shiny	Good	11.6
Ex. 1	Silica (5 μ m)	30%	No	Slightly Shiny	Slightly paler than replica	3.6
Ex. 2	PMMA (5 μ m)	30%	No	Slightly Shiny	Slightly paler than replica	3.7
Ex. 3	Polyurethane	10%	Yes	Matte	Very slightly paler than replica	2.3
Ex. 4	Polyurethane	30%	Yes	Matte	Very slightly paler than replica	1.7
Ex. 5	Polyurethane	30%	Yes	Matte	Good	1.8

[0060] It is apparent from Fig. 3A that the layered structure of Comparative Example 1 had a relatively flat outermost surface. On the other hand, the SEM photographs of Example 4 (Fig. 3B), which is a representative embodiment of the present invention, show an uneven surface covered with spherical particles. Further, as can be seen from Table 1 and Fig. 2, the layered structure of Comparative Example 1 was very shiny and had a high gloss value. In contrast, the layered structures of Examples 1 to 5 all had a matte appearance and much lower gloss values than the layered structure of Comparative Example 1. Further, the layered structure of Example 5, which is a particularly preferred embodiment of the present invention, not only had a low gloss value, but also a color very similar to the color of the Bioskin replica to which the layered structure was attached.

[0061] The present invention has been explained with reference to the examples above. These examples are only exemplifications of specific possibilities, and those skilled in the art will recognize that various modifications are possible, and that such modifications are also covered by the present invention.

Claims

[Claim 1]

A layered structure for cosmetic or dermo-cosmetic use, comprising:

- a substrate to be attached to the skin, the substrate being made from a flexible material so as to enable the substrate to follow the deformation of the skin to which the substrate is to be attached;
- an image forming layer bearing coloring materials thereon;
- a hot-melt adhesive layer on the image forming layer on the side bearing the coloring materials;
- a first adhesive layer on a side of the hot-melt adhesive layer opposite to the image forming layer, said first adhesive layer being water soluble;
- a water permeable protection layer on a side of said first adhesive layer opposite to the hot-melt adhesive layer; and
- particles in the hot-melt adhesive layer or the first adhesive layer.

[Claim 2]

A layered structure for cosmetic or dermo-cosmetic use according to claim 1, wherein:

- when the particles are in the hot-melt adhesive layer, said particles are partially embedded in the hot-melt adhesive layer on the side facing the first adhesive layer; and
- when the particles are in the first adhesive layer, said particles are partially embedded in the first adhesive layer on the side facing the hot-melt adhesive layer;

the particles remaining attached to the hot-melt adhesive layer and protruding from the side of the hot-melt adhesive layer opposite to the coloring materials when the layered structure is in use.

[Claim 3]

A layered structure for cosmetic or dermo-cosmetic use according to claim 1 or 2, further comprising:

- a peelable protection layer on a side of the substrate opposite to the image forming layer;
- a second adhesive layer between the substrate and the peelable protection layer, the second adhesive layer being in contact with the skin when the layered structure is in use; and
- a third adhesive layer between the image forming layer and the substrate to be attached to the skin.

[Claim 4]

A layered structure for cosmetic or dermo-cosmetic use according to any one of claims 1 to 3, further comprising a back-up layer attached to the image forming layer on a side opposite to a side bearing the

coloring materials.

- [Claim 5] A layered structure for cosmetic or dermo-cosmetic use according to any one of claims 1 to 4, wherein the particles comprise polyurethane, silica, an acrylic resin, a fluorine resin, a melamine resin, a silicone resin, talc, kaolin, magnesium carbonate, potassium carbonate, titanium oxide or starch.
- [Claim 6] A layered structure for cosmetic or dermo-cosmetic use according to any one of claims 1 to 5, wherein the particles consist of polyurethane.
- [Claim 7] A layered structure for cosmetic or dermo-cosmetic use according to any one of claims 1 to 6, wherein the particles are spherical.
- [Claim 8] A layered structure for cosmetic or dermo-cosmetic use according to any one of claims 1 to 7, wherein the particles have a diameter between 0.5 and 20 micrometers, preferably 1 to 15 micrometers.
- [Claim 9] A layered structure for cosmetic or dermo-cosmetic use according to any one of claims 1 to 8, wherein the hot-melt adhesive layer comprises a polyurethane elastomer, a urethane resin, an ethylene vinyl acetate copolymer, an ethylene ethyl acrylate copolymer, an acrylic resin, a polyvinyl acetate, a petroleum-based resin, a hydrocarbon resin, polybutadiene, polystyrene, a rosin resin, a terpene resin, a polyamide resin, a vinyl chloride/vinyl acetate copolymer, a styrene resin, or a polyester resin.
- [Claim 10] A layered structure for cosmetic or dermo-cosmetic use according to any one of claims 1 to 9, wherein the hot-melt adhesive layer further comprises a wax.
- [Claim 11] A layered structure for cosmetic or dermo-cosmetic use according to any one of claims 2 to 10, wherein the surface of the hot-melt adhesive layer from which the particles protrude is even.
- [Claim 12] A layered structure for cosmetic or dermo-cosmetic use according to any one of claims 2 to 10, wherein the surface of the hot-melt adhesive layer from which the particles protrude is uneven.
- [Claim 13] A layered structure for cosmetic or dermo-cosmetic use according to any one of claims 1 to 12, wherein the first adhesive layer which is water-soluble comprises a dextrin, a polyvinyl alcohol, polyvinyl pyrrolidone, pullulan, a water-soluble cellulose derivative, a polyacrylic amide, polyvinyl methyl ether, a poly(meth)acrylic acid-containing polymer, an etherized starch or a starch.
- [Claim 14] A method of concealing a flaw in the skin, the method comprising the steps of:

- obtaining color image data of an area of the skin having the flaw to be concealed;
- retouching the color image data by removing the flaw from the color image;
- printing with coloring materials a retouched color image of the skin on the image forming layer of the layered structure according to any one of claims 1 to 13;
- attaching the printed layered structure to the skin, so as to cover at least the flaw to be concealed;
- moistening the water-permeable protection layer; and
- stripping the water-permeable protection layer and removing at least a part of the first adhesive layer, thereby exposing the hot-melt adhesive layer and the particles protruding from the exposed surface thereof.

[Claim 15]

A method according to claim 14, the method further comprising the steps of:

- obtaining color image data of the retouched color image and the skin in the vicinity of the retouched color image;
- modifying the retouched color image data so that the modified color image appears no different from the skin in the vicinity of the retouched color image; and
- printing the modified color image of the skin on the image forming layer with the coloring materials.

[Fig. 1]

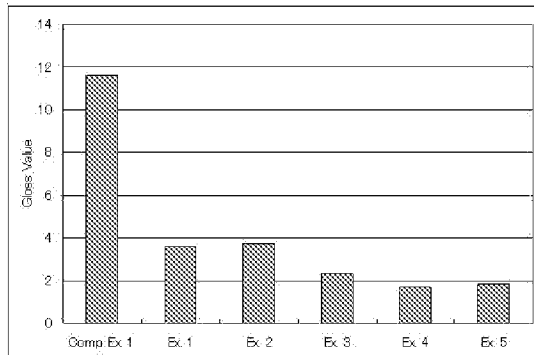
A



B

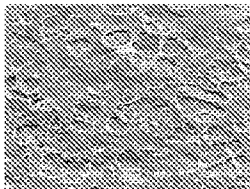


[Fig. 2]

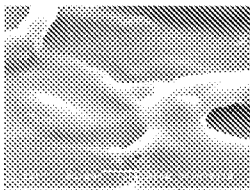
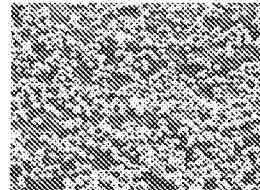
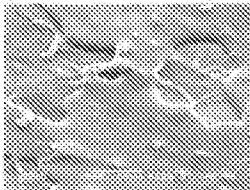
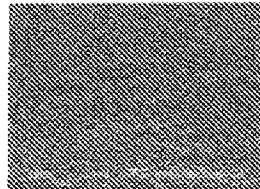


[Fig. 3]

A



B



INTERNATIONAL SEARCH REPORT

International application No
PCT/JP2010/007347

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61F13/02 A61K8/02 A61Q1/00 A61Q19/00 B32B27/30
B32B27/32 B32B27/34 B32B27/40 B32B27/38

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B32B A61F A61K A61Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2010/086901 A1 (OREAL [FR]; KAWAMOTO MAKOTO [JP]; HADASCH ANKE [JP]) 5 August 2010 (2010-08-05) claims 3,6,13,15 paragraphs [0014], [0019], [0020], [0035] figure 1	1-15
A	----- EP 1 914 342 A1 (KURARAY CO [JP]) 23 April 2008 (2008-04-23) paragraph [0008] figure 2	1-15
A	----- EP 1 452 156 A1 (DUFOUR CATHERINE [FR]) 1 September 2004 (2004-09-01) paragraphs [0001], [0020] -----	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

27 September 2011

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/JP2010/007347

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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