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(71) Demandeur/Applicant:
THE PROCTER & GAMBLE COMPANY, US

(72) Inventeurs/Inventors:
SMITH, EDWARD DEWEY III, US;
WASSELL, KAREN JOANNE, GB;
LORENZI, MARC PAUL, GB

(74) Agent: GOWLING LAFLEUR HENDERSON LLP

(54) Titre : ARTICLES D'HYGIENE PERSONNELLE POURVUS D'UNE NAPPE OUATEE
(54) Title: PERSONAL CARE ARTICLES COMPRISING BATTING

(57) Abrégé/Abstract:
The present invention relates to a substantially dry, disposable personal care article comprising: a) a water insoluble substrate comprising: 1) a non-scouring, lofty, low-density batting layer comprising synthetic fibers; and 2) a non-lofty, fluid-permeable nonwoven layer which is disposed adjacent to said batting layer; and b) a cleansing component disposed adjacent to said batting layer, wherein said component comprises from about 10 % to about 1000 %, by weight of the water insoluble substrate, of a lathering surfactant. The present invention further relates to a substantially dry, disposable personal care article suitable for conditioning wherein the above-described article comprises a therapeutic benefit component, disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10 % to about 1000 %, by weight of the water insoluble substrate, of a therapeutic benefit component in addition to or in lieu of the cleansing component. These articles have been found to be particularly useful for personal cleansing applications, namely for the skin and hair. Thus, the present invention further relates to methods of cleansing and/or conditioning skin and hair utilizing the articles of the present invention.

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(71) Applicant: THE PROCTER & GAMBLE COMPANY [US/US]; One Procter & Gamble Plaza, Cincinnati, OH 45202 (US).

(72) Inventors: SMITH, Edward, Dewey, III; 6880 Man-O-War Lane, Mason, OH 45040 (US). WASSELL, Karen, Joanne; 33 Shakespeare Road, Addelstone, Surrey, KT15 25R (GB). LORENZI, Marc, Paul; 18 South Avenue, Egham, Surrey TW20 8HG (GB).

(74) Agents: REED, T., David et al.; The Procter & Gamble Company, 5299 Spring Grove Avenue, Cincinnati, OH 45217-1087 (US).

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(54) Title: PERSONAL CARE ARTICLES COMPRISING BATTING

(57) Abstract: The present invention relates to a substantially dry, disposable personal care article comprising: a) a water insoluble substrate comprising: 1) a non-scouring, lofty, low-density batting layer comprising synthetic fibers; and 2) a non-lofty, fluid-permeable nonwoven layer which is disposed adjacent to said batting layer; and b) a cleansing component disposed adjacent to said batting layer, wherein said component comprises from about 10 % to about 1000 %, by weight of the water insoluble substrate, of a lathering surfactant. The present invention further relates to a substantially dry, disposable personal care article suitable for conditioning wherein the above-described article comprises a therapeutic benefit component, disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10 % to about 1000 %, by weight of the water insoluble substrate, of a therapeutic benefit component in addition to or in lieu of the cleansing component. These articles have been found to be particularly useful for personal cleansing applications, namely for the skin and hair. Thus, the present invention further relates to methods of cleansing and/or conditioning skin and hair utilizing the articles of the present invention.

PERSONAL CARE ARTICLES COMPRISING BATTING

TECHNICAL FIELD

The present invention relates to disposable, personal care articles suitable for cleansing and/or therapeutically treating the skin, hair and any other sites in need of such treatment. These articles each comprise a water insoluble substrate having a non-scouring, lofty, low-density batting layer comprising synthetic fibers and a non-lofty, fluid-permeable nonwoven layer disposed adjacent to the batting layer; and either a cleansing component disposed adjacent to the water insoluble substrate, wherein the cleansing component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a lathering surfactant or a therapeutic benefit component which comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a therapeutic benefit agent or both. Consumers use the articles by wetting them with water and rubbing them on the area to be cleansed and/or therapeutically treated (e.g. conditioned).

The invention also encompasses methods for cleansing and/or conditioning the skin and hair using the articles of the present invention.

BACKGROUND OF THE INVENTION

Personal care products, particularly cleansing and conditioning products, have traditionally been marketed in a variety of forms such as bar soaps, creams, lotions, and gels. Typically, these products have attempted to satisfy a number of criteria to be acceptable to consumers. These criteria include cleansing effectiveness, skin feel, mildness to skin, hair, and ocular mucosae, and lather volume. Ideal personal cleansers should gently cleanse the skin or hair, cause little or no irritation, and should not leave the skin or hair with a heavy buildup or overly dry when used frequently.

It is also highly desirable to deliver such cleansing and conditioning benefits from a disposable product. Disposable products are convenient because they obviate the need to carry or store cumbersome bottles, bars, jars, tubes, and other forms of clutter including cleansing products and other products capable of providing therapeutic or aesthetic benefits. Disposable products are also a more sanitary alternative to the use of a sponge, washcloth, or other cleansing implement intended for extensive reuse, because such implements can develop bacterial growth, unpleasant odors, and other undesirable characteristics related to repeated use.

The articles of the present invention surprisingly provide effective cleansing and/or therapeutic benefits to the skin and hair in a convenient, inexpensive, and sanitary manner. The present invention provides the convenience of not needing to carry, store, or use a separate implement (such as a washcloth or sponge), a cleanser and/or a therapeutic benefit product. These articles are convenient to use because they are in the form of either a single, disposable personal care article or multiple disposable articles useful for cleansing as well as application of a therapeutic or aesthetic benefit agent. Moreover, these articles are suitable for use within or in conjunction with another personal care implement that is designed for more

extensive use. In this instance, the articles of the present invention are disposed within or attached to a separate personal care implement that is not readily disposable, e.g., a bath towel or washcloth. In addition, the disposable articles of the present invention may be removeably attached to a handle or grip suitable for moving the article over the surface to be cleansed and/or therapeutically treated (e.g., conditioned).

Although in preferred embodiments the articles of the present invention are suitable for personal care applications, they may also be useful in a variety of other industries such as the automotive care, marine vehicle care, household care, animal care, etc. where surfaces or areas are in need of cleansing and/or application of a benefit agent, e.g., wax, conditioner, UV protectant, etc..

In preferred embodiments of the present invention, the articles are suitable for personal care applications and are useful for cleansing and/or conditioning the skin, hair, and similar keratinous surfaces in need of such treatment. Consumers use these articles by wetting them with water and rubbing them on the area to be treated. The article consists of a water insoluble substrate having a non-scouring, lofty, low-density batting layer comprising synthetic fibers, a non-lofty, fluid-permeable nonwoven layer; and either a cleansing component containing a lathering surfactant or a therapeutic benefit component or both. Without being limited by theory, it is believed that the batting layer of the substrate, particularly, enhances lathering (where applicable) which in turn increases cleansing and exfoliation, and optimizes delivery and deposition of a therapeutic or aesthetic benefit agent that might be contained within the article.

SUMMARY OF THE INVENTION

The present invention relates to a substantially dry, disposable personal care article suitable for cleansing wherein the article comprises:

a) a water insoluble substrate comprising:

1) a lofty, non-scouring low-density batting layer comprising synthetic fibers; and

2) a non-lofty, fluid-permeable nonwoven layer which is disposed adjacent to said batting layer; and

b) a cleansing component disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a lathering surfactant.

The present invention further relates to a substantially dry, disposable personal care article suitable for conditioning wherein the article comprises:

a) a water insoluble substrate comprising:

1) a lofty, non-scouring low-density batting layer comprising synthetic fibers; and

2) a non-lofty, fluid-permeable nonwoven layer which is disposed adjacent to said batting layer; and

b) a therapeutic benefit component, disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a therapeutic benefit agent.

In another embodiment, the present invention further relates to a substantially dry, disposable personal care article suitable for cleansing and conditioning wherein the article comprises:

a) a water insoluble substrate comprising:

1) a lofty, non-scouring low-density batting layer comprising synthetic fibers; and

2) a non-lofty, fluid-permeable nonwoven layer which is disposed adjacent to said batting layer;

b) a cleansing component disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a lathering surfactant; and

c) a therapeutic benefit component, disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a therapeutic benefit agent.

The present invention also relates to a method of cleansing and/or conditioning the skin and hair which comprises the steps of: a) wetting such articles with water and b) contacting the skin or hair with the wetted articles.

All percentages and ratios used herein, unless otherwise indicated, are by weight and all measurements made are at 25°C, unless otherwise designated. The invention hereof can comprise, consist of, or consist essentially of, the essential as well as optional ingredients and components described therein.

In the description of the invention various embodiments and/or individual features are disclosed. As will be apparent for the skilled practitioner all combinations of such embodiments and features are possible and can result in preferred executions of the invention.

All documents referred to herein, including patents, patent applications, and printed publications, are hereby incorporated by reference in their entirety in this disclosure.

DETAILED DESCRIPTION OF THE INVENTION

As used herein, "disposable" is used in its ordinary sense to mean an article that is disposed or discarded after a limited number of usage events, preferably less than 25, more preferably less than about 10, and most preferably less than about 2 entire usage events.

As used herein, “substantially dry” means that the articles of the present invention exhibit a Moisture Retention of less than about 0.95 gms, preferably less than about 0.75 gms, even more preferably, less than about 0.5 gms, even more preferably less than about 0.25 gms, even still more preferably less than about 0.15 gms, and most preferably, less than about 0.1 gms. The determination of the Moisture Retention is discussed later.

The personal care articles of the present invention comprise the following essential components.

WATER INSOLUBLE SUBSTRATE

The articles of the present invention comprise a water insoluble substrate which further comprises at least two layers, namely a non-scouring, lofty, low-density batting layer and a non-lofty, fluid-permeable nonwoven layer. As used herein, “non-scouring” means that the layer exhibits an Abrasive Value of greater

than about 15, preferably greater than about 30, more preferably greater than about 50, even more preferably greater than about 70, and most preferably greater than about 80 as determined by the Abrasiveness Value Methodology described below. Preferably, the substrate layers are soft yet invigorating to the skin of the consumer when used. In any case, however, the batting layer and the nonwoven layer are each defined as having both an interior and exterior surface. In both cases, the interior surfaces of the layers are those which face the inside or innermost portion of the article of the present invention whereas the exterior surfaces of the layers are those which face the outside or outermost portion of the article. Generally, the orientation of the articles of the present invention may be defined such that the nonwoven layer is closer to the side of the article suitable for gripping (i.e., the gripping side) while the batting layer is closer to the side of the article to be contacted with the area to be cleansed and/or therapeutically treated, e.g. the skin/site contact side. Both sides of the article, however, are suitable for contact with the skin.

Without being limited by theory, the water insoluble substrate enhances cleansing and/or therapeutic treatment. The substrate can have the same or differing textures on each side such that the gripping side of the article is the same or a different texture as the skin/site contact side. The substrate may act as an efficient lathering and exfoliating implement. By physically coming into contact with the skin or hair, the substrate significantly aids in cleansing and removal of dirt, makeup, dead skin, and other debris. In preferred embodiments, however, the substrate is non-scouring or nonabrasive to the skin.

BATTING LAYER

The batting layer of the present invention is lofty, non-scouring, and is of low-density. As used herein, "lofty" means that the layer has density of from about 0.00005 g/cm^3 to about 0.1 g/cm^3, preferably from about 0.001 g/cm^3 to about 0.09 g/cm^3 and a thickness of from about 0.04 inches to about 2 inches at 5 gms/in^2. Also, as used herein, "non-scouring" means having an Abrasiveness Value of greater than about 15, preferably greater than about 30, more preferably great than about 50, even more preferably greater than about 70, and most preferably greater than about 80, as defined by the Abrasiveness Value described below.

The batting layer preferably comprises synthetic materials. As used herein, "synthetic" means that the materials are obtained primarily from various man-made materials or from natural materials that have been further altered. Suitable synthetic materials include, but are not limited to, acetate fibers, acrylic fibers, cellulose ester fibers, modacrylic fibers, polyamide fibers, polyester fibers, polyolefin fibers, polyvinyl alcohol fibers, rayon fibers, polyethylene foam, polyurethane foam, and combinations thereof. Preferred synthetic materials, particularly fibers, may be selected from the group consisting of nylon fibers, rayon fibers, polyolefin fibers, polyester fibers, and combinations thereof. Preferred polyolefin fibers are fibers selected from the group consisting of polyethylene, polypropylene, polybutylene, polypentene, and combinations and copolymers thereof. More preferred polyolefin fibers are fibers selected from the group consisting of polyethylene, polypropylene, and combinations and copolymers thereof. Preferred polyester fibers are fibers selected from the group consisting of polyethylene terephthalate, polybutylene terephthalate, polycyclohexylenedimethylene terephthalate, and combinations and copolymers thereof. More preferred polyester fibers are fibers selected from the group consisting of polyethylene terephthalate,

polybutylene terephthalate, and combinations and copolymers thereof. Most preferred synthetic fibers comprise solid staple polyester fibers that comprise polyethylene terephthalate homopolymers. Suitable synthetic materials may include solid single component (i.e., chemically homogeneous) fibers, multiconstituent fibers (i.e., more than one type of material making up each fiber), and multicomponent fibers (i.e., synthetic fibers which comprise two or more distinct filament types which are somehow intertwined to produce a larger fiber), and combinations thereof., Preferred fibers include bicomponent fibers, multiconstituent fibers, and combinations thereof. Such bicomponent fibers may have a core-sheath configuration or a side-by-side configuration. In either instance, the batting layer may comprise either a combination of fibers comprising the above-listed materials or fibers which themselves comprise a combination of the above-listed materials.

For the core-sheath fibers, preferably, the cores comprise materials selected from the group consisting of polyesters, polyolefins having a T_g of at least about 10°C higher than the sheath material, and combinations thereof. Conversely, the sheaths of the bicomponent fibers preferably comprise materials selected from the group consisting of polyolefins having a T_g of at least about 10°C lower than the core material, polyesters polyolefins having a T_g of at least about 10°C lower than the core material, and combinations thereof.

In any instance, side-by side configuration, core-sheath configuration, or solid single component configuration, the fibers of the batting layer may exhibit a helical or spiral or crimped configuration, particularly the bicomponent type fibers.

The batting layer may also comprise natural fibers. Suitable natural fibers are described below in the Nonwoven Layer section.

Furthermore, the fibers of the batting layer preferably have an average thickness of from about 0.5 microns to about 150 microns. More preferably, the average thickness of the fibers are from about 5 microns to about 75 microns. In an even more preferred embodiment, the average thickness of the fibers are from about 8 microns to about 40 microns. Furthermore, the fibers of the batting layer may be of varying sizes, i.e., the fibers of the batting layer may comprise fibers having different average thicknesses. Also, the cross section of the fibers can be round, flat, oval, elliptical or otherwise shaped.

In another embodiment, the batting layer of the present invention may comprise a composite material, i.e., a material having one or more plies of the same or different suitable materials merely superimposed physically, joined together continuously (e.g., laminated, etc.) or in a discontinuous pattern, or by bonding at the external edges (or periphery) of the layer and/or at discrete loci. For instance, the batting layer may further comprise composite materials selected from the group consisting of fibrous nonwovens, sponges, foams, reticulated foams, polymeric nets, scrims, vacuum-formed laminates, formed films and formed film composite materials. It is preferred that the batting layer comprise a formed film composite material comprising at least one formed film and at least one nonwoven wherein the layer is vacuum formed. A suitable formed film composite material includes, but is not limited to, a vacuum

laminated composite formed film material formed by combining a carded polypropylene nonwoven having a basis weight of 30 gsm with a formed film.

Without being limited by theory, the batting layer is especially useful as a skin contact side in the personal care article of the present invention due to its mild exfoliating properties. Furthermore, the preferred synthetic fibers which make up the batting layer are largely hydrophobic thus allowing water to readily flow through the article to reach the cleansing component and readily flow out from the article to produce a high volume of flash lather which tapers off during use but which still suffices through an entire showering or bathing experience.

Abrasiveness Value Methodology

The Abrasiveness Value indicates the "non-scouring" property of the batting layers of the present articles. The batting layers of the present invention are mildly exfoliating but are not rough to the skin. Therefore, the Abrasiveness Value determination involves rubbing the substrate along a test surface using a mechanical device and then examining the resulting scratch marks produced on the test surface using different analysis techniques.

The following equipment is needed for the methodology.

1. Martindale Toothbrush Wear and Abrasion Tester: Model 103, serial nos. 103-1386/2 upwards. Martindale 07-01-88 made by James H. Heal and Co. Ltd. Textile Testing and QC Equipment. Foot area: 43x44mm. 1Kg weight.
2. Capped Polystyrene strips 11x8cm. Clear general purpose polystyrene layer on white High Impact Polystyrene, e. g., EMA Model Supplies SS-20201L.
3. Substrates to be tested.
4. Glossmeter, e.g. Sheen Tri-Microgloss 20-60-85

Prepare the polystyrene strips for scratching by removing plastic protective coating from the side to be scratched and rinsing with ethanol (do not use tissue). Place the strip onto a non-abrasive surface and allow strip to dry in the air. Then, attach the polystyrene strip to the base of a Martindale wear tester with tape along the edges. Align the strip centrally under the path of the scrubbing device, with the length of the strip in the direction of movement. Cut a 2.5'' x 2.5'' substrate sample. Attach the substrate sample to the scrubbing foot of the Martindale wear tester, with double sided tape, aligning the machine direction of the substrate with the direction of travel. Secure the scrubbing foot assembly into the instrument with the screws supplied. Slot 1Kg weight on to the top of the scrubbing foot assembly and ensure the scrubbing foot moves only in one direction (forward and backwards). Cover the entire Martindale wear tester with a safety screen. Set the machine to perform 50 cycles in 1 minute and allow to run. (Frequency = 0.833Hz). Once the machine has stopped take off the footer assembly and lift the polystyrene strip off the base of the machine. Label the polystyrene indicating the substrate used and store in a plastic bag.

Next, the strips are analyzed. The strips are placed on a black construction paper background and at least 5 samples of the same substrate are analyzed to get a reproducible average. The Glossmeter is placed orthogonally (such that light beam is at right angles to scratches) and centrally over the scratched

side of the polystyrene strip. A 20° angle is selected and the sample is measured yielding the Abrasiveness Value. As the Abrasiveness Value decreases the scratchiness or scouring property of a substrate increases.

NONWOVEN LAYER

The water insoluble substrate of the present invention further comprises a nonwoven layer attached to the batting layer. This nonwoven layer is preferably non-lofty and fluid-permeable. As used herein, "non-lofty" means having a thickness of from about 0.001 to about 0.05 inches. This nonwoven layer is useful for engaging or retaining the cleansing component and/or therapeutic benefit component within the article. Furthermore, the nonwoven layer may also be suitable for contact with the skin in which case it is preferred that the layer is soft to the skin.

Materials suitable for the nonwoven layer are selected from the group consisting of cellulosic nonwovens, non-lofty nonwovens, sponges (i.e., both natural and synthetic), formed films, non-lofty battings, and combinations thereof. Preferably, the nonwoven layer comprises materials selected from the group consisting of cellulosic nonwovens, non-lofty nonwovens, formed films, non-lofty battings, foams, sponges, reticulated foams, vacuum-formed laminates, scrims, polymeric nets, and combinations thereof. More preferably, the nonwoven layer comprises materials selected from the group consisting of cellulosic nonwovens, non-lofty nonwovens, formed films, non-lofty battings, and combinations thereof. As used herein, "nonwoven" means that the layer does not comprise fibers which are woven into a fabric but the layer need not comprise fibers at all, e.g., formed films, sponges, foams, scrims, etc.. When the layer comprises fiber, the fibers can either be random (i.e., randomly aligned) or they can be carded (i.e., combed to be oriented in primarily one direction). Furthermore, the nonwoven layer can be a composite material composed of a combination of additional layers, i.e., plies, of random and carded fibers.

In a preferred embodiment, the nonwoven layer is apertured. The apertures in the nonwoven layer of the water insoluble substrate will generally range in average diameter between about 0.5 mm and 5 mm. More preferably, the apertures will range in size between about 1 mm to 4 mm in average diameter. Preferably, no more than about 10% of the apertures in the nonwoven layer of the substrate will fall outside these size ranges. More preferably, no more than about 5% of the apertures in the nonwoven layer will fall outside these size ranges. For apertures which are not circular in shape, the "diameter" of the aperture refers to the diameter of a circular opening having the same surface area as the opening of the non-circular shaped aperture.

Within the nonwoven layer, the apertures will generally occur at a frequency of from about 0.5 to 12 apertures per straight linear centimeter. More preferably, the apertures in the surface of the layer will occur at a frequency of from about 1.5 to 6 apertures per straight linear centimeter.

The apertures must at least be placed within the nonwoven layer. Such apertures need not protrude completely through one surface of the nonwoven layer to the other. They, however, may do so. Additionally, apertures may or may not be placed in the batting layer of the substrate such that the article is apertured through it's entire volume.

Apertures may be formed in the nonwoven layer of the water insoluble substrate as such a substrate, or layer thereof, is being formed or fabricated. Alternatively, apertures may be formed in the nonwoven layer after the substrate comprising the layer has been completely formed.

The nonwoven layer may comprise a variety of both natural and synthetic fibers or materials. As used herein, "natural" means that the materials are derived from plants, animals, insects or byproducts of plants, animals, and insects. The conventional base starting material is usually a fibrous web comprising any of the common synthetic or natural textile-length fibers, or combinations thereof.

Nonlimiting examples of natural materials useful in the present invention include, but are not limited to, silk fibers, keratin fibers and cellulosic fibers. Nonlimiting examples of keratin fibers include those selected from the group consisting of wool fibers, camel hair fibers, and the like. Nonlimiting examples of cellulosic fibers include those selected from the group consisting of wood pulp fibers, cotton fibers, hemp fibers, jute fibers, flax fibers, and combinations thereof. Cellulosic fiber materials are preferred in the present invention.

Nonlimiting examples of synthetic materials useful in the present invention include those selected from the group consisting of acetate fibers, acrylic fibers, cellulose ester fibers, modacrylic fibers, polyamide fibers, polyester fibers, polyolefin fibers, polyvinyl alcohol fibers, rayon fibers, polyethylene foam, polyurethane foam, and combinations thereof. Examples of suitable synthetic materials include acrylics such as acrilan, creslan, and the acrylonitrile-based fiber, orlon; cellulose ester fibers such as cellulose acetate, arnel, and acele; polyamides such as nylons (e.g., nylon 6, nylon 66, nylon 610, and the like); polyesters such as fortrel, kodel, and the polyethylene terephthalate fiber, polybutylene terephalate fiber, dacron; polyolefins such as polypropylene, polyethylene; polyvinyl acetate fibers; polyurethane foams and combinations thereof. These and other suitable fibers and the nonwovens prepared therefrom are generally described in Riedel, "Nonwoven Bonding Methods and Materials," Nonwoven World (1987); The Encyclopedia Americana, vol. 11, pp. 147-153, and vol. 26, pp. 566-581 (1984); U. S. Patent No. 4,891,227, to Thaman et al., issued January 2, 1990; and U. S. Patent No. 4,891,228, each of which is incorporated by reference herein in its entirety. Additionally, any synthetic materials mentioned above as suitable for inclusion in the batting layer may also be included in the nonwoven layer.

Nonwovens made from natural materials consist of webs or sheets most commonly formed on a fine wire screen from a liquid suspension of the fibers. See C.A. Hampel et al., The Encyclopedia of Chemistry, third edition, 1973, pp. 793-795 (1973); The Encyclopedia Americana, vol. 21, pp. 376-383 (1984); and G.A. Smook, Handbook of Pulp and Paper Technologies, Technical Association for the Pulp and Paper Industry (1986); which are incorporated by reference herein in their entirety.

Natural material nonwovens useful in the present invention may be obtained from a wide variety of commercial sources. Nonlimiting examples of suitable commercially available paper layers useful herein include Airtex®, an embossed airlaid cellulosic layer having a base weight of about 71 gsy, available from James River, Green Bay, WI; and Walkisoft®, an embossed airlaid cellulosic having a base weight of about 75 gsy, available from Walkisoft U.S.A., Mount Holly, NC.

Additional suitable nonwoven materials include, but are not limited to, those disclosed in U. S. Patent Nos. 4,447,294, issued to Osborn on May 8, 1984; 4,603,176 issued to Bjorkquist on July 29, 1986; 4,981,557 issued to Bjorkquist on January 1, 1991; 5,085,736 issued to Bjorkquist on February 4, 1992; 5,138,002 issued to Bjorkquist on August 8, 1992; 5,262,007 issued to Phan et al. on November 16, 1993; 5,264,082, issued to Phan et al. on November 23, 1993; 4,637,859 issued to Trokhan on January 20, 1987; 4,529,480 issued to Trokhan on July 16, 1985; 4,687,153 issued to McNeil on August 18, 1987; 5,223,096 issued to Phan et al. on June 29, 1993 and 5,679,222, issued to Rasch et al. on October 21, 1997, each of which is incorporated by reference herein in its entirety.

Methods of making nonwovens are well known in the art. Generally, these nonwovens can be made by air-laying, water-laying, meltblowing, coforming, spunbonding, or carding processes in which the fibers or filaments are first cut to desired lengths from long strands, passed into a water or air stream, and then deposited onto a screen through which the fiber-laden air or water is passed. The resulting layer, regardless of its method of production or composition, is then subjected to at least one of several types of bonding operations to anchor the individual fibers together to form a self-sustaining web. In the present invention the nonwoven layer can be prepared by a variety of processes including, but not limited to, air-entanglement, hydroentanglement, thermal bonding, and combinations of these processes.

Nonwovens made from synthetic materials useful in the present invention can be obtained from a wide variety of commercial sources. Nonlimiting examples of suitable nonwoven layer materials useful herein include HEF 40-047, an apertured hydroentangled material containing about 50% rayon and 50% polyester, and having a basis weight of about 61 grams per square meter (gsm), available from Veratec, Inc., Walpole, MA; HEF 140-102, an apertured hydroentangled material containing about 50% rayon and 50% polyester, and having a basis weight of about 67 gsm, available from Veratec, Inc., Walpole, MA; Novonet® 149-616, a thermo-bonded grid patterned material containing about 100% polypropylene, and having a basis weight of about 60 gsm available from Veratec, Inc., Walpole, MA; Novonet® 149-801, a thermo-bonded grid patterned material containing about 69% rayon, about 25% polypropylene, and about 6% cotton, and having a basis weight of about 90 gsm, available from Veratec, Inc. Walpole, MA; Novonet® 149-191, a thermo-bonded grid patterned material containing about 69% rayon, about 25% polypropylene, and about 6% cotton, and having a basis weight of about 120 gsm, available from Veratec, Inc. Walpole, MA; HEF Nubtex® 149-801, a nubbed, apertured hydroentangled material, containing about 100% polyester, and having a basis weight of about 84 gsm, available from Veratec, Inc. Walpole, MA; Keybak® 951V, a dry formed apertured material, containing about 75% rayon, about 25% acrylic fibers, and having a basis weight of about 51 gsm, available from Chicopee, New Brunswick, NJ; Keybak® 1368, an apertured material, containing about 75% rayon, about 25% polyester, and having a basis weight of about 47 gsm, available from Chicopee, New Brunswick, NJ; Duralace® 1236, an apertured, hydroentangled material, containing about 100% rayon, and having a basis weight from about 48 gsm to about 138 gsm, available from Chicopee, New Brunswick, NJ; Duralace® 5904, an apertured, hydroentangled material,

containing about 100% polyester, and having a basis weight from about 48 gsm to about 138 gsm, available from Chicopee, New Brunswick, NJ; Chicopee® 5763, a carded hydroapertured material (8x6 apertures per inch, 3X2 apertures per cm), containing about 70% rayon, about 30% polyester, and a optionally a latex binder (Acrylate or EVA based) of up to about 5% w/w, and having a basis weight from about 60 gsm to about 90 gsm, available form Chicopee, New Brunswick, NJ; Chicopee® 9900 series (e.g., Chicopee 9931, 62 gsm, 50/50 rayon/polyester, and Chicopee 9950 50 gsm, 50/50 rayon/polyester), a carded, hydroentangled material, containing a fiber composition of from 50% rayon/50% polyester to 0% rayon/100% polyester or 100% rayon/0% polyester, and having a basis weight of from about 36 gsm to about 84 gsm, available form Chicopee, New Brunswick, NJ; Sontara 8868, a hydroentangled material, containing about 50% cellulose and about 50% polyester, and having a basis weight of about 72 gsm, available from Dupont Chemical Corp. Preferred non-woven substrate materials have a basis weight of about from 24 gsm to about 96 gsm, more preferably from about 36 gsm to about 84 gsm, and most preferably from about 42 gsm to about 78 gsm.

The nonwoven layer may also be a polymeric mesh sponge as described in European Patent Application No. EP 702550A1 published March 27, 1996, which is incorporated by reference herein in its entirety. Such polymeric mesh sponges comprise a plurality of plies of an extruded tubular netting mesh prepared from nylon or a strong flexible polymer, such as addition polymers of olefin monomers and polyamides of polycarboxylic acids.

The nonwoven layer may also comprise formed films and composite materials, i.e., multiple materials containing formed films. Preferably, such formed films comprise plastics which tend to be soft to the skin. Suitable soft plastic formed films include, but are not limited to, polyolefins such as low density polyethylenes (LDPE). In such cases where the nonwoven layer comprises a plastic formed film, it is preferred that the nonwoven layer be apertured, e.g., macroapertured or microapertured, such that the layer is fluid permeable. In one embodiment, the nonwoven layer comprises a plastic formed film which is only microapertured. The surface aberrations of the microapertures, i.e., the male side, are preferably located on the interior surface of the second layer and preferably face toward the inside of the substrate, i.e., toward the cleansing component and/or therapeutic benefit component. In certain embodiments which include apertures having petal-like edged surface aberrations, without being limited by theory, it is believed that when the surface aberrations of the apertures face toward the surfactant-containing cleansing component and/or therapeutic benefit component, the application of pressure by the hand to the article allows the petal-like edges of the surface aberrations to fold inward thereby creating numerous valves on the interior surface of the layer which in effect meter out the cleansing component and/or therapeutic benefit component contained within the article thereby extending the article's useful life.

In another embodiment, the nonwoven layer comprises a plastic formed film which is both microapertured and macroapertured. In such embodiments, the nonwoven layer is well-suited to contact the area to be cleansed and/or therapeutically treated given the cloth-like feel of such microapertured films. Preferably, in such an embodiment, the surface aberrations of the microapertures face opposite of the

surface aberrations of the macroapertures on the nonwoven layer. In such an instance, it is believed that the macroapertures maximize the overall wetting/lathering of the article by the three-dimensional thickness formed from the surface aberrations which are under constant compression and decompression during the use of the article thereby creating lathering bellows.

In any case, the nonwoven layer comprising a formed film preferably has at least about 100 apertures/cm^2, more preferably at least 500 apertures/cm^2, even still more preferably at least about 1000 apertures/cm^2, and most preferably at least about 1500 apertures/cm^2 of the substrate. More preferred embodiments of the present invention include a nonwoven layer which has water flux rate of from about 5 cm^3/cm^2-s to about 70 cm^3/cm^2-s, more preferably from about 10 cm^3/cm^2-s to about 50 cm^3/cm^2-s and most preferably from about 15 cm^3/cm^2-s to about 40 cm^3/cm^2-s.

Suitable formed films and formed film-containing composite materials useful in the nonwoven layer of the present invention include, but are not limited to, those disclosed in U. S. Patent No. 4,342,314 issued to Radel et al. on August 3, 1982, commonly assigned co-pending application U. S. Serial No. 08/326,571 and PCT Application No. US95/07435, filed June 12, 1995 and published January 11, 1996, and U. S. Patent No. 4,629,643, issued to Curro et al. on December 16, 1986, each of which is incorporated by reference herein in its entirety. Furthermore, the nonwoven layer may be a formed film composite material comprising at least one formed film and at least one nonwoven wherein the layer is vacuum formed. A suitable formed film composite material includes, but is not limited to, a vacuum laminated composite formed film material formed by combining a carded polypropylene nonwoven having a basis weight of 30 gsm with a formed film.

Additionally, the nonwoven layer and the aforementioned batting layer are preferably bonded to one another in order to maintain the integrity of the article. This bonding may consist of spot bonding (e.g., hot point bonding), continuous joining (e.g., laminated, etc.) in a discontinuous pattern, or by bonding at the external edges (or periphery) of the layers and/or at discrete loci or combinations thereof. When spot bonding is used in the present articles, it is preferred that the spot bonds are separated by a distance of not less than about 1 cm. In any instance, however, the bonding may be arranged such that geometric shapes and patterns, e.g. diamonds, circles, squares, etc., are created on the exterior surfaces of the layers and the resulting article.

It is also envisioned in the articles of the present invention that the first layer and any additional layers may be surface modified to form single composite layer having 2 sides with different textures. Thus, in effect, the water insoluble substrate can be construed as comprising a single composite layer with dual textured sides or surfaces.

In any event, it is preferred that the bonded area present between the batting and any additional layers (including the nonwoven layers) be not greater than about 50% of the total surface area of the layers, preferably not greater than about 15%, more preferably not greater than about 10%, and most preferably not greater than about 8%.

Each of the layers discussed herein comprises at least two surfaces, namely an interior surface and an exterior surface, each of which may have the same or different texture and abrasiveness. Preferably, the articles of the present invention comprise substrates and therefore layers which are soft to the skin. However, differing texture substrates can result from the use of different combinations of materials or from the use of different manufacturing processes or a combination thereof. For instance, a dual textured water insoluble substrate can be made to provide a personal care article with the advantage of having a more abrasive side for exfoliation and a softer, absorbent side for gentle cleansing and/or therapeutic treatment. In addition, the separate layers of the substrate can be manufactured to have different colors, thereby helping the user to further distinguish the surfaces.

Furthermore, each of the layers of the articles as well as the articles themselves may be made into a wide variety of shapes and forms including flat pads, thick pads, thin sheets, ball-shaped implements, irregularly shaped implements. The exact size of the layers will depend upon the desired use and characteristics of the article and may range in surface area size from about a square inch to about hundreds of square inches. Especially convenient layer and article shapes include, but are not limited to, square, circular, rectangular, hourglass, mitt-type or oval shapes having a surface area of from about 5 in^2 to about 200 in^2, preferably from about 6 in^2 to about 120 in^2, and more preferably from about 15 in^2 to about 100 in^2, and a thickness of from about 0.5 mm to about 50 mm, preferably from about 1 mm to about 25 mm, and more preferably from about 2 mm to about 20 mm.

CLEANSING COMPONENT

The articles of the present invention comprise a cleansing component, which further comprises one or more surfactants. The cleansing component is disposed adjacent to the water insoluble substrate. In certain embodiments, the cleansing component is impregnated into the water insoluble substrate. In another embodiment, the cleansing component is deposited onto either or both surfaces of the water insoluble substrate. The articles of the present invention comprise from about 10% to about 1,000%, preferably from about 50% to about 600%, and more preferably from about 100% to about 250%, based on the weight of the water insoluble substrate, of the surfactant. Also, the articles of the present invention preferably comprise at least about 1 gram, by weight of the water insoluble substrate, of a surfactant. Thus, the cleansing component may be added to the substrate without requiring a drying process.

The surfactants of the cleansing component are preferably lathering surfactants. As used herein, "lathering surfactant" means a surfactant, which when combined with water and mechanically agitated generates a foam or lather. Such surfactants are preferred since increased lather is important to consumers as an indication of cleansing effectiveness. In certain embodiments, the surfactants or combinations of surfactants are mild. As used herein, "mild" means that the surfactants as well as to the articles of the present invention demonstrate skin mildness at least milder than common bar soap matrices which typically comprise a combination of natural soap and synthetic surfactant (e.g., Lever 2000® and Zest®). Methods for measuring mildness, or inversely the irritancy, of surfactant containing articles, are based on a skin barrier destruction test. In this test, the milder the surfactant, the lesser the skin barrier is destroyed. Skin

barrier destruction is measured by the relative amount of radio-labeled (tritium labeled) water (3H-H_2O) which passes from the test solution through the skin epidermis into the physiological buffer contained in the diffusate chamber. This test is described by T. J. Franz in the J. Invest. Dermatol., 1975, 64, pp. 190-195; and in U. S. Patent No. 4,673,525, to Small et al., issued June 16, 1987, which are both incorporated by reference herein in their entirety. Other testing methodologies for determining surfactant mildness well known to one skilled in the art can also be used.

A wide variety of lathering surfactants are useful herein and include those selected from the group consisting of anionic lathering surfactants, nonionic lathering surfactants, cationic lathering surfactants, amphoteric lathering surfactants, and mixtures thereof.

Anionic Lathering Surfactants

Nonlimiting examples of anionic lathering surfactants useful in the compositions of the present invention are disclosed in McCutcheon's, Detergents and Emulsifiers, North American edition (1986), published by Allured Publishing Corporation; McCutcheon's, Functional Materials, North American Edition (1992); and U. S. Patent No. 3,929,678, to Laughlin et al., issued December 30, 1975, each of which is incorporated by reference herein in their entirety.

A wide variety of anionic surfactants are potentially useful herein. Nonlimiting examples of anionic lathering surfactants include those selected from the group consisting of alkyl and alkyl ether sulfates, sulfated monoglycerides, sulfonated olefins, alkyl aryl sulfonates, primary or secondary alkane sulfonates, alkyl sulfosuccinates, acyl taurates, acyl isethionates, alkyl glycerylether sulfonate, sulfonated methyl esters, sulfonated fatty acids, alkyl phosphates, acyl glutamates, acyl sarcosinates, alkyl sulfoacetates, acylated peptides, alkyl ether carboxylates, acyl lactylates, anionic fluorosurfactants, and combinations thereof. Combinations of anionic surfactants can be used effectively in the present invention.

Anionic surfactants for use in the cleansing component include alkyl and alkyl ether sulfates. These materials have the respective formulae R1O-SO3M and R1(CH2H4O)x-O-SO3M, wherein R1 is a saturated or unsaturated, branched or unbranched alkyl group from about 8 to about 24 carbon atoms, x is 1 to 10, and M is a water-soluble cation such as ammonium, sodium, potassium, magnesium, triethanolamine, diethanolamine and monoethanolamine. The alkyl sulfates are typically made by the sulfation of monohydric alcohols (having from about 8 to about 24 carbon atoms) using sulfur trioxide or other known sulfation technique. The alkyl ether sulfates are typically made as condensation products of ethylene oxide and monohydric alcohols (having from about 8 to about 24 carbon atoms) and then sulfated. These alcohols can be derived from fats, e.g., coconut oil or tallow, or can be synthetic. Specific examples of alkyl sulfates which may be used in the cleansing component are sodium, ammonium, potassium, magnesium, or TEA salts of lauryl or myristyl sulfate. Examples of alkyl ether sulfates which may be used include ammonium, sodium, magnesium, or TEA laureth-3 sulfate.

Another suitable class of anionic surfactants are the sulfated monoglycerides of the form R1CO-O-CH2-C(OH)H-CH2-O-SO3M, wherein R1 is a saturated or unsaturated, branched or unbranched alkyl group from about 8 to about 24 carbon atoms, and M is a water-soluble cation such as ammonium, sodium,

potassium, magnesium, triethanolamine, diethanolamine and monoethanolamine. These are typically made by the reaction of glycerin with fatty acids (having from about 8 to about 24 carbon atoms) to form a monoglyceride and the subsequent sulfation of this monoglyceride with sulfur trioxide. An example of a sulfated monoglyceride is sodium cocomonoglyceride sulfate.

Other suitable anionic surfactants include olefin sulfonates of the form R1SO3M, wherein R1 is a mono-olefin having from about 12 to about 24 carbon atoms, and M is a water-soluble cation such as ammonium, sodium, potassium, magnesium, triethanolamine, diethanolamine and monoethanolamine. These compounds can be produced by the sulfonation of alpha olefins by means of uncomplexed sulfur trioxide, followed by neutralization of the acid reaction mixture in conditions such that any sultones which have been formed in the reaction are hydrolyzed to give the corresponding hydroxyalkanesulfonate. An example of a sulfonated olefin is sodium C14/C16 alpha olefin sulfonate.

Other suitable anionic surfactants are the linear alkylbenzene sulfonates of the form R1-C6H4-SO3M, wherein R1 is a saturated or unsaturated, branched or unbranched alkyl group from about 8 to about 24 carbon atoms, and M is a water-soluble cation such as ammonium, sodium, potassium, magnesium, triethanolamine, diethanolamine and monoethanolamine. These are formed by the sulfonation of linear alkyl benzene with sulfur trioxide. An example of this anionic surfactant is sodium dodecylbenzene sulfonate.

Still other anionic surfactants suitable for this cleansing component include the primary or secondary alkane sulfonates of the form R1SO3M, wherein R1 is a saturated or unsaturated, branched or unbranched alkyl chain from about 8 to about 24 carbon atoms, and M is a water-soluble cation such as ammonium, sodium, potassium, magnesium, triethanolamine, diethanolamine and monoethanolamine. These are commonly formed by the sulfonation of paraffins using sulfur dioxide in the presence of chlorine and ultraviolet light or another known sulfonation method. The sulfonation can occur in either the secondary or primary positions of the alkyl chain. An example of an alkane sulfonate useful herein is alkali metal or ammonium C13-C17 paraffin sulfonates.

Still other suitable anionic surfactants are the alkyl sulfosuccinates, which include disodium N-octadecylsulfosuccinamate; diammonium lauryl sulfosuccinate; tetrasodium N-(1,2-dicarboxyethyl)-N-octadecylsulfosuccinate; diamyl ester of sodium sulfosuccinic acid; dihexyl ester of sodium sulfosuccinic acid; and dioctyl esters of sodium sulfosuccinic acid.

Also useful are taurates which are based on taurine, which is also known as 2-aminoethanesulfonic acid. Examples of taurates include N-alkyltaurines such as the one prepared by reacting dodecylamine with sodium isethionate as detailed in U.S. Patent No. 2,658,072 which is incorporated herein by reference in its entirety. Other examples based of taurine include the acyl taurines formed by the reaction of n-methyl taurine with fatty acids (having from about 8 to about 24 carbon atoms).

Another class of anionic surfactants suitable for use in the cleansing component is the acyl isethionates. The acyl isethionates typically have the formula R1CO-O-CH2CH2SO3M wherein R1 is a saturated or unsaturated, branched or unbranched alkyl group having from about 10 to about 30 carbon

atoms, and M is a cation. These are typically formed by the reaction of fatty acids (having from about 8 to about 30 carbon atoms) with an alkali metal isethionate. Nonlimiting examples of these acyl isethionates include ammonium cocoyl isethionate, sodium cocoyl isethionate, sodium lauroyl isethionate, and mixtures thereof.

Still other suitable anionic surfactants are the alkylglyceryl ether sulfonates of the form R1-OCH2-C(OH)H-CH2-SO3M, wherein R1 is a saturated or unsaturated, branched or unbranched alkyl group from about 8 to about 24 carbon atoms, and M is a water-soluble cation such as ammonium, sodium, potassium, magnesium, triethanolamine, diethanolamine and monoethanolamine. These can be formed by the reaction of epichlorohydrin and sodium bisulfite with fatty alcohols (having from about 8 to about 24 carbon atoms) or other known methods. One example is sodium cocoglyceryl ether sulfonate.

Other suitable anionic surfactants include the sulfonated fatty acids of the form R1-CH(SO4)-COOH and sulfonated methyl esters of the from R1-CH(SO4)-CO-O-CH3, where R1 is a saturated or unsaturated, branched or unbranched alkyl group from about 8 to about 24 carbon atoms. These can be formed by the sulfonation of fatty acids or alkyl methyl esters (having from about 8 to about 24 carbon atoms) with sulfur trioxide or by another known sulfonation technique. Examples include alpha sulphonated coconut fatty acid and lauryl methyl ester.

Other anionic materials include phosphates such as monoalkyl, dialkyl, and trialkylphosphate salts formed by the reaction of phosphorous pentoxide with monohydric branched or unbranched alcohols having from about 8 to about 24 carbon atoms. These could also be formed by other known phosphation methods. An example from this class of surfactants is sodium mono or dilaurylphosphate.

Other anionic materials include acyl glutamates corresponding to the formula R1CO-N(COOH)-CH2CH2-CO2M wherein R1 is a saturated or unsaturated, branched or unbranched alkyl or alkenyl group of about 8 to about 24 carbon atoms, and M is a water-soluble cation. Nonlimiting examples of which include sodium lauroyl glutamate and sodium cocoyl glutamate.

Other anionic materials include alkanoyl sarcosinates corresponding to the formula R1CON(CH3)-CH2CH2-CO2M wherein R1 is a saturated or unsaturated, branched or unbranched alkyl or alkenyl group of about 10 to about 20 carbon atoms, and M is a water-soluble cation. Nonlimiting examples of which include sodium lauroyl sarcosinate, sodium cocoyl sarcosinate, and ammonium lauroyl sarcosinate.

Other anionic materials include alkyl ether carboxylates corresponding to the formula R1-(OCH2CH2)x-OCH2-CO2M wherein R1 is a saturated or unsaturated, branched or unbranched alkyl or alkenyl group of about 8 to about 24 carbon atoms, x is 1 to 10, and M is a water-soluble cation. Nonlimiting examples of which include sodium laureth carboxylate.

Other anionic materials include acyl lactylates corresponding to the formula R1CO-[O-CH(CH3)-CO]x-CO2M wherein R1 is a saturated or unsaturated, branched or unbranched alkyl or alkenyl group of about 8 to about 24 carbon atoms, x is 3, and M is a water-soluble cation. Nonlimiting examples of which include sodium cocoyl lactylate.

Other anionic materials include the carboxylates, nonlimiting examples of which include sodium lauroyl carboxylate, sodium cocoyl carboxylate, and ammonium lauroyl carboxylate. Anionic flourosurfactants can also be used.

Other anionic materials include natural soaps derived from the saponification of vegetable and/or animal fats & oils exmaples of which include sodium laurate, sodium myristate, palmitate, stearate, tallowate, cocoate.

Any counter cation, M, can be used on the anionic surfactant. Preferably, the counter cation is selected from the group consisting of sodium, potassium, ammonium, monoethanolamine, diethanolamine, and triethanolamine. More preferably, the counter cation is ammonium.

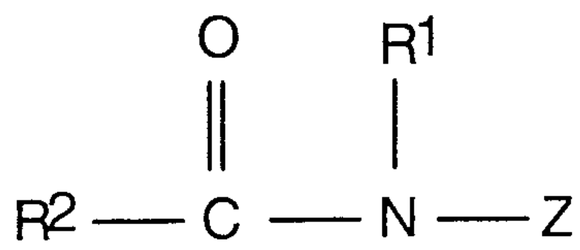
Nonionic Lathering Surfactants

Nonlimiting examples of nonionic lathering surfactants for use in the compositions of the present invention are disclosed in McCutcheon's, Detergents and Emulsifiers, North American edition (1986), published by allured Publishing Corporation; and McCutcheon's, Functional Materials, North American Edition (1992); both of which are incorporated by reference herein in their entirety.

Nonionic lathering surfactants useful herein include those selected from the group consisting of alkyl glucosides, alkyl polyglucosides, polyhydroxy fatty acid amides, alkoxylated fatty acid esters, sucrose esters, amine oxides, and mixtures thereof.

Alkyl glucosides and alkyl polyglucosides are useful herein, and can be broadly defined as condensation products of long chain alcohols, e.g., C8-30 alcohols, with sugars or starches or sugar or starch polymers, i.e., glycosides or polyglycosides. These compounds can be represented by the formula $(S)_n$-O-R wherein S is a sugar moiety such as glucose, fructose, mannose, and galactose; n is an integer of from about 1 to about 1000, and R is a C8-30 alkyl group. Examples of long chain alcohols from which the alkyl group can be derived include decyl alcohol, cetyl alcohol, stearyl alcohol, lauryl alcohol, myristyl alcohol, oleyl alcohol, and the like. Preferred examples of these surfactants include those wherein S is a glucose moiety, R is a C8-20 alkyl group, and n is an integer of from about 1 to about 9. Commercially available examples of these surfactants include decyl polyglucoside (available as APG 325 CS from Henkel) and lauryl polyglucoside (available as APG 600CS and 625 CS from Henkel). Also useful are sucrose ester surfactants such as sucrose cocoate and sucrose laurate.

Other useful nonionic surfactants include polyhydroxy fatty acid amide surfactants, more specific examples of which include glucosamides, corresponding to the structural formula:



wherein: R^1 is H, C_1-C_4 alkyl, 2-hydroxyethyl, 2-hydroxy- propyl, preferably C_1-C_4 alkyl, more preferably methyl or ethyl, most preferably methyl; R^2 is C_5-C_{31} alkyl or alkenyl, preferably C_7-C_{19} alkyl or alkenyl, more preferably C_9-C_{17} alkyl or alkenyl, most preferably C_{11}-C_{15} alkyl or alkenyl; and Z is a polhydroxyhydrocarbyl moiety having a linear hydrocarbyl chain with a least 3 hydroxyls directly connected to the chain, or an alkoxylated derivative (preferably ethoxylated or propoxylated) thereof. Z preferably is a sugar moiety selected from the group consisting of glucose, fructose, maltose, lactose, galactose, mannose, xylose, and mixtures thereof. An especially preferred surfactant corresponding to the above structure is coconut alkyl N-methyl glucoside amide (i.e., wherein the R^2CO- moiety is derived from coconut oil fatty acids). Processes for making compositions containing polyhydroxy fatty acid amides are disclosed, for example, in G.B. Patent Specification 809,060, published February 18, 1959, by Thomas Hedley & Co., Ltd.; U. S. Patent No. 2,965,576, to E.R. Wilson, issued December 20, 1960; U. S. Patent No. 2,703,798, to A.M. Schwartz, issued March 8, 1955; and U. S. Patent No. 1,985,424, to Piggott, issued December 25, 1934; each of which are incorporated herein by reference in their entirety.

Other examples of nonionic surfactants include amine oxides. Amine oxides correspond to the general formula $R_1R_2R_3N\rightarrow O$, wherein R_1 contains an alkyl, alkenyl or monohydroxy alkyl radical of from about 8 to about 18 carbon atoms, from 0 to about 10 ethylene oxide moieties, and from 0 to about 1 glyceryl moiety, and R_2 and R_3 contain from about 1 to about 3 carbon atoms and from 0 to about 1 hydroxy group, e.g., methyl, ethyl, propyl, hydroxyethyl, or hydroxypropyl radicals. The arrow in the formula is a conventional representation of a semipolar bond. Examples of amine oxides suitable for use in this invention include dimethyl-dodecylamine oxide, oleyldi(2-hydroxyethyl) amine oxide, dimethyloctylamine oxide, dimethyl-decylamine oxide, dimethyl-tetradecylamine oxide, 3,6,9-trioxaheptadecyldiethylamine oxide, di(2-hydroxyethyl)-tetradecylamine oxide, 2-dodecoxyethyldimethylamine oxide, 3-dodecoxy-2-hydroxypropyldi(3-hydroxypropyl)amine oxide, dimethylhexadecylamine oxide.

Nonlimiting examples of preferred nonionic surfactants for use herein are those selected form the group consisting of C8-C14 glucose amides, C8-C14 alkyl polyglucosides, sucrose cocoate, sucrose laurate, lauramine oxide, cocoamine oxide, and mixtures thereof.

Cationic Lathering Surfactants

Cationic lathering surfactants are also useful in the articles of the present invention. Suitable cationic lathering surfactants include, but are not limited to, fatty amines, di-fatty quaternary amines, tri-fatty quaternary amines, imidazolinium quaternary amines, and combinations thereof. Suitable fatty amines include monalkyl quaternary amines such as cetyltrimethylammonium bromide. A suitable quaternary amine is dialklamidoethyl hydroxyethylmonium methosulfate. The fatty amines, however, are preferred. It is preferred that a lather booster is used when the cationic lathering surfactant is the primary lathering

surfactant of the cleansing component. Additionally, nonionic surfactants have been found to be particularly useful in combination with such cationic lathering surfactants.

Amphoteric Lathering Surfactants

The term "amphoteric lathering surfactant," as used herein, is also intended to encompass zwitterionic surfactants, which are well known to formulators skilled in the art as a subset of amphoteric surfactants.

A wide variety of amphoteric lathering surfactants can be used in the compositions of the present invention. Particularly useful are those which are broadly described as derivatives of aliphatic secondary and tertiary amines, preferably wherein the nitrogen is in a cationic state, in which the aliphatic radicals can be straight or branched chain and wherein one of the radicals contains an ionizable water solubilizing group, e.g., carboxy, sulfonate, sulfate, phosphate, or phosphonate.

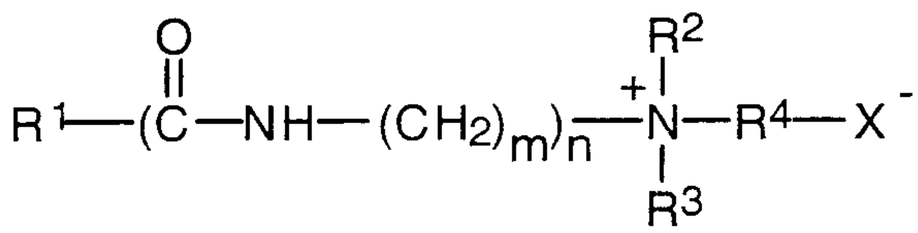
Nonlimiting examples of amphoteric surfactants useful in the compositions of the present invention are disclosed in McCutcheon's, Detergents and Emulsifiers, North American edition (1986), published by allured Publishing Corporation; and McCutcheon's, Functional Materials, North American Edition (1992); both of which are incorporated by reference herein in their entirety.

Nonlimiting examples of amphoteric or zwitterionic surfactants are those selected from the group consisting of betaines, sultaines, hydroxysultaines, alkyliminoacetates, iminodialkanoates, aminoalkanoates, and mixtures thereof.

Examples of betaines include the higher alkyl betaines, such as coco dimethyl carboxymethyl betaine, lauryl dimethyl carboxymethyl betaine, lauryl dimethyl alphacarboxyethyl betaine, cetyl dimethyl carboxymethyl betaine, cetyl dimethyl betaine (available as Lonzaine 16SP from Lonza Corp.), lauryl bis-(2-hydroxyethyl) carboxymethyl betaine, oleyl dimethyl gamma-carboxypropyl betaine, lauryl bis-(2-hydroxypropyl)alpha-carboxyethyl betaine, coco dimethyl sulfopropyl betaine, lauryl dimethyl sulfoethyl betaine, lauryl bis-(2-hydroxyethyl) sulfopropyl betaine, amidobetaines and amidosulfobetaines (wherein the $RCONH(CH_2)_3$ radical is attached to the nitrogen atom of the betaine), oleyl betaine (available as amphoteric Velvetex OLB-50 from Henkel), and cocamidopropyl betaine (available as Velvetex BK-35 and BA-35 from Henkel).

Examples of sultaines and hydroxysultaines include materials such as cocamidopropyl hydroxysultaine (available as Mirataine CBS from Rhone-Poulenc).

Preferred for use herein are amphoteric surfactants having the following structure:

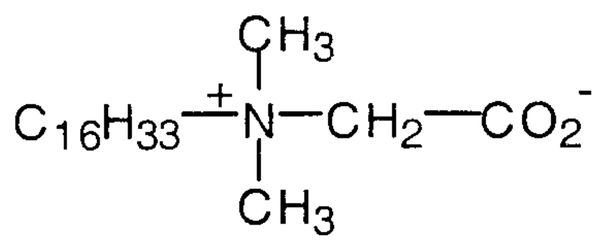


wherein R^1 is unsubstituted, saturated or unsaturated, straight or branched chain alkyl having from about 9 to about 22 carbon atoms. Preferred R^1 has from about 11 to about 18 carbon atoms; more preferably from

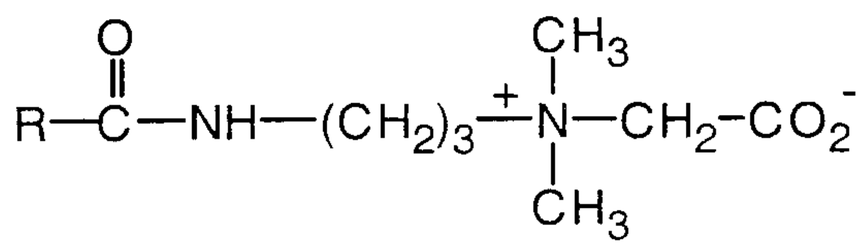
about 12 to about 18 carbon atoms; more preferably still from about 14 to about 18 carbon atoms; m is an integer from 1 to about 3, more preferably from about 2 to about 3, and more preferably about 3; n is either 0 or 1, preferably 1; R^2 and R^3 are independently selected from the group consisting of alkyl having from 1 to about 3 carbon atoms, unsubstituted or mono-substituted with hydroxy, preferred R^2 and R^3 are CH_3; X is selected from the group consisting of CO_2, SO_3 and SO_4; R^4 is selected from the group consisting of saturated or unsaturated, straight or branched chain alkyl, unsubstituted or monosubstituted with hydroxy, having from 1 to about 5 carbon atoms. When X is CO_2, R^4 preferably has 1 or 3 carbon atoms, more preferably 1 carbon atom. When X is SO_3 or SO_4, R^4 preferably has from about 2 to about 4 carbon atoms, more preferably 3 carbon atoms.

Examples of amphoteric surfactants of the present invention include the following compounds:

Cetyl dimethyl betaine (this material also has the CTFA designation cetyl betaine)

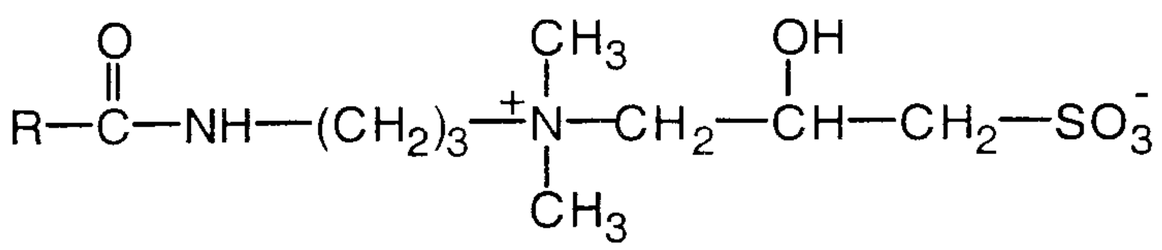


Cocamidopropylbetaine



wherein R has from about 9 to about 13 carbon atoms

Cocamidopropyl hydroxy sultaine



wherein R has from about 9 to about 13 carbon atoms,

Examples of other useful amphoteric surfactants are alkyliminoacetates, and iminodialkanoates and aminoalkanoates of the formulas $RN[CH_2)_mCO_2M]_2$ and $RNH(CH_2)_mCO_2M$ wherein m is from 1 to 4, R is a C_8-C_{22} alkyl or alkenyl, and M is H, alkali metal, alkaline earth metal ammonium, or alkanolammonium. Also included are imidazolinium and ammonium derivatives. Specific examples of suitable amphoteric surfactants include sodium 3-dodecyl-aminopropionate, sodium 3-dodecylamino-propane sulfonate, N-higher alkyl aspartic acids such as those produced according to the teaching of U. S. Patent 2,438,091 which is incorporated herein by reference in its entirety; and the products sold under the trade name "Miranol" and described in U. S. Patent 2,528,378, which is incorporated herein by reference in

its entirety. Other examples of useful amphoterics include amphoteric phosphates, such as coamidopropyl PG-dimonium chloride phosphate (commercially available as Monaquat PTC, from Mona Corp.). Also useful are amphoacetates such as disodium lauroamphodiacetate, sodium lauroamphoacetate, and mixtures thereof.

Preferred lathering surfactants are selected from the group consisting of anionic lathering surfactants selected from the group consisting of ammonium lauroyl sarcosinate, sodium trideceth sulfate, sodium lauroyl sarcosinate, ammonium laureth sulfate, sodium laureth sulfate, ammonium lauryl sulfate, sodium lauryl sulfate, ammonium cocoyl isethionate, sodium cocoyl isethionate, sodium lauroyl isethionate, sodium cetyl sulfate, sodium monolauryl phospate, sodium cocoglyceryl ether sulfonate, sodium C_9-C_{22} soap, and combinations thereof; nonionic lathering surfactants selected from the group consisting of lauramine oxide, cocoamine oxide, decyl polyglucose, lauryl polyglucose, sucrose cocoate, C12-14 glucosamides, sucrose laurate, and combinations thereof; cationic lathering surfactants selected from the group consisting of fatty amines, di-fatty quaternary amines, tri-fatty quaternary amines, imidazolinium quaternary amines, and combinations thereof; amphoteric lathering surfactants selected from the group consisting of disodium lauroamphodiacetate, sodium lauroamphoacetate, cetyl dimethyl betaine, cocoamidopropyl betaine, cocoamidopropyl hydroxy sultaine, and combinations thereof.

THERAPEUTIC BENEFIT COMPONENT

In certain embodiments of the present invention, the articles essentially comprise a therapeutic benefit component. This benefit component is disposed adjacent to the water insoluble substrate and comprises from about 10% to about 1000%, more preferably, from about 10% to about 500%, and most preferably from about 10% to about 250%, by weight of the water insoluble substrate, of a therapeutic benefit agent. Preferably, the therapeutic benefit agent is selected from the group consisting of hydrophobic conditioning agents, hydrophilic conditioning agents, structured conditioning agents, and combinations thereof.

Hydrophobic Conditioning Agents

The articles of the present invention may comprise one or more hydrophobic conditioning agents which are useful for providing a conditioning benefit to the skin or hair during the use of the article. The articles of present invention preferably comprise from about 0.5% to about 1,000%, more preferably from about 1% to about 200%, and most preferably from about 10% to about 100%, by weight of the water insoluble substrate, of a hydrophobic conditioning agent.

The hydrophobic conditioning agent may be selected from one or more hydrophobic conditioning agents such that the weighted arithmetic mean solubility parameter of the hydrophobic conditioning agent is less than or equal to 10.5. It is recognized, based on this mathematical definition of solubility parameters, that it is possible, for example, to achieve the required weighted arithmetic mean solubility parameter, i.e., less than or equal to 10.5, for a hydrophobic conditioning agent comprising two or more compounds if one of the compounds has an individual solubility parameter greater than 10.5.

Solubility parameters are well known to the formulation chemist of ordinary skill in the art and are routinely used as a guide for determining compatibility's and solubilities of materials in the formulation process.

The solubility parameter of a chemical compound, δ, is defined as the square root of the cohesive energy density for that compound. Typically, a solubility parameter for a compound is calculated from tabulated values of the additive group contributions for the heat of vaporization and molar volume of the components of that compound, using the following equation:

$$\delta = \left[\frac{\sum_i E_i}{\sum_i m_i} \right]^{1/2}$$

wherein $\sum_i E_i$ = the sum of the heat of vaporization additive group contributions, and

$\sum_i m_i$ = the sum of the molar volume additive group contributions

Standard tabulations of heat of vaporization and molar volume additive group contributions for a wide variety of atoms and groups of atoms are collected in Barton, A.F.M. Handbook of Solubility Parameters, CRC Press, Chapter 6, Table 3, pp. 64-66 (1985), which is incorporated by reference herein in its entirety. The above solubility parameter equation is described in Fedors, R.F., "A Method for Estimating Both the Solubility Parameters and Molar Volumes of Liquids", Polymer Engineering and Science, vol. 14, no. 2, pp. 147-154 (February 1974), which is incorporated by reference herein in its entirety.

Solubility parameters obey the law of mixtures such that the solubility parameter for a mixture of materials is given by the weighted arithmetic mean (i.e. the weighted average) of the solubility parameters for each component of that mixture. See, Handbook of Chemistry and Physics, 57th edition, CRC Press, p. C-726 (1976-1977), which is incorporated by reference herein in its entirety.

Formulation chemists typically report and use solubility parameters in units of $(cal/cm^3)^{1/2}$. The tabulated values of additive group contributions for heat of vaporization in the Handbook of Solubility Parameters are reported in units of kJ/mol. However, these tabulated heat of vaporization values are readily converted to cal/mol using the following well-known relationships:

1 J/mol = 0.239006 cal/mol and 1000 J = 1 kJ.

See Gordon, A.J. et al., The Chemist's Companion, John Wiley & Sons, pp. 456-463, (1972), which is incorporated by reference herein in its entirety.

Solubility parameters have also been tabulated for a wide variety of chemical materials. Tabulations of solubility parameters are found in the above-cited Handbook of Solubility Parameters. Also, see "Solubility Effects In Product, Package, Penetration, And Preservation", C.D. Vaughan, Cosmetics and Toiletries, vol. 103, October 1988, pp. 47-69, which is incorporated by reference herein in its entirety.

Nonlimiting examples of hydrophobic conditioning agents include those selected from the group consisting of mineral oil, petrolatum, lecithin, hydrogenated lecithin, lanolin, lanolin derivatives, C7-C40 branched chain hydrocarbons, C1-C30 alcohol esters of C1-C30 carboxylic acids, C1-C30 alcohol esters of C2-C30 dicarboxylic acids, monoglycerides of C1-C30 carboxylic acids, diglycerides of C1-C30 carboxylic acids, triglycerides of C1-C30 carboxylic acids, ethylene glycol monoesters of C1-C30 carboxylic acids, ethylene glycol diesters of C1-C30 carboxylic acids, propylene glycol monoesters of C1-C30 carboxylic acids, propylene glycol diesters of C1-C30 carboxylic acids, C1-C30 carboxylic acid monoesters and polyesters of sugars, polydialkylsiloxanes, polydiarylsiloxanes, polyalkarylsiloxanes, cylcomethicones having 3 to 9 silicon atoms, vegetable oils, hydrogenated vegetable oils, polypropylene glycol C4-C20 alkyl ethers, di C8-C30 alkyl ethers, and combinations thereof.

Mineral oil, which is also known as petrolatum liquid, is a mixture of liquid hydrocarbons obtained from petroleum. See The Merck Index, Tenth Edition, Entry 7048, p. 1033 (1983) and International Cosmetic Ingredient Dictionary, Fifth Edition, vol. 1, p.415-417 (1993), which are incorporated by reference herein in their entirety.

Petrolatum, which is also known as petroleum jelly, is a colloidal system of nonstraight-chain solid hydrocarbons and high-boiling liquid hydrocarbons, in which most of the liquid hydrocarbons are held inside the micelles. See The Merck Index, Tenth Edition, Entry 7047, p. 1033 (1983); Schindler, Drug. Cosmet. Ind., **89**, 36-37, 76, 78-80, 82 (1961); and International Cosmetic Ingredient Dictionary, Fifth Edition, vol. 1, p. 537 (1993), which are incorporated by reference herein in their entirety.

Lecithin is also useful as a hydrophobic conditioning agent. It is a naturally occurring mixture of the diglycerides of certain fatty acids, linked to the choline ester of phosphoric acid.

Straight and branched chain hydrocarbons having from about 7 to about 40 carbon atoms are useful herein. Nonlimiting examples of these hydrocarbon materials include dodecane, isododecane, squalane, cholesterol, hydrogenated polyisobutylene, docosane (i.e. a C_{22} hydrocarbon), hexadecane, isohexadecane (a commercially available hydrocarbon sold as Permethyl® 101A by Presperse, South Plainfield, NJ). Also useful are the C7-C40 isoparaffins, which are C7-C40 branched hydrocarbons. Polydecene, a branched liquid hydrocarbon, is also useful herein and is commercially available under the tradenames Puresyn 100® and Puresyn 3000® from Mobile Chemical (Edison, NJ).

Also useful are C1-C30 alcohol esters of C1-C30 carboxylic acids and of C2-C30 dicarboxylic acids, including straight and branched chain materials as well as aromatic derivatives. Also useful are esters such as monoglycerides of C1-C30 carboxylic acids, diglycerides of C1-C30 carboxylic acids, triglycerides

of C1-C30 carboxylic acids, ethylene glycol monoesters of C1-C30 carboxylic acids, ethylene glycol diesters of C1-C30 carboxylic acids, propylene glycol monoesters of C1-C30 carboxylic acids, and propylene glycol diesters of C1-C30 carboxylic acids. Straight chain, branched chain and aryl carboxylic acids are included herein. Also useful are propoxylated and ethoxylated derivatives of these materials. Nonlimiting examples include diisopropyl sebacate, diisopropyl adipate, isopropyl myristate, isopropyl palmitate, myristyl propionate, ethylene glycol distearate, 2-ethylhexyl palmitate, isodecyl neopentanoate, di-2-ethylhexyl maleate, cetyl palmitate, myristyl myristate, stearyl stearate, cetyl stearate, behenyl behenrate, dioctyl maleate, dioctyl sebacate, diisopropyl adipate, cetyl octanoate, diisopropyl dilinoleate, carpylic/capric triglyceride, PEG-6 caprylic/capric triglyceride, PEG-8 caprylic/capric triglyceride, and combinations thereof.

Also useful are various C1-C30 monoesters and polyesters of sugars and related materials. These esters are derived from a sugar or polyol moiety and one or more carboxylic acid moieties. Depending on the constituent acid and sugar, these esters can be in either liquid or solid form at room temperature. Examples of liquid esters include: glucose tetraoleate, the glucose tetraesters of soybean oil fatty acids (unsaturated), the mannose tetraesters of mixed soybean oil fatty acids, the galactose tetraesters of oleic acid, the arabinose tetraesters of linoleic acid, xylose tetralinoleate, galactose pentaoleate, sorbitol tetraoleate, the sorbitol hexaesters of unsaturated soybean oil fatty acids, xylitol pentaoleate, sucrose tetraoleate, sucrose pentaoletate, sucrose hexaoleate, sucrose hepatoleate, sucrose octaoleate, and mixtures thereof. Examples of solid esters include: sorbitol hexaester in which the carboxylic acid ester moieties are palmitoleate and arachidate in a 1:2 molar ratio; the octaester of raffinose in which the carboxylic acid ester moieties are linoleate and behenate in a 1:3 molar ratio; the heptaester of maltose wherein the esterifying carboxylic acid moieties are sunflower seed oil fatty acids and lignocerate in a 3:4 molar ratio; the octaester of sucrose wherein the esterifying carboxylic acid moieties are oleate and behenate in a 2:6 molar ratio; and the octaester of sucrose wherein the esterifying carboxylic acid moieties are laurate, linoleate and behenate in a 1:3:4 molar ratio. A preferred solid material is sucrose polyester in which the degree of esterification is 7-8, and in which the fatty acid moieties are C18 mono- and/or di-unsaturated and behenic, in a molar ratio of unsaturates: behenic of 1:7 to 3:5. A particularly preferred solid sugar polyester is the octaester of sucrose in which there are about 7 behenic fatty acid moieties and about 1 oleic acid moiety in the molecule. Other materials include cottonseed oil or soybean oil fatty acid esters of sucrose. The ester materials are further described in, U. S. Patent No. 2,831,854, U. S. Patent No. 4,005,196, to Jandacek, issued January 25, 1977; U. S. Patent No. 4,005,195, to Jandacek, issued January 25, 1977, U. S. Patent No. 5,306,516, to Letton et al., issued April 26, 1994; U. S. Patent No. 5,306,515, to Letton et al., issued April 26, 1994; U. S. Patent No. 5,305,514, to Letton et al., issued April 26, 1994; U. S. Patent No. 4,797,300, to Jandacek et al., issued January 10, 1989; U. S. Patent No. 3,963,699, to Rizzi et al, issued June 15, 1976; U. S. Patent No. 4,518,772, to Volpenhein, issued May 21, 1985; and U. S. Patent No. 4,517,360, to Volpenhein, issued May 21, 1985; each of which is incorporated by reference herein in its entirety.

Nonvolatile silicones such as polydialkylsiloxanes, polydiarylsiloxanes, and polyalkarylsiloxanes are also useful oils. These silicones are disclosed in U. S. Patent No. 5,069,897, to Orr, issued December 3, 1991, which is incorporated by reference herein in its entirety. The polyalkylsiloxanes correspond to the general chemical formula $R_3SiO[R_2SiO]_xSiR_3$ wherein R is an alkyl group (preferably R is methyl or ethyl, more preferably methyl) and x is an integer up to about 500, chosen to achieve the desired molecular weight. Commercially available polyalkylsiloxanes include the polydimethylsiloxanes, which are also known as dimethicones, nonlimiting examples of which include the Vicasil® series sold by General Electric Company and the Dow Corning® 200 series sold by Dow Corning Corporation. Specific examples of polydimethylsiloxanes useful herein include Dow Corning® 225 fluid having a viscosity of 10 centistokes and a boiling point greater than 200°C, and Dow Corning® 200 fluids having viscosities of 50, 350, and 12,500 centistokes, respectively, and boiling points greater than 200°C. Also useful are materials such as trimethylsiloxysilicate, which is a polymeric material corresponding to the general chemical formula $[(CH_2)_3SiO_{1/2}]_x[SiO_2]y$, wherein x is an integer from about 1 to about 500 and y is an integer from about 1 to about 500. A commercially available trimethylsiloxysilicate is sold as a mixture with dimethicone as Dow Corning® 593 fluid. Also useful herein are dimethiconols, which are hydroxy terminated dimethyl silicones. These materials can be represented by the general chemical formulas $R_3SiO[R_2SiO]_xSiR_2OH$ and $HOR_2SiO[R_2SiO]_xSiR_2OH$ wherein R is an alkyl group (preferably R is methyl or ethyl, more preferably methyl) and x is an integer up to about 500, chosen to achieve the desired molecular weight. Commercially available dimethiconols are typically sold as mixtures with dimethicone or cyclomethicone (e.g. Dow Corning® 1401, 1402, and 1403 fluids). Also useful herein are polyalkylaryl siloxanes, with polymethylphenyl siloxanes having viscosities from about 15 to about 65 centistokes at 25°C being preferred. These materials are available, for example, as SF 1075 methylphenyl fluid (sold by General Electric Company) and 556 Cosmetic Grade phenyl trimethicone fluid (sold by Dow Corning Corporation). Alkylated silicones such as methyldecyl silicone and methyloctyl silicone are useful herein and are commercially available from General Electric Company. Also useful herein are alkyl modified siloxanes such as alkyl methicones and alkyl dimethicones wherein the alkyl chain contains 10 to 50 carbons. Such siloxanes are commercially available under the tradenames ABIL WAX 9810 (C_{24}-C_{28} alkyl methicone) (sold by Goldschmidt) and SF1632 (cetearyl methicone)(sold by General Electric Company).

Vegetable oils and hydrogenated vegetable oils are also useful herein. Examples of vegetable oils and hydrogenated vegetable oils include safflower oil, castor oil, coconut oil, cottonseed oil, menhaden oil, palm kernel oil, palm oil, peanut oil, soybean oil, rapeseed oil, linseed oil, rice bran oil, pine oil, sesame oil, sunflower seed oil, hydrogenated safflower oil, hydrogenated castor oil, hydrogenated coconut oil, hydrogenated cottonseed oil, hydrogenated menhaden oil, hydrogenated palm kernel oil, hydrogenated palm oil, hydrogenated peanut oil, hydrogenated soybean oil, hydrogenated rapeseed oil, hydrogenated linseed

oil, hydrogenated rice bran oil, hydrogenated sesame oil, hydrogenated sunflower seed oil, and mixtures thereof.

Also useful are C4-C20 alkyl ethers of polypropylene glycols, C1-C20 carboxylic acid esters of polypropylene glycols, and di-C8-C30 alkyl ethers. Nonlimiting examples of these materials include PPG-14 butyl ether, PPG-15 stearyl ether, dioctyl ether, dodecyl octyl ether, and mixtures thereof.

Hydrophobic chelating agents are also useful herein as hydrophobic conditioning agents. Suitable agents are described in U. S. Patent No. 4,387,244, issued to Scanlon et al. on June 7, 1983, and copending U. S. Patent Application Serial Nos. 09/258,747 and 09/259,485, filed in the names of Schwartz et al. on February 26, 1999.

Hydrophilic Conditioning Agents

The articles of the present invention may optionally comprise one or more hydrophilic conditioning agents. Nonlimiting examples of hydrophilic conditioning agents include those selected from the group consisting of polyhydric alcohols, polypropylene glycols, polyethylene glycols, ureas, pyrolidone carboxylic acids, ethoxylated and/or propoxylated C3-C6 diols and triols, alpha-hydroxy C2-C6 carboxylic acids, ethoxylated and/or propoxylated sugars, polyacrylic acid copolymers, sugars having up to about 12 carbons atoms, sugar alcohols having up to about 12 carbon atoms, and mixtures thereof. Specific examples of useful hydrophilic conditioning agents include materials such as urea; guanidine; glycolic acid and glycolate salts (e.g., ammonium and quaternary alkyl ammonium); lactic acid and lactate salts (e.g., ammonium and quaternary alkyl ammonium); sucrose, fructose, glucose, eruthrose, erythritol, sorbitol, mannitol, glycerol, hexanetriol, propylene glycol, butylene glycol, hexylene glycol, and the like; polyethylene glycols such as PEG-2, PEG-3, PEG-30, PEG-50, polypropylene glycols such as PPG-9, PPG-12, PPG-15, PPG-17, PPG-20, PPG-26, PPG-30, PPG-34; alkoxylated glucose; hyaluronic acid; cationic skin conditioning polymers (e.g., quaternary ammonium polymers such as Polyquaternium polymers); and mixtures thereof. Glycerol, in particular, is a preferred hydrophilic conditioning agent in the articles of the present invention. Also useful are materials such as aloe vera in any of its variety of forms (e.g., aloe vera gel), chitosan and chitosan derivatives, e.g., chitosan lactate, lactamide monoethanolamine; acetamide monoethanolamine; and mixtures thereof. Also useful are propoxylated glycerols as described in propoxylated glycerols described in U. S. Patent No. 4,976,953, to Orr et al., issued December 11, 1990, which is incorporated by reference herein in its entirety.

The therapeutic benefit component may be made into a variety of forms. In one embodiment of the present invention, the therapeutic benefit component is in the form of an emulsion. For instance, oil-in-water, water-in-oil, water-in-oil-in-water, and oil-in-water-in-silicone emulsions are useful herein. As used in the context of emulsions, "water" may refer not only to water but also water soluble or water miscible agents like glycerin.

Preferred therapeutic benefit components comprise an emulsion, which further comprises an aqueous phase and an oil phase. As will be understood by the skilled artisan, a given component will distribute primarily into either the aqueous or oil phase, depending on the water solubility/dispersibility of

the therapeutic benefit agent in the component. In one embodiment, the oil phase comprises one or more hydrophobic conditioning agents. In another embodiment, the aqueous phase comprises one or more hydrophilic conditioning agents.

Therapeutic benefit components of the present invention, which are emulsion form, generally contain an aqueous phase and an oil or lipid phase. Suitable oils or lipids may be derived from animals, plants, or petroleum and may be natural or synthetic (i.e., man-made). Such oils are discussed above in the Hydrophobic Conditioning Agents section. Suitable aqueous phase components include the Hydrophilic Conditioning Agents, which are discussed above. Preferred emulsion forms include water-in-oil emulsions, water-in-silicone emulsions, and other inverse emulsions. Additionally, preferred emulsions also contain a hydrophilic conditioning agent such as glycerin such that a glycerin-in-oil emulsion results.

Therapeutic benefit components in emulsion form will preferably further contain from about 1% to about 10%, more preferably from about 2% to about 5%, of an emulsifier, based on the weight of therapeutic benefit component. Emulsifiers may be nonionic, anionic or cationic. Suitable emulsifiers are disclosed in, for example, U.S. Patent 3,755,560, issued August 28, 1973, Dickert et al.; U.S. Patent 4,421,769, issued December 20, 1983, Dixon et al.; and McCutcheon's Detergents and Emulsifiers, North American Edition, pages 317-324 (1986). Therapeutic benefit components in emulsion form may also contain an anti-foaming agent to minimize foaming upon application to the skin. Anti-foaming agents include high molecular weight silicones and other materials well known in the art for such use.

The therapeutic benefit component may also be in the form of a microemulsion. As used herein, "microemulsion" refers to thermodynamic stable mixtures of two immiscible solvents (one apolar and the other polar) stabilized by an amphiphilic molecule, a surfactant. Preferred microemulsions include water-in-oil microemulsions.

Structured Conditioning Agents

The therapeutic benefit component may comprise structured conditioning agents. Suitable structured conditioning agents include, but are not limited to, vesicular structures such as ceramides, liposomes, and the like.

In another embodiment, the therapeutic benefit agents of the benefit component are comprised within a coacervate-forming composition. Preferably, the coacervate-forming composition comprises a cationic polymer, an anionic surfactant, and a dermatologically acceptable carrier for the polymer and surfactant. The cationic polymer may be selected from the group consisting of natural backbone quaternary ammonium polymers, synthetic backbone quaternary ammonium polymers, natural backbone amphoteric type polymers, synthetic backbone amphoteric type polymers, and combinations thereof.

More preferably, the cationic polymer is selected from the group consisting of natural backbone quaternary ammonium polymers selected from the group consisting of Polyquaternium-4, Polyquaternium-10, Polyquaternium-24, PG-hydroxyethylcellulose alkyldimonium chlorides, guar hydroxypropyltrimonium chloride, hydroxypropylguar hydroxypropyltrimonium chloride, and combinations thereof; synthetic backbone quaternary ammonium polymers selected from the group consisting of Polyquaternium-2,

Polyquaternium-6, Polyquaternium-7, Polyquaternium-11, Polyquaternium-16, Polyquaternium-17, Polyquaternium-18, Polyquaternium-28, Polyquaternium-32, Polyquaternium-37, Polyquaternium-43, Polyquaternium-44, Polyquaternium-46, polymethacylamidopropyl trimonium chloride, acrylamidopropyl trimonium chloride/acrylamide copolymer, and combinations thereof; natural backbone amphoteric type polymers selected from the group consisting of chitosan, quaternized proteins, hydrolyzed proteins, and combinations thereof; synthetic backbone amphoteric type polymers selected from the group consisting of Polyquaternium-22, Polyquaternium-39, Polyquaternium-47, adipic acid/dimethylaminohydroxypropyl diethylenetriamine copolymer, polyvinylpyrrolidone/dimethylyaminoethyl methacyrlate copolymer, vinylcaprolactam/ polyvinylpyrrolidone/dimethylaminoethylmethacrylate copolymer, vinaylcaprolactam/ polyvinylpyrrolidone/dimethylaminopropylmethacrylamide terpolymer, polyvinylpyrrolidone/dimethylaminopropylmethacrylamide copolymer, polyamine, and combinations thereof; and combinations thereof. Even more preferably, the cationic polymer is a synthetic backbone amphoteric type polymer. Even still more preferably, the cationic polymer is a polyamine.

When the cationic polymer is a polyamine, it is preferred that the cationic polyamine polymer be selected from the group consisting of polyethyleneimines, polyvinylamines, polypropyleneimines, polylysines and combinations thereof. Even more preferably, the cationic polyamine polymer is a polyethyleneimine.

In certain embodiments in which the cationic polymer is a polyamine, the polyamine may be hydrophobically or hydrophilically modified. In this instance, the cationic polyamine polymer is selected from the group consisting of benzylated polyamines, ethoxylated polyamines, propoxylated polyamines, alkylated polyamines, amidated polyamines, esterified polyamines and combinations thereof. The coacervate-forming composition comprises from about 0.01% to about 20%, more preferably from about 0.05% to about 10%, and most preferably from about 0.1% to about 5%, by weight of the coacervate-forming composition, of the cationic polymer.

Suitable anionic surfactants include those discussed above as related to the "cleansing component." Preferably, for the coacervate-forming composition, the anionic surfactant is selected from the group consisting of sarcosinates, glutamates, sodium alkyl sulfates, ammonium alkyl sulfates, sodium alkyleth sulfates, ammonium alkyleth sulfates, ammonium laureth-n-sulfates, sodium laureth-n-sulfates, isethionates, glycerylether sulfonates, sulfosuccinates and combinations thereof. More preferably, the anionic surfactant is selected from the group consisting of sodium lauroyl sarcosinate, monosodium lauroyl glutamate, sodium alkyl sulfates, ammonium alkyl sulfates, sodium alkyleth sulfates, ammonium alkyleth sulfates, and combinations thereof.

Suitable coacervate-forming compositions are further described in copending U. S. patent applications Serial Nos. 09/397,747, filed in the name of Schwartz et al.; 09/397,746, filed in the name of Heinrich et al.; 09/397,712, filed in the name of Schwartz et al.; 09/397,723, filed in the name of Heinrich et al.; and 09/397,722, filed in the name of Venkitaraman et al.; each of which were filed on September 16, 1999.

Alternatively, the coacervate-forming composition may comprise an anionic polymer, a cationic surfactant, and a dermatologically acceptable carrier for the polymer and surfactant. The anionic polymer may be selected from the group consisting of polyacrylic acid polymers, polyacrylamide polymers, copolymers of acrylic acid, acrylamide, and other natural or synthetic polymers (e.g., polystyrene, polybutene, polyurethane, etc.), naturally derived gums, and combinations thereof. Suitable gums include alginates (e.g., propylene glycol alginate), pectins, chitosans (e.g., chitosan lactate), and modified gums (e.g., starch octenyl succinate), and combinations thereof. More preferably, the anionic polymer is selected from the group consisting of polyacrylic acid polymers, polyacrylamide polymers, pectins, chitosans, and combinations thereof. Preferred articles of the present invention comprise from about 0.01% to about 20%, more preferably from about 0.05% to about 10%, and most preferably from about 0.1% to about 5%, by weight of the coacervate-forming composition, of the anionic polymer. Suitable cationic surfactants include, but are not limited to, those discussed herein.

The therapeutic benefit component of the article is suitable for providing therapeutic or aesthetic skin or hair benefits by deposition onto such surfaces of not only conditioning agents but also various agents including, but not limited to, anti-acne actives, anti-wrinkle actives, anti-microbial actives, anti-fungal actives, anti-inflammatory actives, topical anesthetic actives, artificial tanning agents and accelerators, anti-viral agents, enzymes, sunscreen actives, anti-oxidants, skin exfoliating agents, and combinations thereof.

It should also be understood that the therapeutic benefit component may be contained within the cleansing component of the present invention or vice versa such that they form a unitary component with indistinguishable ingredients.

Surface to Saturation Ratio Methodology

The articles of the present invention have the therapeutic benefit component substantially on the surface of the substrate. By "substantially on the surface of the substrate" is meant that the surface to saturation ratio is greater than about 1.25, preferably greater than about 1.5, more preferably greater than about 2.0, even more preferably greater than about 2.25, and most preferably greater than 2.5. The surface to saturation ratio is a ratio of the measurement of benefit agent on the surface of the substrate. These measurements are obtained from Attenuated Total Reflectance (ATR) FT-IR Spectroscopy the use of which is well known to one skilled in the art of analytical chemistry.

Many conventional methods of application of conditioning agents to substrates employ processes and/or product rheologies unsuitable for the purposes of the present invention. For example, a process to dip the substrate web in a fluid bath of conditioning agent and then squeeze the substrate web through metering rolls, so called "dip and nip" processing, applies conditioning agent through the entire substrate and therefore does not afford opportunity for effective direct transfer of the composition off the cloth and onto another surface during use. Furthermore, many of the articles of the present invention utilize sufficient loadings of conditioning agent onto substrates to provide an effective whole body benefit, usually requiring about 100-200% loading rates based on the weight of the dry substrate. Known personal care implements

that use these high loading levels essentially avoid dealing with aesthetic issues that can result from these high loadings by distributing the loading evenly throughout the substrate, including the substrate interior. Applicants have surprisingly found that high loadings of conditioning agent can be maintained on the surface of the article, thus advantageously affording opportunity for direct transfer of the benefit agents from the substrate to the surface to be treated during use, while delivering improved aesthetics by the compositions of the present invention.

The procedure to obtain the measurements is as follows:

Instrumental Setup: A BioRad FTS-7 spectrometer, manufactured by Bio Rad Labs, Digital Laboratory Division, located in Cambridge, MA, is used to collect the infrared spectra. Typically, the measurements consist of 100 scans at 4 cm^{-1} resolution. The collection optics consist of a flat 60 deg ZnSe ATR crystal, manufactured by Graseby Specac, Inc., located in Fairfield, CT. Data is collected at 25°C and analyzed using Grams 386 software, distributed by Galactic Industries Corp., located in Salem, NH. Prior to measurement the crystal is cleaned with a suitable solvent. The sample is placed onto the ATR crystal and held under constant 4 kilogram weight.

Experimental Procedure:

(1) Measure the reference (background) spectrum of the cleaned, air dried cell.

(2) First, select a substrate with no benefit agents applied to it, the substrate selected comprising the external surface of the article. Place substrate on top of the ATR crystal., external surface against the crystal. First lay the substrate flat on the measuring platform. Then place a 4 kg. weight on top of the substrate. Then, measure the spectrum (typically 100 scans at 4 cm^{-1} resolution). The substrate acts as an internal standard because the absorbancy of the substrate alone is thus identified. Identify the main substrate peaks and wavenumbers.

(3) Repeat the procedure for the substrate of the article with benefit agent applied to it. Identify the primary benefit agent's peak heights, which are the highest observed peaks that either do not correspond to a substrate peak as observed previously; or which may correspond to a previously observed substrate peak but which exhibit the greatest percentage increase in absorbance due to presence of the conditioning agent. Record the wavenumber and absorbance of several benefit agent peaks.

(4) Select the substrate peak from the spectra determined in step 3 which occurs at a wavenumber determined in step 2, but which does not correspond to one of the primary benefit agent peaks selected in step 3. Record the wavenumber selected and the absorbance from the absorbance spectrum in step 3.

(5) Calculate the ratio of each benefit agent's peak height determined in step 3 to the substrate's peak height determined in step 4. The highest number of the group represents the surface to saturation ratio for the article.

The following contain some examples:

Substrate*	Substrate Peak and Peak Ht.	Conditioner	Conditioner Peak Ht.	Ratio
Batting (blend of polyester heat bonded with 70% PET/PE bicomponent fiber)	0.0865 (C=O Peak at 1710 cm^{-1})	Glycerin (C-O Peak at 1030 cm^{-1})	0.181	2.09
Batting (blend of polyester heat bonded with 70% PET/PE bicomponent fiber)	0.0865 (C=O Peak at 1710 cm^{-1})	Hydrocarbon (C-H Peak at 2923 cm^{-1})	0.160	1.85
70% Rayon/30% Polyester, hydroentangled	0.0333 (C=O Peak at 1710 cm^{-1})	Glycerin (C-O Peak at 1030 cm^{-1})	0.0684	2.05

*Substrates of these types are readily available, for example from PGI Nonwovens, Benson, NC

Moisture Retention Methodology

As described above, the articles of the present invention are considered to be "substantially dry". As used herein, "substantially dry" means that the articles of the present invention exhibit a Moisture Retention of less than about 0.95 gms, preferably less than about 0.75 gms, even more preferably, less than about 0.5 gms, even more preferably less than about 0.25 gms, even still more preferably less than about 0.15 gms, and most preferably, less than about 0.1 gms. The Moisture Retention is indicative of the dry feel that users perceive upon touching the articles of the present invention as opposed to the feel of "wet" wipes.

In order to determine the Moisture Retention of the present articles and other disposable substrate-based products, the following equipment and materials are needed.

Bounty White Paper Towel	Procter & Gamble SKU 37000 63037 Basis Weight = 42.14gsm
Balance	Accurate to 0.0g
Lexan	0.5" thickness large enough to cover samples completely and weighs 1000g
Weight	A 2000g weight or combination to equal 2000g

Next, weigh two paper towels separately and record each weight. Place one paper towel on flat surface (e.g. lab bench). Place the sample article on top of that towel. Place the other paper towel on top of sample article. Next, place the Lexan and then the 2000g weight(s) on top of the sandwiched sample article. Wait 1 minute. After the minute, remove weight(s) and Lexan. Weigh the top and bottom paper towel and record the weight.

Calculate the Moisture Retention by subtracting the initial paper towel weight from the final weight (after 1 minute) for both the top and bottom paper towels. Add the weight differences obtained for the top and bottom paper towels. Assuming multiple articles are tested, average the total weight differences to obtain the Moisture Retention.

MULTIPLE ARTICLE EMBODIMENT

The articles of the present invention may also be packaged individually or with additional articles suitable for providing separate benefits not provided by the primary article, e.g., aesthetic, therapeutic, functional, or otherwise, thereby forming a personal care kit. The additional article of this personal care kit preferably comprises a water insoluble substrate comprising at least one layer and either a cleansing component containing a lathering surfactant or a therapeutic benefit component disposed onto or impregnated into that layer of the substrate of the additional article.

The additional article of the present invention may also serve a functional benefit in addition to or in lieu of a therapeutic or aesthetic benefit. For instance, the additional article may be useful as a drying implement suitable for use to aid in the removal of water from the skin or hair upon completion of a showering or bathing experience.

MULTIPLE CHAMBERED EMBODIMENT

The articles of the present invention may also comprise one or more chambers. Such chambers or compartments result from the connection (e.g., bonding) of the substrate layers to one another at various loci to define enclosed areas. These chambers are useful, e.g., for separating various article components from one another, e.g., the surfactant-containing cleansing component from a conditioning agent. The separated article components which provide a therapeutic or aesthetic or cleansing benefit may be released from the chambers in a variety of ways including, but not limited to, solubilization, emulsification, mechanical transfer, puncturing, popping, bursting, squeezing of the chamber or even peeling away a substrate layer which composes a portion of the chamber.

OPTIONAL COMPONENTS

The articles of the present invention may contain a variety of other components such as are conventionally used in a given product type provided that they do not unacceptably alter the benefits of the invention. These optional components should be suitable for application to human skin and hair, that is, when incorporated into the article they are suitable for use in contact with human skin without undue toxicity, incompatibility, instability, allergic response, and the like, within the scope of sound medical or formulator's judgment. The *CTFA Cosmetic Ingredient Handbook*, Second Edition (1992) describes a wide variety of nonlimiting cosmetic and pharmaceutical ingredients commonly used in the skin care industry, which are suitable for use in the articles of the present invention. Examples of these ingredient classes include: enzymes, abrasives, skin exfoliating agents, absorbents, aesthetic components such as fragrances, pigments, colorings/colorants, essential oils, skin sensates, astringents, etc. (e.g., clove oil, menthol, camphor, eucalyptus oil, eugenol, menthyl lactate, witch hazel distillate), anti-acne agents (e.g., resorcinol, sulfur, salicylic acid, erythromycin, zinc, etc.), anti-caking agents, antifoaming agents, additional

antimicrobial agents (e.g., iodopropyl butylcarbamate), antioxidants, binders, biological additives, buffering agents, bulking agents, chelating agents, chemical additives, colorants, cosmetic astringents, cosmetic biocides, denaturants, drug astringents, external analgesics, film formers or materials, e.g., polymers, for aiding the film-forming properties and substantivity of the composition (e.g., copolymer of eicosene and vinyl pyrrolidone), humectants, opacifying agents, pH adjusters, propellants, reducing agents, sequestrants, skin bleaching agents (or lightening agents) (e.g., hydroquinone, kojic acid, ascorbic acid, magnesium ascorbyl phosphate, ascorbyl glucosamine), skin soothing and/or healing agents (e.g., panthenol and derivatives (e.g., ethyl panthenol), aloe vera, pantothenic acid and its derivatives, allantoin, bisabolol, and dipotassium glycyrrhizinate), skin treating agents, including agents for preventing, retarding, arresting, and/or reversing skin wrinkles (e.g., alpha-hydroxy acids such as lactic acid and glycolic acid and beta-hydroxy acids such as salicylic acid), thickeners, hydrocolloids, particular zeolites, and vitamins and derivatives thereof (e.g. tocopherol, tocopherol acetate, beta carotene, retinoic acid, retinol, retinoids, retinyl palmitate, niacin, niacinamide, and the like). The articles of the present invention may include carrier components such as are known in the art. Such carriers can include one or more compatible liquid or solid filler diluents or vehicles which are suitable for application to skin or hair.

The articles of the present invention may optionally contain one or more of such optional components. Preferred articles optionally contain a safe and effective amount of therapeutic benefit component comprising a therapeutic benefit agent selected from the group consisting of vitamin compounds, skin treating agents, anti-acne actives, anti-wrinkle actives, anti-skin atrophy actives, anti-inflammatory actives, topical anesthetics, artificial tanning actives and accelerators, anti-microbial actives, anti-fungal actives, sunscreen actives, anti-oxidants, skin exfoliating agents, and combinations thereof. As used herein, "a safe and effective amount" means an amount of a compound or component sufficient to significantly induce a positive effect or benefit, but low enough to avoid serious side effects, (e.g., undue toxicity or allergic reaction), i.e., to provide a reasonable benefit to risk ratio, within the scope of sound medical judgment.

The optional components useful herein can be categorized by their therapeutic or aesthetic benefit or their postulated mode of action. However, it is to be understood that the optional components useful herein can in some instances provide more than one therapeutic or aesthetic benefit or operate via more than one mode of action. Therefore, classifications herein are made for the sake of convenience and are not intended to limit the component to that particular application or applications listed. Also, when applicable, the pharmaceutically-acceptable salts of the components are useful herein.

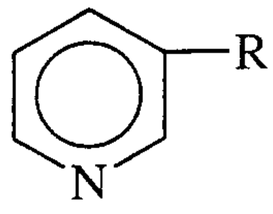
Vitamin Compounds

The present articles may comprise vitamin compounds, precursors, and derivatives thereof. These vitamin compounds may be in either natural or synthetic form. Suitable vitamin compounds include, but are not limited to, Vitamin A (e.g., beta carotene, retinoic acid, retinol, retinoids, retinyl palmitate, retinyl proprionate, etc.), Vitamin B (e.g., niacin, niacinamide, riboflavin, pantothenic acid, etc.), Vitamin C (e.g.,

ascorbic acid, etc.), Vitamin D (e.g., ergosterol, ergocalciferol, cholecalciferol, etc.), Vitamin E (e.g., tocopherol acetate, etc.), and Vitamin K (e.g., phytonadione, menadione, phthiocol, etc.) compounds.

In particular, the articles of the present invention may comprise a safe and effective amount of a vitamin B_3 compound. Vitamin B_3 compounds are particularly useful for regulating skin condition as described in co-pending U. S. Application Serial No. 08/834,010, filed April 11, 1997 (corresponding to international publication WO 97/39733 A1, published October 30, 1997) which is incorporated by reference herein in its entirety. The therapeutic component of the present invention preferably comprise from about 0.01% to about 50%, more preferably from about 0.1% to about 10%, even more preferably from about 0.5% to about 10%, and still more preferably from about 1% to about 5%, most preferably from about 2% to about 5%, of the vitamin B_3 compound.

As used herein, "vitamin B_3 compound" means a compound having the formula:



wherein R is - $CONH_2$ (i.e., niacinamide), - COOH (i.e., nicotinic acid) or - CH_2OH (i.e., nicotinyl alcohol); derivatives thereof; and salts of any of the foregoing.

Exemplary derivatives of the foregoing vitamin B_3 compounds include nicotinic acid esters, including non-vasodilating esters of nicotinic acid, nicotinyl amino acids, nicotinyl alcohol esters of carboxylic acids, nicotinic acid N-oxide and niacinamide N-oxide.

Examples of suitable vitamin B_3 compounds are well known in the art and are commercially available from a number of sources, e.g., the Sigma Chemical Company (St. Louis, MO); ICN Biomedicals, Inc. (Irvin, CA) and Aldrich Chemical Company (Milwaukee, WI).

The vitamin compounds may be included as the substantially pure material, or as an extract obtained by suitable physical and/or chemical isolation from natural (e.g., plant) sources.

Skin Treating Agents

The articles of the present invention may contain one or more skin treating agents. Suitable skin treating agents include those effective for preventing, retarding, arresting, and/or reversing skin wrinkles. Examples of suitable skin treating agents include, but are not limited to, alpha-hydroxy acids such as lactic acid and glycolic acid and beta-hydroxy acids such as salicylic acid.

Anti-Acne Actives

Examples of useful anti-acne actives for the articles of the present invention include, but are not limited to, the keratolytics such as salicylic acid (o-hydroxybenzoic acid), derivatives of salicylic acid such as 5-octanoyl salicylic acid, and resorcinol; retinoids such as retinoic acid and its derivatives (e.g., cis and trans); sulfur-containing D and L amino acids and their derivatives and salts, particularly their N-acetyl derivatives, a preferred example of which is N-acetyl-L-cysteine; lipoic acid; antibiotics and antimicrobials such as benzoyl peroxide, octopirox, tetracycline, 2,4,4'-trichloro-2'-hydroxy diphenyl ether, 3,4,4'-trichlorobanilide, azelaic acid and its derivatives, phenoxyethanol, phenoxypropanol, phenoxyisopropanol,

ethyl acetate, clindamycin and meclocycline; sebostats such as flavonoids; and bile salts such as scymnol sulfate and its derivatives, deoxycholate, and cholate.

Anti-Wrinkle and Anti-Skin Atrophy Actives

Examples of anti-wrinkle and anti-skin atrophy actives useful for the articles of the present invention include, but are not limited to, retinoic acid and its derivatives (e.g., cis and trans); retinol; retinyl esters; niacinamide, salicylic acid and derivatives thereof; sulfur-containing D and L amino acids and their derivatives and salts, particularly the N-acetyl derivatives, a preferred example of which is N-acetyl-L-cysteine; thiols, e.g., ethane thiol; hydroxy acids, phytic acid, lipoic acid; lysophosphatidic acid, and skin peel agents (e.g., phenol and the like).

Non-Steroidal Anti-Inflammatory Actives (NSAIDS)

Examples of NSAIDS useful for the articles of the present invention include, but are not limited to, the following categories: propionic acid derivatives; acetic acid derivatives; fenamic acid derivatives; biphenylcarboxylic acid derivatives; and oxicams. All of these NSAIDS are fully described in U. S. Patent 4,985,459 to Sunshine et al., issued January 15, 1991, incorporated by reference herein in its entirety. Examples of useful NSAIDS include acetyl salicylic acid, ibuprofen, naproxen, benoxaprofen, flurbiprofen, fenoprofen, fenbufen, ketoprofen, indoprofen, pirprofen, carprofen, oxaprozin, pranoprofen, miroprofen, tioxaprofen, suprofen, alminoprofen, tiaprofenic acid, fluprofen and bucloxic acid. Also useful are the steroidal anti-inflammatory drugs including hydrocortisone and the like.

Topical Anesthetics

Examples of topical anesthetic drugs useful for the articles of the present invention include, but are not limited to, benzocaine, lidocaine, bupivacaine, chlorprocaine, dibucaine, etidocaine, mepivacaine, tetracaine, dyclonine, hexylcaine, procaine, cocaine, ketamine, pramoxine, phenol, and pharmaceutically acceptable salts thereof.

Artificial Tanning Actives and Accelerators

Examples of artificial tanning actives and accelerators useful for the articles of the present invention include, but are not limited to, dihydroxyacetaone, tyrosine, tyrosine esters such as ethyl tyrosinate, and phospho-DOPA.

Antimicrobial and Antifungal Actives

Examples of antimicrobial and antifungal actives useful for the articles of the present invention include, but are not limited to, ß-lactam drugs, quinolone drugs, ciprofloxacin, norfloxacin, tetracycline, erythromycin, amikacin, 2,4,4'-trichloro-2'-hydroxy diphenyl ether, 3,4,4'-trichlorocarbanilide, phenoxyethanol, phenoxy propanol, phenoxyisopropanol, doxycycline, capreomycin, chlorhexidine, chlortetracycline, oxytetracycline, clindamycin, ethambutol, hexamidine isethionate, metronidazole, pentamidine, gentamicin, kanamycin, lineomycin, methacycline, methenamine, minocycline, neomycin, netilmicin, paromomycin, streptomycin, tobramycin, miconazole, tetracycline hydrochloride, erythromycin, zinc erythromycin, erythromycin estolate, erythromycin stearate, amikacin sulfate, doxycycline hydrochloride, capreomycin sulfate, chlorhexidine gluconate, chlorhexidine hydrochloride, chlortetracycline

hydrochloride, oxytetracycline hydrochloride, clindamycin hydrochloride, ethambutol hydrochloride, metronidazole hydrochloride, pentamidine hydrochloride, gentamicin sulfate, kanamycin sulfate, lineomycin hydrochloride, methacycline hydrochloride, methenamine hippurate, methenamine mandelate, minocycline hydrochloride, neomycin sulfate, netilmicin sulfate, paromomycin sulfate, streptomycin sulfate, tobramycin sulfate, miconazole hydrochloride, amanfadine hydrochloride, amanfadine sulfate, octopirox, parachlorometa xylenol, nystatin, tolnaftate, zinc pyrithione and clotrimazole.

Anti-viral Agents

The articles of the present invention may further comprise one or more anti-viral agents. Suitable anti-viral agents include, but are not limited to, metal salts (e.g., silver nitrate, copper sulfate, iron chloride, etc.) and organic acids (e.g., malic acid, salicylic acid, succinic acid, benzoic acid, etc.). In particular compositions which contain additional suitable anti-viral agents include those described in copending U. S. patent applications Serial Nos. 09/421,084 (Beerse et al.) ; 09/421,131 (Biedermann et al.); 09/420,646 (Morgan et al.); and 09/421,179 (Page et al.), which were each filed on October 19, 1999.

Enzymes

The article of the present invention may optionally include one or more enzymes. Preferably, such enzymes are dermatologically acceptable. Suitable enzymes include, but are not limited to, keratinase, protease, amylase, subtilisin, etc..

Sunscreen Actives

Also useful herein are sunscreening actives. A wide variety of sunscreening agents are described in U.S. Patent No. 5,087,445, to Haffey et al., issued February 11, 1992; U.S. Patent No. 5,073,372, to Turner et al., issued December 17, 1991; U.S. Patent No. 5,073,371, to Turner et al. issued December 17, 1991; and Segarin, et al., at Chapter VIII, pages 189 et seq., of Cosmetics Science and Technology, all of which are incorporated herein by reference in their entirety. Nonlimiting examples of sunscreens which are useful in the compositions of the present invention are those selected from the group consisting of 2-ethylhexyl *p*-methoxycinnamate, 2-ethylhexyl N,N-dimethyl-*p*-aminobenzoate, *p*-aminobenzoic acid, 2-phenylbenzimidazole-5-sulfonic acid, octocrylene, oxybenzone, homomenthyl salicylate, octyl salicylate, 4,4'-methoxy-t-butyldibenzoylmethane, 4-isopropyl dibenzoylmethane, 3-benzylidene camphor, 3-(4-methylbenzylidene) camphor, titanium dioxide, zinc oxide, silica, iron oxide, and mixtures thereof. Still other useful sunscreens are those disclosed in U.S. Patent No. 4,937,370, to Sabatelli, issued June 26, 1990; and U.S. Patent No. 4,999,186, to Sabatelli et al., issued March 12, 1991; these two references are incorporated by reference herein in their entirety. Especially preferred examples of these sunscreens include those selected from the group consisting of 4-N,N-(2-ethylhexyl)methylaminobenzoic acid ester of 2,4-dihydroxybenzophenone, 4-N,N-(2-ethylhexyl)methylaminobenzoic acid ester with 4-hydroxydibenzoylmethane, 4-N,N- (2-ethylhexyl)-methylaminobenzoic acid ester of 2-hydroxy-4-(2-hydroxyethoxy)benzophenone, 4-N,N-(2-ethylhexyl)-methylaminobenzoic acid ester of 4-(2-hydroxyethoxy)dibenzoylmethane, and mixtures thereof. Exact amounts of sunscreens which can be employed will vary depending upon the sunscreen chosen and the desired Sun Protection Factor (SPF) to be

achieved. SPF is a commonly used measure of photoprotection of a sunscreen against erythema. See Federal Register, Vol. 43, No. 166, pp. 38206-38269, August 25, 1978, which is incorporated herein by reference in its entirety.

Hydrocolloids

Hydrocolloids may also be optionally included in the articles of the present invention. Hydrocolloids are well known in the art and are helpful in extending the useful life of the surfactants contained in the cleansing component of the present invention such that the articles may last throughout at least one entire showering or bathing experience. Suitable hydrocolloids include, but are not limited to, xanthan gum, carboxymethyl cellulose, hydroxyethyl cellulose, hydroxylpropyl cellulose, methyl and ethyl cellulose, natural gums, gudras guar gum, bean gum, natural starches, deionitized starches (e.g., starch octenyl succinate) and the like.

Exothermic Zeolites

Zeolites and other compounds which react exothermically when combined with water may also be optionally included in the articles of the present invention.

Hydrogel Forming Polymeric Gelling Agents

In certain embodiments of the present invention, the articles may optionally comprise an aqueous gel, i.e., a "hydrogel", formed from a hydrogel forming polymeric gelling agent and water. More specifically, the hydrogel is contained within the cleansing component or the therapeutic benefit component of the article. When an aqueous gel is present, the articles preferably comprise from about 0.1% to about 100%, by weight of the water insoluble substrate, more preferably from about 3% to about 50%, and most preferably from about 5% to about 35%, of a hydrogel forming polymeric gelling agent, calculated based on the dry weight of the hydrogel forming polymeric gelling agent.

In general, the hydrogel forming polymeric gelling agent materials of the present invention are at least partially crosslinked polymers prepared from polymerizable, unsaturated acid-containing monomers which are water-soluble or become water-soluble upon hydrolysis. These include monoethylenically unsaturated compounds having at least one hydrophilic radical, including (but not limited to) olefinically unsaturated acids and anhydrides which contain at least one carbon-carbon olefinic double bond. With respect to these monomers, water-soluble means that the monomer is soluble in deionized water at 25°C at a level of at least 0.2%, preferably at least 1.0%.

Upon polymerization, monomeric units as described above will generally constitute from about 25 mole percent to 99.99 mole percent, more preferably from about 50 mole percent to 99.99 mole percent, most preferably at least about 75 mole percent of the polymeric gelling agent material (dry polymer weight basis), of acid-containing monomers.

The hydrogel forming polymeric gelling agent herein is partially crosslinked to a sufficient degree preferably that is high enough such that the resulting polymer does not exhibit a glass transition temperature (Tg) below about 140°C, and accordingly, the term "hydrogel forming polymeric gelling agent," as used herein, shall mean polymers meeting this parameter. Preferably the hydrogel forming polymeric gelling

agent does not have a Tg below about 180°C, and more preferably does not have a Tg prior to decomposition of the polymer, at temperatures of about 300°C or higher. The Tg can be determined by differential scanning calorimetry (DSC) conducted at a heating rate of 20.0 C°/minute with 5 mg or smaller samples. The Tg is calculated as the midpoint between the onset and endset of heat flow change corresponding to the glass transition on the DSC heat capacity heating curve. The use of DSC to determine Tg is well known in the art, and is described by B. Cassel and M. P. DiVito in "Use of DSC To Obtain Accurate Thermodynamic and Kinetic Data", American Laboratory, January 1994, pp 14-19, and by B. Wunderlich in Thermal Analysis, Academic Press, Inc., 1990.

The hydrogel forming polymeric material is characterized as highly absorbent and able to retain water in its absorbed or "gel" state. Preferred hydrogel forming polymeric gelling agent hereof will be able to absorb at least about 40 g water (deionized) per gram of gelling agent, preferably at least about 60 g/g, more preferably at least about 80 g/g. These values, referred to as "Absorptive Capacity" herein can be determined according to the procedure in the Absorptive Capacity "Tea Bag" test described above.

The hydrogel forming polymeric gelling agent hereof will, in general, be at least partially crosslinked. Suitable cross-linking agents are well know in the art and include, for example, (1) compounds having at least two polymerizable double bonds; (2) compounds having at least one polymerizable double bond and at least one functional group reactive with the acid-containing monomer material; (3) compounds having at least two functional groups reactive with the acid-containing monomer material; and (4) polyvalent metal compounds which can form ionic cross-linkages.

Cross-linking agents having at least two polymerizable double bonds include (i) di- or polyvinyl compounds such as divinylbenzene and divinyltoluene; (ii) di- or poly-esters of unsaturated mono- or poly-carboxylic acids with polyols including, for example, di- or triacrylic acid esters of polyols such as ethylene glycol, trimethylol propane, glycerine, or polyoxyethylene glycols; (iii) bisacrylamides such as N,N-methylenebisacrylamide; (iv) carbamyl esters that can be obtained by reacting polyisocyanates with hydroxyl group-containing monomers; (v) di- or poly-allyl ethers of polyols; (vi) di- or poly-allyl esters of polycarboxylic acids such as diallyl phthalate, diallyl adipate, and the like; (vii) esters of unsaturated mono- or poly-carboxylic acids with mono-allyl esters of polyols such as acrylic acid ester of polyethylene glycol monoallyl ether; and (viii) di- or tri-allyl amine.

Cross-linking agents having at least one polymerizable double bond and at least one functional group reactive with the acid-containing monomer material include N-methylol acrylamide, glycidyl acrylate, and the like. Suitable cross-linking agents having at least two functional groups reactive with the acid-containing monomer material include glyoxal; polyols such as ethylene glycol and glycerol; polyamines such as alkylene diamines (e.g., ethylene diamine), polyalkylene polyamines, polyepoxides, di- or polyglycidyl ethers and the like. Suitable polyvalent metal cross-linking agents which can form ionic cross-linkages include oxides, hydroxides and weak acid salts (e.g., carbonate, acetate and the like) of alkaline earth metals (e.g., calcium, magnesium) and zinc, including, for example, calcium oxide and zinc diacetate.

Cross-linking agents of many of the foregoing types are described in greater detail in Masuda et al., U. S. Patent 4,076,663, issued February 28, 1978, and Allen et al., U. S. Patent 4,861,539, issued August 29, 1989, both incorporated herein by reference. Preferred cross-linking agents include the di- or polyesters of unsaturated mono- or polycarboxylic acids mono-allyl esters of polyols, the bisacrylamides, and the di- or tri-allyl amines. Specific examples of especially preferred cross-linking agents include N,N'-methylenebisacrylamide and trimethylol propane triacrylate.

The cross-linking agent will generally constitute from about 0.001 mole percent to 5 mole percent of the resulting hydrogel-forming polymeric material. More generally, the cross-linking agent will constitute from about 0.01 mole percent to 3 mole percent of the hydrogel-forming polymeric gelling agent used herein.

The hydrogel forming polymeric gelling agents hereof may be employed in their partially neutralized form. For purposes of this invention, such materials are considered partially neutralized when at least 25 mole percent, and preferably at least 50 mole percent of monomers used to form the polymer are acid group-containing monomers which have been neutralized with a base. Suitable neutralizing bases cations include hydroxides of alkali and alkaline earth metal (e.g. KOH, NaOH), ammonium, substituted ammonium, and amines such as amino alcohols (e.g., 2-amino-2-methyl-1,3-propanediol, diethanolamine, and 2-amino-2-methyl-1-propanol. This percentage of the total monomers utilized which are neutralized acid group-containing monomers is referred to herein as the "degree of neutralization." The degree of neutralization will preferably not exceed 98%.

Hydrogel forming polymeric gelling agents suitable for use herein are well known in the art, and are described, for example, in U. S. Patent 4,076,663, Masuda et al., issued February 28, 1978; U. S. Patent 4,062,817, Westerman, issued December 13, 1977; U. S. Patent 4,286,082, Tsubakimoto et al., issued August 25, 1981; U. S. Patent 5,061,259, Goldman et al., issued October 29, 1991, and U. S. Patent 4,654,039, Brandt et al., issued March 31, 1987 each of which is incorporated herein in its entirety.

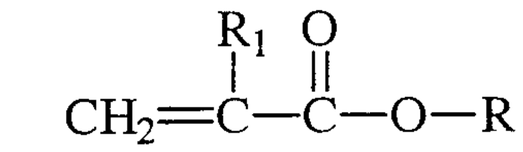
Hydrogel forming polymeric gelling agents suitable for use herein are also described in U. S. Patent 4,731,067, Le-Khac, issued March 15, 1988, U. S. Patent 4,743,244, Le-Khac, issued May 10, 1988, U. S. Patent 4,813,945, Le-Khac, issued March 21, 1989, U. S. Patent 4,880,868, Le-Khac, issued November 14, 1989, U. S. Patent 4,892,533, Le-Khac, issued January 9, 1990, U. S. Patent 5,026,784, Le-Khac, issued June 25, 1991, U. S. Patent 5,079,306, Le-Khac, issued January 7, 1992, U. S. Patent 5,151,465, Le-Khac, issued September 29, 1992, U. S. Patent 4,861,539, Allen, Farrer, and Flesher, issued August 29, 1989, and U. S. Patent 4,962,172, Allen, Farrer, and Flesher, issued October 9, 1990, each of which is incorporated herein by reference in its entirety.

Suitable hydrogel forming polymeric gelling agents in the form of particles are commercially available from Hoechst Celanese Corporation, Portsmouth, VA, USA (Sanwet™ Superabsorbent Polymers) Nippon Shokubai, Japan (Aqualic™, e.g., L-75, L-76) and Dow Chemical Company, Midland, MI, USA (Dry Tech™).

Hydrogel forming polymeric gelling agents in the form of fibers are commercially available from Camelot Technologies Inc., Leominster, MA, USA (Fibersorb™, e.g., SA 7200H, SA 7200M, SA 7000L, SA 7000, and SA 7300).

The articles of the present invention may also contain other hydrophilic gelling agents. These include carboxylic acid-containing polymers as otherwise described above, except which have relatively lower degrees of crosslinking, such that they exhibit a Tg below 140°C, as well as a variety of other water soluble or colloidally water soluble polymers, such as cellulose ethers (e.g. hydroxyethyl cellulose, methyl cellulose, hydroxy propylmethyl cellulose), polyvinylpyrrolidone, polyvinylalcohol, guar gum, hydroxypropyl guar gum and xanthan gum. Preferred among these additional hydrophilic gelling agents are the acid-containing polymers, particularly carboxylic acid-containing polymers. Especially preferred are those that comprise water-soluble polymer of acrylic acid crosslinked with a polyalkenyl polyether of a polyhydric alcohol, and optionally an acrylate ester or a polyfunctional vinylidene monomer.

Preferred copolymers useful in the present invention are polymers of a monomeric mixture containing 95 to 99 weight percent of an olefinically unsaturated carboxylic monomer selected from the group consisting of acrylic, methacrylic and ethacrylic acids; about 1 to about 3.5 weight percent of an acrylate ester of the formula:



$$CH_2=C-C-O-R$$

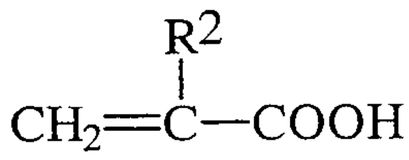
wherein R is an alkyl radical containing 10 to 30 carbon atoms and R_1 is hydrogen, methyl or ethyl; and 0.1 to 0.6 weight percent of a polymerizable cross-linking polyalkenyl polyether of a polyhydric alcohol containing more than one alkenyl ether group per molecule wherein the parent polyhydric alcohol contains at least 3 carbon atoms and at least 3 hydroxyl groups.

Preferably, these polymers contain from about 96 to about 97.9 weight percent of acrylic acid and from about 2.5 to about 3.5 weight percent of acrylic esters wherein the alkyl group contains 12 to 22 carbon atoms, and R_1 is methyl, most preferably the acrylate ester is stearyl methacrylate. Preferably, the amount of crosslinking polyalkenyl polyether monomer is from about 0.2 to 0.4 weight percent. The preferred crosslinking polyalkenyl polyether monomers are allyl pentaerythritol, trimethylolpropane diallylether or allyl sucrose. These polymers are fully described in U. S. Patent No. 4,509,949, to Huang et al., issued April 5, 1985, this patent being incorporated herein by reference.

Other preferred copolymers useful in the present invention are the polymers which contain at least two monomeric ingredients, one being a monomeric olefinically-unsaturated carboxylic acid, and the other being a polyalkenyl, polyether of a polyhydric alcohol. Additional monomeric materials may be present in the monomeric mixture if desired, even in predominant proportion.

The first monomeric ingredient useful in the production of these carboxylic polymers are the olefinically-unsaturated carboxylic acids containing at least one activated carbon-to-carbon olefinic double

bond, and at least one carboxyl group. The preferred carboxylic monomers are the acrylic acids having the general structure



wherein R^2 is a substituent selected from the class consisting of hydrogen, halogen, and the cyanogen (-C=N) groups, monovalent alkyl radicals, monovalent alkaryl radicals and monovalent cycloaliphatic radicals. Of this class, acrylic, methacrylic, and ethacrylic acid are most preferred. Another useful carboxylic monomer is maleic anhydride or the acid. The amount of acid used will be from about 95.5 to about 98.9 weight percent.

The second monomeric ingredient useful in the production of these carboxylic polymers are the polyalkenyl polyethers having more than one alkenyl ether grouping per molecule, such as alkenyl groups in which an olefinic double bond is present attached to a terminal methylene grouping, CH_2=C<.

The additional monomeric materials which may be present in the polymers include polyfunctional vinylidene monomers containing at least two terminal CH_2< groups, including for example, butadiene, isoprene, divinyl benzene, divinyl naphthlene, allyl acrylates, and the like. These polymers are fully described in U. S. Patent No. 2,798,053, to Brown, issued July 2, 1957, which is incorporated herein by reference in its entirety.

Examples of carboxylic acid copolymers useful in the present invention include Carbomer 934, Carbomer 941, Carbomer 950, Carbomer 951, Carbomer 954, Carbomer 980, Carbomer 981, Carbomer 1342, acrylates/C10-30 alkyl acrylate cross polymer (available as Carbopol 934, Carbopol 941, Carbopol 950, Carbopol 951, Carbopol 954, Carbopol 980, Carbopol 981, Carbopol 1342, and the Pemulen series, respectively, from B. F. Goodrich).

Other carboxylic acid copolymers useful in the present invention include sodium salts of acrylic acid/acrylamide copolymers sold by the Hoechst Celanese Corporation under the trademark of Hostaceren PN73. Also included are the hydrogel polymers sold by Lipo Chemicals Inc. under the trademark of HYPAN hydrogels. These hydrogels consist of crystalline plicks of nitrates on a C-C backbone with various other pendant groups such as carboxyls, amides, and amidines. An example would include HYPAN SA 100 H, a polymer powder available from Lipo Chemical.

Neutralizing agents for use in neutralizing the acidic groups of these polymers include those previously described.

Cationic Surfactants

Cationic surfactants are typically categorized as non-lathering surfactants but may be used in the articles of the present invention provided they do not negatively impact the desired benefits of the articles.

Nonlimiting examples of cationic surfactants useful herein are disclosed in McCutcheon's, Detergents and Emulsifiers, North American edition (1986), published by allured Publishing Corporation;

and McCutcheon's, Functional Materials, North American Edition (1992); both of which are incorporated by reference herein in their entirety.

Nonlimiting examples of cationic surfactants useful herein include cationic alkyl ammonium salts such as those having the formula:

$$R_1 R_2 R_3 R_4 N^+ X^-$$

wherein R_1, is selected from an alkyl group having from about 12 to about 18 carbon atoms, or aromatic, aryl or alkaryl groups having from about 12 to about 18 carbon atoms; R_2, R_3, and R_4 are independently selected from hydrogen, an alkyl group having from about 1 to about 18 carbon atoms, or aromatic, aryl or alkaryl groups having from about 12 to about 18 carbon atoms; and X is an anion selected from chloride, bromide, iodide, acetate, phosphate, nitrate, sulfate, methyl sulfate, ethyl sulfate, tosylate, lactate, citrate, glycolate, and mixtures thereof. Additionally, the alkyl groups can also contain ether linkages, or hydroxy or amino group substituents (e.g., the alkyl groups can contain polyethylene glycol and polypropylene glycol moieties).

More preferably, R_1 is an alkyl group having from about 12 to about 18 carbon atoms; R_2 is selected from H or an alkyl group having from about 1 to about 18 carbon atoms; R_3 and R_4 are independently selected from H or an alkyl group having from about 1 to about 3 carbon atoms; and X is as described in the previous paragraph.

Most preferably, R_1 is an alkyl group having from about 12 to about 18 carbon atoms; R_2, R_3, and R_4 are selected from H or an alkyl group having from about 1 to about 3 carbon atoms; and X is as described previously.

Alternatively, other useful cationic surfactants include amino-amides, wherein in the above structure R_1 is alternatively $R_5CO\text{-}(CH_2)_n$ -, wherein R_5 is an alkyl group having from about 12 to about 22 carbon atoms, and n is an integer from about 2 to about 6, more preferably from about 2 to about 4, and most preferably from about 2 to about 3. Nonlimiting examples of these cationic emulsifiers include stearamidopropyl PG-dimonium chloride phosphate, stearamidopropyl ethyldimonium ethosulfate, stearamidopropyl dimethyl (myristyl acetate) ammonium chloride, stearamidopropyl dimethyl cetearyl ammonium tosylate, stearamidopropyl dimethyl ammonium chloride, stearamidopropyl dimethyl ammonium lactate, and mixtures thereof.

Nonlimiting examples of quaternary ammonium salt cationic surfactants include those selected from the group consisting of cetyl ammonium chloride, cetyl ammonium bromide, lauryl ammonium chloride, lauryl ammonium bromide, stearyl ammonium chloride, stearyl ammonium bromide, cetyl dimethyl ammonium chloride, cetyl dimethyl ammonium bromide, lauryl dimethyl ammonium chloride, lauryl dimethyl ammonium bromide, stearyl dimethyl ammonium chloride, stearyl dimethyl ammonium bromide, cetyl trimethyl ammonium chloride, cetyl trimethyl ammonium bromide, lauryl trimethyl ammonium chloride, lauryl trimethyl ammonium bromide, stearyl trimethyl ammonium chloride, stearyl

trimethyl ammonium bromide, lauryl dimethyl ammonium chloride, stearyl dimethyl cetyl ditallow dimethyl ammonium chloride, dicetyl ammonium chloride, dicetyl ammonium bromide, dilauryl ammonium chloride, dilauryl ammonium bromide, distearyl ammonium chloride, distearyl ammonium bromide, dicetyl methyl ammonium chloride, dicetyl methyl ammonium bromide, dilauryl methyl ammonium chloride, dilauryl methyl ammonium bromide, distearyl methyl ammonium chloride, distearyl dimethyl ammonium chloride, distearyl methyl ammonium bromide, and mixtures thereof. Additional quaternary ammonium salts include those wherein the C12 to C22 alkyl carbon chain is derived from a tallow fatty acid or from a coconut fatty acid. The term "tallow" refers to an alkyl group derived from tallow fatty acids (usually hydrogenated tallow fatty acids), which generally have mixtures of alkyl chains in the C16 to C18 range. The term "coconut" refers to an alkyl group derived from a coconut fatty acid, which generally have mixtures of alkyl chains in the C12 to C14 range. Examples of quaternary ammonium salts derived from these tallow and coconut sources include ditallow dimethyl ammonium chloride, ditallow dimethyl ammonium methyl sulfate, di(hydrogenated tallow) dimethyl ammonium chloride, di(hydrogenated tallow) dimethyl ammonium acetate, ditallow dipropyl ammonium phosphate, ditallow dimethyl ammonium nitrate, di(coconutalkyl)dimethyl ammonium chloride, di(coconutalkyl)dimethyl ammonium bromide, tallow ammonium chloride, coconut ammonium chloride, stearamidopropyl PG-dimonium chloride phosphate, stearamidopropyl ethyldimonium ethosulfate, stearamidopropyl dimethyl (myristyl acetate) ammonium chloride, stearamidopropyl dimethyl cetearyl ammonium tosylate, stearamidopropyl dimethyl ammonium chloride, stearamidopropyl dimethyl ammonium lactate, and mixtures thereof.

Preferred cationic surfactants useful herein include those selected from the group consisting of dilauryl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, dimyristyl dimethyl ammonium chloride, dipalmityl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, and mixtures thereof.

Chelators

The articles of the present invention may also comprise a safe and effective amount of a chelator or chelating agent. As used herein, "chelator" or "chelating agent" means an active agent capable of removing a metal ion from a system by forming a complex so that the metal ion cannot readily participate in or catalyze chemical reactions. The inclusion of a chelating agent is especially useful for providing protection against UV radiation that can contribute to excessive scaling or skin texture changes and against other environmental agents, which can cause skin damage.

A safe and effective amount of a chelating agent may be added to the compositions of the subject invention, preferably from about 0.1% to about 10%, more preferably from about 1% to about 5%, of the composition. Exemplary chelators that are useful herein are disclosed in U.S. Patent No. 5,487,884, issued 1/30/96 to Bissett et al.; International Publication No. 91/16035, Bush et al., published 10/31/95; and International Publication No. 91/16034, Bush et al., published 10/31/95. Preferred chelators useful in compositions of the subject invention are furildioxime and derivatives thereof.

Flavonoids

The articles of the present invention may optionally comprise a flavonoid compound. Flavonoids are broadly disclosed in U.S. Patents 5,686,082 and 5,686,367, both of which are herein incorporated by reference. Flavonoids suitable for use in the present invention are flavanones selected from the group consisting of unsubstituted flavanones, mono-substituted flavanones, and mixtures thereof; chalcones selected from the group consisting of unsubstituted chalcones, mono-substituted chalcones, di-substituted chalcones, tri-substituted chalcones, and mixtures thereof; flavones selected from the group consisting of unsubstituted flavones, mono-substituted flavones, di-substituted flavones, and mixtures thereof; one or more isoflavones; coumarins selected from the group consisting of unsubstituted coumarins, mono-substituted coumarins, di-substituted coumarins, and mixtures thereof; chromones selected from the group consisting of unsubstituted chromones, mono-substituted chromones, di-substituted chromones, and mixtures thereof; one or more dicoumarols; one or more chromanones; one or more chromanols; isomers (e.g., cis/trans isomers) thereof; and mixtures thereof. By the term "substituted" as used herein means flavonoids wherein one or more hydrogen atom of the flavonoid has been independently replaced with hydroxyl, C1-C8 alkyl, C1-C4 alkoxyl, O-glycoside, and the like or a mixture of these substituents.

Examples of suitable flavonoids include, but are not limited to, unsubstituted flavanone, mono-hydroxy flavanones (e.g., 2'-hydroxy flavanone, 6-hydroxy flavanone, 7-hydroxy flavanone, etc.), mono-alkoxy flavanones (e.g., 5-methoxy flavanone, 6-methoxy flavanone, 7-methoxy flavanone, 4'-methoxy flavanone, etc.), unsubstituted chalcone (especially unsubstituted trans-chalcone), mono-hydroxy chalcones (e.g., 2'-hydroxy chalcone, 4'-hydroxy chalcone, etc.), di-hydroxy chalcones (e.g., 2', 4-dihydroxy chalcone, 2',4'-dihydroxy chalcone, 2,2'-dihydroxy chalcone, 2',3-dihydroxy chalcone, 2',5'-dihydroxy chalcone, etc.), and tri-hydroxy chalcones (e.g., 2',3',4'-trihydroxy chalcone, 4,2',4'-trihydroxy chalcone, 2,2',4'-trihydroxy chalcone, etc.), unsubstituted flavone, 7,2'-dihydroxy flavone, 3',4'-dihydroxy naphthoflavone, 4'-hydroxy flavone, 5,6-benzoflavone, and 7,8-benzoflavone, unsubstituted isoflavone, daidzein (7,4'-dihydroxy isoflavone), 5,7-dihydroxy-4'-methoxy isoflavone, soy isoflavones (a mixture extracted from soy), unsubstituted coumarin, 4-hydroxy coumarin, 7-hydroxy coumarin, 6-hydroxy-4-methyl coumarin, unsubstituted chromone, 3-formyl chromone, 3-formyl-6-isopropyl chromone, unsubstituted dicoumarol, unsubstituted chromanone, unsubstituted chromanol, and mixtures thereof.

Preferred for use herein are unsubstituted flavanone, methoxy flavanones, unsubstituted chalcone, 2', 4-dihydroxy chalcone, and mixtures thereof. Most preferred are unsubstituted flavanone, unsubstituted chalcone (especially the trans isomer), and mixtures thereof.

They can be synthetic materials or obtained as extracts from natural sources (e.g., plants). The naturally sourced material can also further be derivatized (e.g., a glycoside, an ester or an ether derivative prepared following extraction from a natural source). Flavonoid compounds useful herein are commercially available from a number of sources, e.g., Indofine Chemical Company, Inc. (Somerville, New Jersey), Steraloids, Inc. (Wilton, New Hampshire), and Aldrich Chemical Company, Inc. (Milwaukee, Wisconsin).

Mixtures of the above flavonoid compounds may also be used.

The herein described flavonoid compounds are preferably present in the instant invention at concentrations of from about 0.01% to about 20%, more preferably from about 0.1% to about 10%, and most preferably from about 0.5% to about 5%.

Sterols

The articles of the present invention may comprise a safe and effective amount of one or more sterol compounds. Examples of useful sterol compounds include sitosterol, stigmasterol, campesterol, brassicasterol, lanosterol, 7-dehydrocholesterol, and mixtures thereof. These can be synthetic in origin or from natural sources, e.g., blends extracted from plant sources (e.g., phytosterols).

Anti-Cellulite Agents

The articles of the present invention may also comprise a safe and effective amount of an anti-cellulite agent. Suitable agents may include, but are not limited to, xanthine compounds (e.g., caffeine, theophylline, theobromine, and aminophylline).

Skin Lightening Agents

The articles of the present invention may comprise a skin lightening agent. When used, the compositions preferably comprise from about 0.1% to about 10%, more preferably from about 0.2% to about 5%, also preferably from about 0.5% to about 2%, by weight of the composition, of a skin lightening agent. Suitable skin lightening agents include those known in the art, including kojic acid, arbutin, ascorbic acid and derivatives thereof, e.g., magnesium ascorbyl phosphate or sodium ascorbyl phosphate or other salts of ascorbyl phosphate. Skin lightening agents suitable for use herein also include those described in copending patent application Serial No. 08/479,935, filed on June 7, 1995 in the name of Hillebrand, corresponding to PCT Application No. U.S. 95/07432, filed 6/12/95; and copending patent application Serial No. 08/390,152, filed on February 24, 1995 in the names of Kalla L. Kvalnes, Mitchell A. DeLong, Barton J. Bradbury, Curtis B. Motley, and John D. Carter, corresponding to PCT Application No. U.S. 95/02809, filed 3/1/95, published 9/8/95.

Binders

The articles of the present invention may optionally comprise binders. Binders or binding materials are useful for sealing the various layers of the present articles to one another thereby maintaining the integrity of the article. The binders may be in a variety of forms including, but not limited to, spray on, webs, separate layers, binding fibers, etc. Suitable binders may comprise latexes, polyamides, polyesters, polyolefins and combinations thereof.

Additional Layers

In another embodiment, the article of the present invention may comprise one or more additional layers which one having ordinary skill in the art would recognize as separate and distinct from the batting and nonwoven layers yet which are attached to the batting and nonwoven layers at some point. The additional layers are suitable for enhancing the overall grippability of the side of the article closest to the hand or other means for exerting mechanical action on the surface to be cleansed and/or therapeutically treated. Also, the additional layers are suitable for enhancing the soft feel of the side of the article which

contacts the area to be cleansed and/or therapeutically treated. In any instance, these additional layers may also be referred to as consecutively numbered layers in addition to the two essential layers of the articles of the present invention, e.g., third layer, fourth layer, etc..

Suitable additional layers may be macroscopically expanded. As used herein, "macroscopically expanded, refers to webs, ribbons, and films which have been caused to conform to the surface of a three-dimensional forming structure so that both surfaces thereof exhibit a three-dimensional forming pattern of surface aberrations corresponding to the macroscopic cross-section of the forming structure, wherein the surface aberrations comprising the pattern are individually discernible to the normal naked eye (i.e., normal naked eye having 20/20 vision) when the perpendicular distance between the viewer's eye and the plane of the web is about 12 inches.

As used herein, "embossed" it is meant that the forming structure of the material exhibits a pattern comprised primarily of male projections. On the other hand, "debossed" refers to when the forming structure of the material exhibits a pattern comprised primarily of female capillary networks.

Preferred macroscopically expanded films comprise formed films which are structural elastic-like films. These films are described in U. S. Patent No. 5,554,145, issued September 10, 1996, to Roe et al., which is incorporated by reference herein in its entirety.

Materials suitable for use in the additional layer having a thickness of at least one millimeter include, but are not limited to, those web materials disclosed in U. S. Patent No. 5,518,801, issued to Chappell et al. on May 21, 1996, which is incorporated by reference herein in its entirety.

METHODS OF MANUFACTURE

The personal care articles of the present invention are manufactured by adding the cleansing component and/or the therapeutic benefit component to the appropriate sheet of the batting layer or nonwoven layer via a conventional method which may include, but is not limited to, sprinkling, dip coating, spraying, slot coating, and roll transfer (e.g., pressure roll or kiss roll). The sheet of the remaining layer is then placed on the sheet of the first layer, preferably, but not always, over the cleansing component and/or therapeutic benefit component. The sheets are sealed together by a conventional sealing method which may include, but is not limited to, heat, pressure, glue, ultrasound, etc. Heat sealing devices vary in design, and where a seal may not be able to be effected an interposing layer of a low-melting heat-sealable fibrous web such as the polyamide fibrous web known as Wonder Under (manufactured by Pellon, available from H. Levinson & Co., Chicago, IL) may be used between layers for this and other examples without changing the effect or utility of the articles. The sealed sheets are then partitioned into units for the consumer's use. Optional manufacturing steps may include calendaring to flatten the article, drying, creping, shrinking, stretching, or otherwise mechanically deforming.

METHODS OF CLEANSING AND DELIVERING A THERAPEUTIC OR AESTHETIC BENEFIT AGENT TO THE SKIN OR HAIR

The present invention also relates to a method of cleansing the skin or hair with a personal care article of the present invention. These methods comprise the steps of: a) wetting with water a substantially

dry, disposable personal care article comprising: 1) a water insoluble substrate comprising: a lofty, low-density batting layer comprising synthetic fibers wherein said batting layer is non-scouring; and a non-lofty, fluid-permeable nonwoven layer which is disposed adjacent to said batting layer; and 2) a cleansing component disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a lathering surfactant; and b) contacting the skin or hair with the wetted article.

In another embodiment, the present invention is useful for delivering a therapeutic benefit component to the area in need of treatment (e.g., skin, hair, etc.) wherein the method comprises the additional steps of: A) wetting with water a substantially dry, disposable personal care article, said article comprising: 1) a water insoluble substrate which comprises (a) a non-scouring, lofty, low-density batting layer comprising synthetic fibers; and (b) a non-lofty, fluid-permeable nonwoven layer which is disposed adjacent to said batting layer; and 2) a therapeutic benefit component, disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a therapeutic benefit agent; and B) contacting the skin or hair with the wetted article.

The articles of the present invention are water-activated and are therefore intended to be wetted with water prior to use. As used herein, "water-activated" means that the present invention is presented to the consumer in dry form to be used after wetting with water. It is found that when the articles of the present invention include a lathering surfactant they produce a lather or are "activated" upon contact with water and further agitation. Accordingly, the article is wetted by immersion in water or by placing it under a stream of water. When the articles of the present invention comprise a lathering surfactant in the cleansing component, lather may be generated from the article by mechanically agitating and/or deforming the article either prior to or during contact of the article with the skin or hair. The resulting lather is useful for cleansing the skin or hair. During the cleansing process and subsequent rinsing with water, any therapeutic or aesthetic benefit agents are deposited onto the skin or hair. Deposition of the therapeutic or aesthetic benefit agents are enhanced by the physical contact of the substrate with the skin or hair as well by the inclusion of one or more deposition aids.

EXAMPLES

The following examples further describe and demonstrate embodiments within the scope of the present invention. In the following examples, all ingredients are listed at an active level. The examples are given solely for the purpose of illustration and are not to be construed as limitations of the present invention, as many variations thereof are possible without departing from the spirit and scope of the invention.

Ingredients are identified by chemical or CTFA name.

I. Cleansing Components

Example 1

Prepare a representative cleansing component for the articles of the present invention in the following manner.

Shave a 53.0 gms of a bar soap which includes the following components:

Component	Wt %
Sodium Cocyl Isethionate	27.77
Paraffin	16.72
Sodium Alkyl Glycerol Sulfonate (AGS)	14.90
Soaps	11.41
Glycerine	8.57
Water	5.50
Stearic Acid	5.74
Sodium Isethionate	3.04
NaCl	1.41
EDTA	0.10
Etidronic Acid	0.10
Polyox	0.03
Perfume	0.70
Miscellaneous (including pigments)	4.01
Total	100

Mix the bar soap shavings with 37.0 gms glycerin (99.7%), 9.5 gms water, and 0.5 gms perfume. Heat mixture to 200 °F while stirring continuously. Cold-mill mixture on a standard 3-roll mill and store cleansing component in a suitable sealed container.

Example 2

Prepare a representative cleansing component for the articles of the present invention in the following manner.

Shave 40.0 gms of a bar soap which includes the following components:

Component	Wt %
Sodium Soap	52.40
Sodium Alkyl Glycerol Sulfonate (AGS)	16.50
Magnesium Soap	13.40
Glycerine	0.19
Water	5.50
Stearic Acid	1.60
Sodium Isethionate	3.00
NaCl	3.89

EDTA	0.10
Etidronic Acid	0.10
Perfume	0.70
Miscellaneous (including pigments)	2.62
Total	100

Mix the bar soap shavings with 45.0 gms glycerin (99.7%), 4.5 gms water, and 0.5 gms perfume. Heat mixture to 200°F while stirring continuously. Cold-mill mixture on a standard 3-roll mill and store cleansing component in a suitable sealed container.

Example 3

A representative powdery cleansing component for the articles of the present invention is prepared in the following manner.

Shave 40.0 gms of a bar soap which includes the following components:

Component	Wt %
Soap (Magnesium and Sodium)	80.16
Water	11.50
Stearic Acid	5.70
NaCl	1.10
EDTA	0.25
Perfume	1.15
Miscellaneous (including pigments)	0.14
Total	100

Store the bar soap flakes in a suitable sealed container.

Example 4

A representative powdery cleansing component for the articles of the present invention is prepared in the following manner.

Shave 40.0 gms of a bar soap which includes the following components:

Component	Wt %
Soap (Magnesium and Sodium)	80.16
Water	11.50
Stearic Acid	5.70
NaCl	1.10
EDTA	0.25
Perfume	1.15
Miscellaneous (including pigments)	0.14

Total	100

Blend the bar soap flakes with sodium bicarbonate in a 90:10 weight ratio. Mill the mixture twice in a standard 3-roll mill. Collect the flakes and store in a suitable sealed container.

Example 5

Prepare a representative cleansing component for the articles of the present invention in the following manner. Blend the cleansing component of Example 2 with 0.1% by weight of the bar soap flakes of a protease enzyme. Next, blend the resultant mixture with 2% by weight of the cleansing component of a dry hydrocolloid, sodium carboxymethylcellulose, and mill. Store the enzyme cleansing component in a suitable sealed container.

Example 6

Prepare a representative liquid cleansing component which includes the following components.

Component	Wt%
Sodium coconut alkyl glyceryl sulfonate (AGS)	7.2
Ammonium lauryl sulfate (ALS)	10.4
Alkyl laureth sulfate (AE3S)	10.4
Poly(ethylene oxide) (PolyOx WSR N-3000, Union Carbide)	0.5
Xanthan gum	1.4
Water	70.1

Example 7

Prepare a representative cleansing component for the articles of the present invention in the following manner. Heat 3 lbs of soap shavings of Example 2 with ¾ cup of isopropyl alcohol (99%) until the soap is melted. When the soap has melted, add the remaining alcohol. Add 10 oz. table sugar dissolved in as little water as possible. Blend about 4 tsp. of a dye into 8 oz. glycerin. Add the glycerin (99.7%). Stir. Continue to heat until consistency changes from a thin liquid to rope-like ribbons falling off the stirring implement and an aliquot of material hardens when dropped on a cold surface. Pour the mixture into a suitable container to harden. The mixture has the advantage of being remeltable upon heating which allows easy processing to prepare articles.

Example 8

Prepare a representative tear-free liquid cleansing component which includes the following components.

Component	Wt%
Cocamido propyl betaine	17.1
Sodium trideceth sulfate	8.3
POE 100 sorbitan monooleate	7.5
Misc. (including perfume, preservative, dye)	2.0
Water	65.1

Distinguishing characteristics of this composition are its non-irritating properties to skin and eyes.

Example 9

Prepare a representative liquid cleansing component which includes the following components.

Component	Wt%
Polyquaternium 10	0.50
Sodium Lauroamphoacetate	5.4
Sodium Laureth 3 Sulfate	11.6
Disodium EDTA	0.20
Sodium citrate dihydrate	0.50
Citric acid, anhydrous	1.0
PEG-6 caprylic/capric glycerides	2.0
Cocamide MEA	2.0
Glycerin	3.5
MgSO4-7H2O (Epsom salts)	1.5
Maleated Soybean Oil	2.5
Deodorized Soybean Oil	5.0
Misc. (including perfume, caustic, colorant)	1.5
Water	62.8

The mixture is mild for use on sensitive skin.

Example 10

Prepare a representative liquid cleansing component which includes the following components.

Component	Wt%
Polyquaternium-10	0.1
Sodium sulfate	1.5
Lauryl alcohol	0.3

Sodium laureth sulfate	5.8
Citric acid, anhydrous	0.2
Cocamidopropyl betaine	15.5
Sodium lauroyl sarcosinate	1.5
Misc. (including perfume, blue colorant)	1.0
Water	74.1

Example 11

Prepare a representative cleansing component which includes the following components.

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Component	Wt%
Decylpolyglucose	12.0
Cocamidopropyl betaine	12.0
Sodium lauroyl sarcosinate	12.0
Butylene glycol	3.6
PEG 14M	1.8
Polyquaternium-10	0.9
Dex panthenol	0.7
Phenoxyethanol	0.5
Benzyl alcohol	0.5
Methylparaben	0.45
Propylparaben	0.25
Disodium EDTA	0.2
Water	55.1

Example 12

Prepare a representative cleansing component which includes the following components.

Component	Wt%
EGDS	3.1
Cocamidopropyl betaine	4.0
TEA soap (Molecular Weight about 330)	9.5
Monoalkyl phosphate	15.0
Cocamine oxide	7.5
1,2-propanediol	1.0
Ethanol	3.0

Miscellaneous (perfume, colorant, preservative)	8.9
Water	48.0

Heat the mixture to 50 degrees Celsius, stirring continuously, until the mixture has lost 38% of its original weight, and it has a paste-like consistency. The cleansing component advantageously is easy to process with substrate layers and requires no further drying.

Example 13

Prepare a representative cleansing component which includes the following components.

Component	Wt%
SEFA* Cottonate	57.5
Citric acid	0.30
Cocamidopropyl betaine	3.5
Sodium lauroyl sarcosinate	10.7
Ethylene vinyl acetate polymer (Elvax 40W)	8.0
Silicone polymer microbeads (Tospearly 145A)	20.0

*SEFA is an acronym for sucrose esters of fatty acids

Melt the ethylene vinyl acetate polymer into the SEFA cottonate at 90 degrees Celsius and high shear mix. Add the surfactant powders and citric acid and mix. Add the silicone polymer microbeads, mix, and cool to set. The composition is remeltable and easy impregnates into or coat onto cloths.

Example 14

Prepare a representative cleansing component which includes the following components.

Component	Wt%
Sodium laureth-10 carboxylate (Empicol CB5S*)	50.0
C12-14, 12EO Alcohol Ethoxylate (Empilan KB12*)	50.0

*available from Albright & Wilson

Melt the alcohol ethoxylate, blend in the carboxylate until homogeneous, cool to solidify until ready for use. The composition is remeltable and easy impregnate into or coat onto cloths.

Example 15

Prepare a representative cleansing component which includes the following components.

Component	Wt%
Monosodium lauroyl glutamate	22.0

Cocamidopropyl betaine	2.0
Sodium chloride	1.0
Glycerin	2.5
Water	72.5

Heat the components together with gentle stirring until homogeneous.

Example 16

Prepare a representative cleansing component which includes the following components.

Component	Wt%
Triethanolamine	2.9
Polyquaternium-39	0.1
Monolauryl phosphate	4.0
C12-C14N-methyl Glucose amide[1]	5.0
Cocamidopropylhydroxysultaine[2]	2.0
Sodium decyl sulfate	0.5
Citric acid monohydrate	0.3
Perfume, Preservatives & misc.	4.0
Water	81.2

[1] Available from Hoechst Celanese

[2] Available from Rhone Poulenc

Add ingredients slowly in the following order at 60°C until each is dissolved in the water: TEA, lauryl phosphate, glucose amide. Cool to 45°C and add sultaine, polyquaternium-39 and sulfate, stirring as before. Add perfume, preservatives and cool to room temperature.

Example 17

Prepare a representative cleansing component by mixing the following components.

Component	Wt%
Lauroyl polyglucose[1]	20.0
Cetyltrimethylammonium bromide	4.0
Perfume, Preservatives & misc.	4.0
Water	72.0

[1] Available as Plantaren 1200 from Henkel

II. Therapeutic Benefit Components

Examples 18-22

Prepare a representative skin conditioning component by mixing the following components.

Component	Example 18	Example 19	Example 20	Example 21	Example 22
SEFA* Cottonate	48.0	75.0	33.5	40.0	80.0
SEFA* Behenate	12.0	25.0	8.4	10.0	10.0
Petrolatum	10.0	-	7.0	-	-
Glyceryl Tribehenate	5.0	-	3.5	-	-
Stearyl Alcohol	-	-	-	5.0	-
Paraffin	-	-	-	15.0	-
Cholesterol Ester	25.0	-	17.5	-	-
Ozokerite Wax	-	-	-	-	10.0
Glycerin	-	-	28.0	-	-
Triglyceryl monostearate	-	-	1.9	-	-
Decaglyceryl dipalmitate	-	-	0.2	-	-
Nonylphenol polyglycine ether[1]	-	-	-	30.0	-

*SEFA is an acronym for sucrose esters of fatty acids

[1]Hamplex TNP, Hampshire Chemical Co.

Examples 23-27

Prepare a representative skin conditioning component by mixing the following components.

Component	Example 23	Example 24	Example 25	Example 26	Example 27
Petrolatum (white)	35.87	35.87	-	-	34.0
Mineral oil	11.0	13.0	-	-	10.0
Jojoba oil	-	-	-	4.5	
Castor oil	10.0	9.0	-	-	
Cocoa butter					5.0
Diisostearyl trimethylpopane siloxy silicate	20.0	20.0	-	-	

Polydimethylsiloxane, 500 cSt fluid	-	-	0.7	1.5	
Decamethylcyclopentasiloxane	-	-	-	16.5	
Octamethylcyclotetrasiloxane	-	-	-	10.0	
Polydimethylsiloxane, gum	-	-	5.9	7.5	
Stearyl methicone wax	-	-	-	3.0	
Polybutene	-	-	-	4.5	
Candelilla wax	4.6	4.6	-	-	6.0
Paraffin wax	-	-	-	15.0	2.0
Microcrystalline wax	-	-	-	6.0	4.0
Beeswax	3.0	3.0	-	-	4.0
Ozokerite wax	6.0	6.0	-	-	
Carnauba wax	3.0	3.0	-	-	
Hydrogenated castor oil	0.50	0.50	4.0	-	
Silica	-	-	-	4.5	
Sodium magnesium silicate	-	-	-	1.5	
Tocopherol	0.03	0.03	-	-	
Cyclomethicone	-	-	59.0	-	
Stearyl alcohol	-	-	25.5	-	9.0
Cetyl alcohol					9.0
Glyceryl stearate	-	-	2.6	-	
Acetylated monoglyceride					15.0
Diisostearyl maleate[1]	-	-	-	6.0	
Glyceryl distearate	-	-	-	9.5	
Glycerin	-	-	-	6.0	
Water	-	-	-	3.0	
Nonylphenol polyglycine ether[2]	-	-	5.0	-	
Micronized titanium dioxide		5.0	-	-	

Octyl methoxycinnamate	5.0	-	-	-	
Fragrance & misc.	1.0	1.0	1.0	1.0	2.0

[1] Available as Myvacet 7-07, about half acetylated, from Eastman Chemical Co.

[2] Available as Hamplex TNP, Hampshire Chemical Co.

Example 28

Prepare a representative skin conditioning component by mixing the following components.

Component	Example 28
Polydecene[1]	53.3
Stearyl Alcohol	7.7
12-Hydroxystearic acid	13.5
Nonylphenol polyglycine ether	25.0
Octyl methoxycinnamate	1.5

[1]Puresyn 3000, Mobil Chemical Co.

Examples 29-31

Prepare a representative skin conditioning component by mixing the following components.

Component	Example 29	Example 30	Example 31
Glycerin	95.0	95.0	94.0
Decaglyceryl dipalmitate[1]	5.0	1.0	5.0
Deceglyceryl dibehenate		4.0	
Tribehenin			1.0

[1] Available as Polyaldo 10-2-P from Lonza

Examples 32-36

Prepare a representative conditioning component for the articles of the present invention in the following manner.

Component	Example 32	Example 33	Example 34	Example 35	Example 36
Hydrophobic Phase:					
SEFA* cottonate	4.65	4.65	15.5	15.5	
SEFA* behenate	0.35	0.35	8.0	8.0	
Tribehenin			6.0	6.0	
Petrolatum			4.0	4.0	4.4

Cocoa butter					15.5
C10-C30 Cholesterol/Lanosterol esters			13.0	13.0	
C30-C45 alkylmethicone[1]					
Polyglyceryl-4 isostearate (and) Cetyl dimethicone (and) Hexyl laurate[2]	5.0	5.0			
PEG 30 dipolyhydroxystearate[3]			3.0		
Tetraglyceryl monostearate				2.1	
Decaglyceryl dipalmitate				0.90	
Ceresin wax					5.5
Beeswax					7.0
Lecithin, purified					10.0
1-Monostearin					10.0
Hydrophilic Phase:					
Glycerin	70.0	66.5	42.30	42.30	40.0
Water		3.5			5.0
PVM/MA decadiene crosspolymer[4]			0.25	0.25	
Sodium hydroxide (10% solution)			0.25	0.25	
Gelatin					2.6
Active skin care ingredients:					
Panthenol	20.0	10.0	2.50		
Nicotinamide		5.0	2.50	3.0	
Urea		5.0	2.50	2.50	
Allantoin			0.20	0.20	
Acetamidopropyl trimonium chloride				2.0	

* SEFA is an acronym for sucrose esters of fatty acids

[1] Available as AMS-C30 from Dow Corning

[2] Available as Abil WE-09 from Goldschmidt

[3] Available as Arlacel P135 from ICI

[4] Available as Stabileze 06 from ISP

Process for all emulsions:

Heat the hydrophobic phase to 70°C, add the hydrophobic active skin care ingredients, and stir until homogenous. Premix the hydrophilic phase ingredients with the hydrophilic active skin care ingredients, heating gently if necessary to dissolve or disperse them. Add these slowly to the hydrophobic phase, continuing to stir. Homogenize (high shear mixer; ultrasonic homogenizer; or high pressure homogenizer such as Microfluidizer from Microfluidics Corp.). Apply immediately to substrate surface or cool rapidly to below room temperature in ice or ice water. Store in controlled environment, under nitrogen if needed for chemical stability.

Examples 37-41

Prepare a representative conditioning component as described in Examples 32-36 using the following ingredients.

Component	Example 37	Example 38	Example 39	Example 40	Example 41
Hydrophobic Phase:					
SEFA* cottonate			15.0	16.0	
SEFA* behenate			7.5	4.0	
Tribehenin			6.0		
Petrolatum			4.0	4.0	4.4
Cocoa butter					15.5
Polydecene[1]	50.0	46.5			
C10-C30 Cholesterol/ Lanosterol esters			13.0	10.5	
PEG 30 dipolyhydroxy-stearate			3.0	3.0	
Ceresin wax					5.5
Beeswax					7.0
Aluminum/ magnesium				7.5	

hydroxystearate in mineral oil[2]					
C30-38 Olefin/isopropyl maleate copolymer[3]				2.5	
Polyethylene wax[4]				1.0	
Lecithin, purified					10.0
Fragrance and misc.			1.0		
1-Monostearin					10.0
Hydrophilic Phase:					
Glycerin	30.0	25.0	34.80	20.0	38.0
Water	8.0	8.0			5.0
PEG 2000				17.0	
PVM/MA decadiene crosspolymer			0.25		
Sodium hydroxide (10% solution)			0.25		
Gelatin	9.50	9.50			2.6
Active skin care ingredients:					
Nicotinamide			2.50		
Menthol in 50% beta cyclodextrin		2.50			
Ascorbic acid (natural)		2.50			
Tocopherol (natural)		1.00		2.50	
Sorbitol			2.50		
Lactic acid	2.5				
Urea			2.50		
Allantoin			0.20		
Triclosan					1.50
Chlorhexidine					0.50
Benzoyl peroxide			5.0		

15% Salicylic acid in PPG 14 butyl ether				12.0	
Salicylic acid			2.5		

[1] Available as Puresyn 3000 from Mobil

[2] Available as Gilugel Min from Giulini Chemie

[3] Available as Performa 1608 from New Phase Technologies

[4] Available as Performalene 400 from New Phase Technologies

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Examples 42-46

Prepare a representative conditioning component as described in Examples 32-36 using the following ingredients.

Component	Example 42	Example 43	Example 44	Example 45	Example 46
Hydrophobic Phase:					
SEFA* cottonate	20.5	15.5			16.0
Mineral oil			7.50		
SEFA* behenate	8.0	8.0			8.0
Tribehenin	9.5	6.0			6.0
Petrolatum (white or superwhite)	4.0	4.0	22.6	3.0	4.0
Candelilla wax			4.50		
Paraffin wax			3.00	14.0	
Microcrystalline wax			1.50		
Beeswax			3.00		
C10-C30 Cholesterol/Lanosterol esters	18.0	13.0			13.0
Laurylmethicone copolyol[1]				5.0	
Acetylated monoglyceride[2]			11.3		
Stearyl alcohol			6.8		
Cetyl alcohol			6.8		
Stearic acid					

PEG 30 dipolyhydroxy-stearate	4.5	3.0			
Decaglyceryl dipalmitate[3]					0.90
Tetraglyceryl monostearate					2.10
Fragrance, misc.	1.0		3.0	2.0	
Hydrophilic Phase:					
Glycerin	22.8	27.5	25.0	38.0	41.0
Decaglyceryl dipalmitate[3]	2.5				
Calcium silicate microspheres[4]		15.0			
Active skin care ingredients:					
Guar hydroxypropyl-trimonium chloride	1.00				
Chitosan glycolate		2.50			
Nicotinamide	1.50	2.50	2.50		
0.2% Carbopol 940 aqueous solution, pH 6.0				38.0	
Retinol					2.50
Phytantriol[5]	1.00				
Urea	2.50	3.0	2.50		
Vitamin C					2.50
Borage oil					2.50
Ascorbyl palmitate					1.50
Acetamidopropyl trimonium chloride[6]	2.50				

[1] Available as Dow Q2-5200, Dow Corning

[2] Available as Myvacet 7-07, about half acetylated, from Eastman Chemical Co.

[3] Available as Polyaldo 10-2-P from Lonza

[4] Available as Celite C from Celite Co.

[5] Available as Hydagen CMF from Henkel

[6] Available as Incromectant AQ from Croda

Example 43: Glycerin incorporated into microspheres, then blended into molten lipid phase and cooled for storage or applied to substrate.

Examples 47-52

Prepare a representative conditioning component as described in Examples 32-36 using the following ingredients.

Component	Example 47	Example 48	Example 49	Example 50	Example 51	Example 52
Hydrophobic Phase:						
SEFA* cottonate	16.0	16.0	16.0	16.0	16.0	16.0
Mineral oil						
SEFA* behenate		8.0	8.0	8.0	8.0	8.0
Tribehenin	6.0	6.0	6.0	6.0	6.0	6.0
Petrolatum (white or superwhite)	4.0	4.0	4.0	4.0	4.0	4.0
C10-C30 Cholesterol/ Lanosterol esters	13.0	13.0	13.0	13.0	13.0	13.0
Stearyl dimethicone	2.0					
Dimethicone hydroxystearate	4.0					
Dimethicone copolyol behenate	2.0					
PEG 30 dipolyhydroxy stearate			3.00		3.00	
Sodium lauroyl glutamate				2.00		
Sodium stearoyl				2.00		

lactylate						
Calcium stearate						5.0
Decaglyceryl dipalmitate	0.90	0.90		0.90		0.90
Tetraglyceryl monostearate	2.10	2.10		2.10		2.10
Fragrance, misc.	1.00	1.00	1.00	1.00	1.00	1.00
Hydrophilic Phase:						
Glycerin	44.5	42.5	35.5	35.5	25.0	43.0
75% Polyethylene -imine[1] in water, pH 6.5			4.50	4.50		
Water						2.0
Decaglyceryl dipalmitate			2.50	2.50		
Fumed silica					20.0	
Propylene glycol alginate[2]						2.0
Active skin care ingredients:						
Nicotinamide		2.00			2.00	
Chitosan		1.50				
Green tea extract	4.50					
Aloe vera gel		3.0				
Vitamin C			2.50			
Ascorbyl palmitate			2.00	2.50		
Acetamidopropyl trimonium chloride			2.00		2.00	

[1] Available as Epomin SP-018 from Nippon Shokubai Co.

[2] Available as Kelcoloid HVF from Kelco

Examples 53-55

Prepare a representative conditioning component for the articles of the present invention in the following manner.

Component	Example 53	Example 54	Example 55
Hydrophobic Phase:			
Lecithin, purified[1]	15.4	10.3	10.8
Decane	28.6	19.2	15.0
Mineral Oil			5.0
Tricontanyl PVP[2]			26.0
Stearyl alcohol		13.0	
12-hydroxystearic acid		19.4	
Hydrophilic Phase:			
Glycerin	28.0	18.8	19.6
Propylene glycol	28.0	18.8	19.6
Active skin care ingredients:			
Triclosan		0.20	
Salicylic acid		0.40	
Nicotinamide			4.0

[1] Available as Epikuron 200 from Lucas Meyer

[2] Available as Ganex WP-660 from ISP

Stir all ingredients together until microemulsion forms. Add skin care ingredients first to the phase which most closely matches their solubility parameter. When adding waxes, heat slowly just to the wax melting point, disperse by stirring, and add to substrate or cool to room temperature and store.

Examples 56-58

Prepare a representative conditioning component for the articles of the present invention in the following manner.

Component	Example 56	Example 57	Example 58
Hydrophobic Phase:			
Isohexadecane	42.29	43.0	28.3
Sodium dioctyl sulfosuccinate[2]	10.62	7.0	7.1
Hydrophilic Phase:			
Glycerin	35.17	19.0	23.6

Water	11.72	19.0	7.8
Carnauba wax			29.0
Gelatin		6.0	
Active skin care ingredients:			
Triclosan	0.20		
Titanium dioxide, cosmetic			4.2
Titanium dioxide, micronized		4.2	
Salicylic acid		1.8	

[1] Available as Epikuron 200 from Lucas Meyer

[2] Available as Aerosol OT from Pfaltz and Bauer

Add skin care ingredients first to the phase which most closely matches their solubility parameter. Then, stir all ingredients together until microemulsion forms. Coat onto substrate surface.

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Examples 59-64

Prepare a representative conditioning component for the articles of the present invention in the following manner.

Part A	Example 59	Example 60	Example 61	Example 62	Example 63	Example 64
Sodium lauroyl ether sulfate (SLES, add as 27% active)	15.0	6.51	6.20			5.9
Cocamido-propyl betaine[1]	13.5	5.85	5.57	5.82	5.19	5.3
Sodium lauroyl sarcosinate[2]	1.35	0.60	0.57	6.01	5.36	0.54
Decylpoly-glucose[3]				5.80	5.18	
Lauryl alcohol	1.31	0.56	0.54			0.54
Polyethylene-imine[4]	7.87	3.38	3.22	2.64	2.36	3.2
Citric acid (add as 50%	0.32	0.11	0.11			0.09

aqueous solution)						
Tetrasodium EDTA	0.28					
Sulfuric acid	5.4	2.37	2.25			2.2
Preservative, fragrance	0.62	0.45	0.43	2.86	2.55	0.3
Sodium sulfate	7.9	3.47	3.21			3.0
Glycerin	26.45	56.7	46.4	44.1	39.36	44.8
Sorbitol			5.0			
SEFA* cottonate					12.8	
SEFA* behenate					8.0	

Part B – Polymer gelling agents

Gelatin					4.2	
Polyacryl-amide and isoparaffin[5]				7.5		
Polyurethane latex in 50% isopropanol[6]						34.1
Polyacrylate copolymer[7]				7.5		
Polystyrene sulfonates copolymer[8]			1.1			
Chitosan lactate			5.4			

Part C – Physical gelling agents

12-Hydroxy-stearic acid	10.0			10.66		
Stearyl alcohol	10.0	20.0	20.0	7.11	15.0	

* SEFA is an acronym for sucrose esters of fatty acids

[1] Available as Tegobetaine F from Goldschmidt

[2] Available as Hamposyl L-30 (type 721) from Hampshire Chemical, 31% active

[3] Available as Plantaren 2000NP from Henkel

[4] Available as Epomin SP-018, molecular weight about 1800, from Nippon Shokubai Co.

[5] Available as Carbopol Ultrez from B.F. Goodrich

[6] Available as Sancure 2710 from B.F. Goodrich, prepared as premix comprising about 20% polymer, 30% water, 50% IPA

[6] Available as Sepigel 305 from Seppic Corp.

[7] Available as AQ38S from Eastman Chemical

Blend the surfactants and fatty alcohol while heating to 65°C with a low speed impeller mixer. Remove from heat, allow to cool to 65°C while continuing to mix. Add the cationic polymer and stir until homogeneous. Slowly add remaining Part A ingredients while stirring. Homogenize to disperse the SEFA as an emulsion. Titrate with concentrated sulfuric acid until a pH of about 6.5 is reached. Prepare a dried mixture by spreading the Part A composition in trays and drying in a suitable (vacuum or convection) oven at a temperature not exceeding 65°C until essentially no water remains. Blend the dried Part A ingredients with the polymeric gelling agents from Part B, heat to dissolve or disperse. Blend the resulting composition with the physical gelling agents. Heat to melt and dissolve gelling agents into the composition. Apply to substrate surface(s) or cool to room temperature and store.

Examples 65-70

Prepare a representative conditioning component for the articles of the present invention as described in Examples 59-64 using the following ingredients.

Part A	Example 65	Example 66	Example 67	Example 68	Example 69	Example 70
Sodium lauroyl sarcosinate[1]	8.87			11.4	10.8	10.8
Polyethylene-imine[2]	7.39	7.50	7.50	9.5	9.0	9.0
Water	4.43	3.00	3.00	5.7	5.4	5.4
Sulfuric acid	6.36	QS	QS	8.1	7.7	7.7
Fragrance, misc.						
Glycerin	34.45	52.5	45.0	41.3	39.25	34.25
Propylene glycol	2.50					
Urea		2.50	2.50	2.0	1.9	1.9
Panthenol				2.0	1.9	1.9
Nicotinamide		2.50	2.50	2.0	1.9	1.9
Salicylic acid						

Polymethyl-silsesquioxane[3]					4.20	4.20
Mica, pearlescent					3.85	3.85
Stearylmethi-cone wax						5.0
SEFA cottonate			5.0			
Petrolatum			5.0			

Part B – Polymer gelling agents

Gelatin						0.1
Polyacrylamide and isoparaffin[4]	16.0	12.0	12.0			

Part C – Physical gelling agents

12-Hydroxystearic acid	12.0	12.0	10.5			
Carnauba wax				18.0	14.1	14.1
Stearyl alcohol	8.0	8.0	7.0			

[1] Available as Hamposyl L-95 from Hampshire Chemical, dry

[2] Available as Epomin SP-018, molecular weight about 1800, from Nippon Shokubai Co.

[3] Available as Tospearl 145A from Kobo, Inc.

4 Available as Sepigel 305 from Seppic Corp.

Examples 71-74

Prepare a representative skin conditioning component which includes the following components.

Component	Example 71	Example 72	Example 73	Example 74
SEFA* Cottonate		62.0	52.0	
Petrolatum			4.5	
Stearyl Alcohol	4.0			
Stearic Acid	3.0			
Lanolin		20.0	13.0	
Ethylene vinyl acetate polymer[1]		10.0	10.0	
Polydecene[2]			2.0	2.0
Sodium lauroyl sarcosinate[3]	25.0	3.00	3.0	

Lauryl betaine[4]		1.50	2.0	
Lauroampho-acetate[5]				5.25
Sodium laureth-3 sulfate[6]				10.5
Cocamide MEA[7]				2.80
Sulfuric acid	QS			
Guar hydroxypropyl-trimonium chloride	0.50		0.50	
Cholesterol[8]	9.0	1.0		
Nonylphenol polyglycine ether[9]			5.0	
Micronized titanium dioxide			4.0	
Octyl methoxycinnamate			4.0	
Nicotinamide		2.5		
Glycerin	10.0			3.00
Water	48.5			55.95
PEG 6 caprylic/capric glycerides				3.40
Maleated soybean oil				1.50
Soybean oil (deodorized)				8.0
Palm kernel fatty acids				2.60
Polyquaternium-10				0.40
Fragrance, preservative, misc.				4.60

*SEFA is an acronym for sucrose esters of fatty acids

[1] Available Elvax 40W from DuPont

[2] Available as Puresyn 3000 from Mobil

[3] Available as Hamposyl L95 (solid) or L30 (30% active in water) from Hampshire Chemical, e.g.

[4] Available as Empigen BS98 from Albright & Wilson (80% betaine, 20% salt)

[5] Available Empigen CDL60 from Albright & Wilson

[6] Available as Empicol ESC3 from Albright & Wilson

[7] Available as Empilan CME/G from Albright & Wilson

[8] Available as Super Hartolan from Croda

[9]Hamplex TNP, Hampshire Chemical Co.

Melt the lipid components, add the water (if applicable) and humectant(s), add the surfactant and continue to heat and stir until homogeneous. Cool to room temperature and add the skin care active(s) and deposition agent(s). Adjust pH to about 7.0 with sulfuric acid. Spray, roll, dip or otherwise apply to substrate and dry (if water containing) before packaging.

III. Personal Care Articles

Example 75

Prepare a representative skin cleansing article in the following manner.

Four grams of the cleansing component of Example 11 is applied to one side of a permeable, fusible web comprised of low-melting heat-sealable polyamide fibers. The permeable web is Wonder Under manufactured by Pellon, available from H. Levinson & Co., Chicago, IL. The cleansing component is applied to an oval area approximately 13 cm by 18 cm. The cleansing component is air dried. A layer of 2 oz/sq yd polyester batting cut to the same size as the web is placed over the fusible web. The polyester batting has a basis weight of 2 oz/yd^2 and is comprised of a blend of fibers of about 23 microns and 40 microns average diameter, at least some of which are crimped. The thickness of the batting is about 0.23 in. measured at 5 gsi. The batting is believed to be heat-bonded, utilizing no adhesive. A layer of a nonwoven is placed under the fusible web to form the second side of the article. The nonwoven is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. The shape of the article is about 122 mm x 160 mm oval. The layers are sealed together using point bonds in a grid pattern with a heat sealing die utilizing a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA. The point bonds measure about 4 mm diameter each and there are about 51 individual sealing points evenly spaced. The article is trimmed and ready for use.

Example 76

Prepare a representative skin cleansing article in the following manner.

The cleansing component of Example 11 is applied to one side of a first substrate by extruding it through a coating head continuously in four lines separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The cleansing component is extruded at a rate to yield 4.4 grams of cleansing component per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-

butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the surfactant-containing layer. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. The web is cut into individual articles measuring about 120 mm x 160 mm rectangles with rounded corners, which has a total of about 51 sealing points per article.

Example 77

Prepare a representative skin cleansing and conditioning article in the following manner.

Three grams of the skin conditioning composition of Example 34 is applied, half to each side, of the finished article of Example 75. The composition is applied by slot coating the composition as a hot liquid (60-70°C) to the article surfaces evenly, half of the composition on each side of the article.

Example 78

Prepare a representative skin cleansing and conditioning article in the following manner.

Three grams of the skin conditioning composition of Example 18 is applied, half to each side, of the finished article of Example 75. The composition is applied by slot coating the composition as a hot liquid (60-70°C) to the article surfaces evenly, half of the composition on each side of the article.

Example 79

Prepare a representative skin cleansing and conditioning article in the following manner.

Three grams of the skin conditioning composition of Example 65 is applied, half to each side, of the finished article of Example 75. The composition is applied by slot coating the composition as a hot liquid (60-70°C) to the article surfaces evenly, half of the composition on each side of the article.

Example 80

Prepare a representative skin cleansing and conditioning article in the following manner.

Three grams of the skin conditioning composition of Example 34 is applied, half to each side, of the finished article of Example 76. The composition is applied by slot coating the composition as a hot liquid (60-70°C) to the article surfaces evenly, half of the composition on each side of the article.

Example 81

Prepare a representative skin cleansing and conditioning article in the following manner.

Three grams of the skin conditioning composition of Example 18 is applied, half to each side, of the finished article of Example 76. The composition is applied by slot coating the composition as a hot liquid (60-70°C) to the article surfaces evenly, half of the composition on each side of the article.

Example 82

Prepare a representative skin cleansing and conditioning article in the following manner.

Three grams of the skin conditioning composition of Example 65 is applied, half to each side, of the finished article of Example 76. The composition is applied by slot coating the composition as a hot liquid (60-70°C) to the article surfaces evenly, half of the composition on each side of the article.

Example 83

Prepare a representative skin cleansing article in the following manner.

The cleansing component of Example 11 is applied to one side of a first substrate by extruding it through a coating head continuously in four lines separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The cleansing component is extruded at a rate to yield 4.4 grams of cleansing component per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the surfactant-containing layer. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. The web is cut into individual articles measuring about 120 mm x 480 mm rectangles with rounded corners.

Example 84

Prepare a representative skin cleansing article in the following manner.

The cleansing component of Example 11 is applied to one side of a first substrate by extruding it through a coating head continuously in four lines separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The cleansing component is extruded at a rate to yield 4.4 grams of cleansing component per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second substrate web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the surfactant-containing layer. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core

and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). A third substrate web which is the same as the second substrate web is continuously fed over the second substrate web placing it in contact with the second substrate. The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. The web is cut into individual articles measuring about 120 mm x 90 mm rectangles with rounded corners.

Example 85

Prepare a representative skin cleansing article in the following manner.

Four grams of the cleansing component of Example 12 is applied to one side of a permeable, fusible web comprised of low-melting heat-sealable polyamide fibers. The permeable web is Wonder Under manufactured by Pellon, available from H. Levinson & Co., Chicago, IL. The cleansing component is applied to an oval area approximately 13 cm by 18 cm. The cleansing component is air dried. A layer of 2 oz/sq yd polyester batting cut to the same size as the web is placed over the fusible web. The polyester batting has a basis weight of 2 oz/yd^2 and is comprised of a blend of fibers of about 23 microns and 40 microns average diameter, at least some of which are crimped. The thickness of the batting is about 0.23 in. measured at 5 gsi. The batting has an air permeability of about 1270 cfm/ft^2 and a foam permeability critical pressure of about 2.7 cm H_2O. The batting is believed to be heat-bonded, utilizing no adhesive. A layer of a nonwoven is placed under the fusible web to form the second side of the article. The nonwoven is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. The shape of the article is about 122 mm x 160 mm oval. The layers are sealed together using point bonds in a grid pattern with a heat sealing die utilizing a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA. The point bonds measure about 4 mm diameter each and there are about 51 individual sealing points evenly spaced. The article is trimmed and ready for use.

Examples 86-88

Prepare representative skin cleansing articles with the cleansing components of Examples 1, 2 and 5 in the following manner.

Eight grams of cleansing component is applied to one side of a permeable, fusible web comprised of low-melting heat-sealable fibers in four quadrants forming a rectangle about 10 inches by 12 inches, leaving space at the edge and between quadrants to seal layers without the presence of surfactant. The permeable web is a fibrous, low density polyethylene (LDPE or LLDPE) material commonly available from sewing supply distributors. A layer of 4 oz/sq yd polyester batting cut to the same size as the web is placed over the fusible web. The polyester batting has a basis weight of 4 oz/yd^2 and is comprised of polyester fibers of about 30 microns average diameter and is adhesive bonded, available for example as Mountain Mist Extra Heavy Batting #205 from Stearns Textiles, Cincinnati, OH. A layer of fibrous nonwoven which

is a hydroentangled blend of 55% cellulose and 45% polyester having a basis weight of about 65 gsm (available as Technicloth II from The Texwipe Company, Saddle River, NJ) is placed under the fusible web. The layers are sealed together in a rectangular windowpane shape with a heat sealing die utilizing a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA with sufficient temperature and pressure to cause the batting to melt and flow into the first layer and hence form an adequate seal, usually about 300 degrees Fahrenheit and 30 psi machine pressure sealing for 6-10 seconds is sufficient. The seal is continuous around the edges and has a single windowpane cross-member in each X- and Y-direction measuring about 2 mm width. After cooling the article is trimmed and the corners rounded and it is stored until ready for use.

Examples 89-90

Prepare representative skin cleansing and conditioning articles with the cleansing component powders of Examples 3 and 4 in the following manner.

Four grams of dry cleansing component powder is applied to one side of a permeable, fusible web comprised of low-melting heat-sealable fibers. The permeable web is Wonder Under manufactured by Pellon, available from H. Levinson & Co., Chicago, IL. The powder is sprinkled evenly over an oval area approximately 17 cm by 19 cm. A layer of 2 oz/sq yd polyester batting cut to the same size as the web is placed over the fusible web. The polyester batting has a basis weight of 2 oz/yd^2 and is comprised of a blend of fibers of about 23 microns and 40 microns average diameter, at least some of which are crimped. The thickness of the batting is about 0.23 in. measured at 5 gsi. The batting has an air permeability of about 1270 cfm/ft^2 and a foam permeability critical pressure of about 2.7 cm H_2O. The batting is believed to be heat-bonded, utilizing no adhesive. A second nonwoven layer is prepared which is hydroapertured, comprising polyester fibers of about 10 microns diameter and containing within it an interlaced polypropylene scrim having a fiber diameter about 150 microns, laced at about 0.8 cm intervals. The second layer is cut larger than the required article dimensions and placed in a convection oven at a temperature of about 150 degrees Celsius for about 10 minutes, until the X- and Y-dimensions of the layer have shrunk to about 70 percent of their original size and the layer has a macroscopic thickness of about 0.12 in. measured at 5 gsi. The layer has a macroscopic average basis weight of about 64 gsm before shrinking, and apertures measuring about 0.5 mm average diameter. The second layer is placed under the fusible web and the layers are sealed together using point bonds and also a 2 mm wide seal around the perimeter with a heat sealing die utilizing a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA. The point bonds measure about 3 mm diameter each and there are about 51 individual sealing points evenly spaced. The article is trimmed, and 2.5 grams of the skin conditioning composition of Example 25 is applied to the lofty batting side of the article by feeding the composition through a slotted rolling device with a machined 1.5 mm gap and a feed reservoir held at about 60°C. The composition quickly cools on the article surface and is stored in a sealed, metallized film package until ready for use.

Examples 91-96

Prepare representative skin cleansing and conditioning articles with the liquid cleansing components of Examples 6, 8, 9, 15, 16 and 17 in the following manner.

Liquid cleansing component is applied to one side of a first substrate by coating with a brush until 2 grams of solid cleansing component has been applied, in a windowpane design avoiding the edges and the sealing loci. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. The substrates are air dried in a convection oven at 45°C for about 6 hours or until dry to the touch. A second substrate which is an airlaid, lofty, low density batting is placed over the first substrate placing it in contact with the surfactant-containing layer. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The layers are sealed together in a rectangular windowpane shape with a heat sealing die utilizing a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA with sufficient temperature and pressure to cause the batting to melt and flow into the first layer and hence form an adequate seal, usually about 300 degrees Fahrenheit and 30 psi machine pressure sealing for 6-10 seconds is sufficient. The seal is continuous around the edges and has a single windowpane cross-member in each X- and Y-direction measuring about 2 mm width. After cooling the article is trimmed and 3 grams of the skin conditioning composition of Example 26 is applied to the lofty batting side of the article by feeding the composition through a slotted rolling device with a machined 1.5 mm gap and a feed reservoir held at about 60°C. The composition quickly cools on the article surface and is stored in a sealed, metallized film package until ready for use.

Examples 97-102

Prepare representative skin cleansing and conditioning articles with the liquid cleansing components of Example 7 and the skin conditioning compositions of Examples 19 through 24 in the following manner.

Four strips of the liquid cleansing component are extruded continuously on a moving first web which is an airlaid, lofty, low density batting. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm), and is airlaid and heat bonded with no adhesive. The liquid cleansing component is heated to melting point and held in a reservoir at about 65°C and fed by pump to an extrusion head which continuously meters 4 cylindrical strands onto the web at even spacing across the web, to achieve a final add-on rate of about 5 grams of composition per finished article. A second web which is a microapertured and macroapertured formed film which is the formed film of U.S. Patent No. 4,629,643 is continuously fed onto the first web, macroapertured male side towards the batting and cleansing component. The skin conditioning composition

is slot coated evenly onto the exposed batting surface at a rate of 3 grams of composition per finished article while hot, cooling on the article surface to solidify. The webs are continuously sealed and cut into 120mm by 160 mm rectangles with rounded corners using a heated metal roll and a pressure roll applied against the formed film side. The articles are packaged until ready for use.

Examples 103-105

Prepare representative skin cleansing and conditioning articles with the liquid cleansing component of Example 6 and the skin conditioning compositions of Examples 56, 57 and 58 in the following manner.

Liquid cleansing component is applied to one side of a first substrate by coating with a brush until 2 grams of solid surfactant has been applied, in a windowpane design avoiding the edges and the sealing loci. The substrate is an airlaid, lofty, low density batting comprising a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The cleansing component is dried. A second substrate which is a high wet strength, adhesive bonded cellulose paper towel with good loft and a basis weight of about 53 gsm is placed over the cleansing component exposed side of the batting. A useful towel is available from The Procter & Gamble Company and marketed as Bounty Rinse & Reuse ®, which retains its Z-direction height when wet, and which has a thickness of about 0.047 inches at 5 gsi and a Loft/Soft ratio of about 1.28. The layers are sealed together in a rectangular windowpane shape with a heat sealing die utilizing a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA with sufficient temperature and pressure to form an adequate seal. The seal is continuous around the edges and has a single windowpane cross-member in each X- and Y-direction measuring about 2 mm width. The article is trimmed, and 1.5 grams of skin conditioning composition is applied to the lofty batting side of the article by feeding the composition through a slotted rolling device with a machined 1.5 mm gap and a feed reservoir held at about 60°C. The composition quickly cools on the article surface and is stored in a sealed, metallized film package until ready for use.

Example 106

Prepare a representative skin cleansing and conditioning article in the following manner.

The cleansing component of Example 12 is applied to one side of a first substrate by extruding it through a coating head continuously in four lines separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The cleansing component is extruded at a rate to yield 4.4 grams of cleansing component per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second substrate web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the surfactant layer. The batting

comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). A third substrate web which is the same as the second substrate web is continuously fed over the second substrate web placing it in contact with the second substrate. The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. The skin conditioning liquid of Example 53 is sprayed onto the web at a rate of about 25 gsm per side, or about 0.5 grams of composition per finished article. The web is cut into individual articles measuring about 120 mm x 90 mm rectangles with rounded corners and packaged until ready for use.

Example 107-108

Prepare representative skin cleansing and conditioning articles in the following manner, utilizing the skin conditioning compositions of Examples 54 and 55.

The low water activity cleansing component of Example 2 is three-roll milled with aluminosilicate (available as Advera 401 N from The PQ Corporation, Valley Forge, PA, which generates heat due to an exothermic reaction upon exposure to water) in a ratio of 1:1. Ten grams the cleansing component is applied to one side of a layer of batting. The batting is an airlaid, lofty, low density batting comprising a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The surfactant is applied fibers in four quadrants together forming a rectangle about 10 inches by 12 inches, leaving space at the edge and between quadrants to seal layers without the presence of surfactant. A second nonwoven layer is prepared which is hydroapertured, comprising polyester fibers of about 10 microns diameter and containing within it an interlaced scrim having a fiber diameters about 100 microns running across the width of the nonwoven and about 250 microns orthogonal to the width, laced (bonded) at about 1 cm intervals. Such a scrim is available from Conwed plastics, Minneapolis, MN. The second nonwoven has a basis weight of about 70 gsm, and is slightly creped due to web tension during manufacture of the nonwoven, and subsequent relaxation of the tension. The layers are sealed together using point bonds and also a 2 mm wide seal around the perimeter with a heat sealing die utilizing a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA. The point bonds measure about 3 mm diameter each and there are about 51 individual sealing points evenly spaced. The article is trimmed, and 4 grams of skin conditioning composition is applied to the lofty batting side of the article by feeding the composition through a slotted rolling device with a machined 1.5 mm gap and a feed reservoir held at about 60°C. The composition quickly cools on the article surface and is stored in a sealed, metallized film package until ready for use.

Examples 109-116

Prepare representative skin cleansing and conditioning articles in the following manner, utilizing the skin conditioning compositions of Examples 59, 60, 61, 62, 63, 68, 69 and 70.

Four grams of the cleansing component of Example 11 is spread evenly by hand across a lofty batting. The batting is an airlaid, lofty, low density batting comprising a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). A layer of fibrous nonwoven which is a hydroentangled blend of 55% cellulose and 45% polyester having a basis weight of about 65 gsm (available as Technicloth II from The Texwipe Company, Saddle River, NJ) is placed over the cleansing component coated side of the batting. The layers are sealed together using interlocking sealing plates using an unheated plate having inverted thimble-shaped reservoirs spaced evenly in a hexagonal grid pattern. The thimble shaped reservoirs are about 1.2 cm diameter at the base and are spaced about 2 cm apart, center-to-center. The land area between the dimples on the unheated plate is concave inwards by several mm, forming an interconnected trough. The heated plate has an external ridge which fit precisely into the trough on the land area of the unheated plate. The heated plate contacts the cellulose/polyester substrate and a heat seal is effected using pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA. The resulting unfinished article has pronounced thimble shapes rising up on the batting side, and shorter dimples or 'buttons' rising up on the cellulose/polyester substrate side of the article, making both sides easy to grip. The article is cut into a rectangle about 120 mm by 160 mm. Three grams of skin conditioning composition per article is pipetted into the trough area while the composition is hot, and allowed to cool and solidify. The article is packaged until ready for use.

Example 117

Prepare a representative skin cleansing and conditioning article in the following manner.

Eight grams of the liquid cleansing component of Example 10 cleansing component is applied by brush to one side of a permeable, fusible web comprised of low-melting heat-sealable fibers in four quadrants forming a rectangle about 10 inches by 12 inches, leaving space at the edge and between quadrants to seal layers without the presence of cleansing component. The permeable web is a fibrous, low density polyethylene (LDPE or LLDPE) material commonly available from sewing supply distributors. The composition is dried. A layer of 4 oz/sq yd polyester batting cut to the same size as the web is placed over the fusible web. The polyester batting has a basis weight of 4 oz/yd^2 and is comprised of polyester fibers of about 30 microns average diameter and is adhesive bonded, available for example as Mountain Mist Extra Heavy Batting #205 from Stearns Textiles, Cincinnati, OH. A layer of fibrous nonwoven which is a hydroentangled blend of 55% cellulose and 45% polyester having a basis weight of about 65 gsm (available as Technicloth II from The Texwipe Company, Saddle River, NJ) is placed under the fusible web. The layers are sealed together in a rectangular windowpane shape with a heat sealing die utilizing a pressure-

platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA with sufficient temperature and pressure to cause the batting to melt and flow into the first layer and hence form an adequate seal, usually about 300 degrees Fahrenheit and 30 psi machine pressure sealing for 6-10 seconds is sufficient. The seal is continuous around the edges and has a single windowpane cross-member in each X- and Y-direction measuring about 2 mm width. Five grams of the conditioning composition of Example 64 is brush applied to the article, half to each side, and the article is again dried. The article is trimmed, the corners rounded and it is stored until ready for use.

Example 118 - 119

Prepare representative skin cleansing and conditioning articles utilizing the skin conditioning compositions of Examples 66 and 67 in the following manner.

The liquid cleansing component of Example 15 is applied to a first substrate by dipping a 120 mm by 160 mm section of the substrate in a bath of the composition until it has increased its weight by about 8 grams. The substrate is a batting comprising a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The substrate is dried. A piece of a second substrate which is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive and hydroapertured to form holes about 2 mm in diameter, having a basis weight of about 70 gsm is placed over the first substrate. The substrates are sealed together using an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the article. Four grams of skin conditioning composition is applied evenly over both sides of the article by feeding the composition through a slotted rolling device with a machined 1.5 mm gap and a feed reservoir held at about 60°C. The composition quickly cools on the article surface and is stored in a sealed, metallized film package until ready for use.

Example 120-124

Prepare representative skin cleansing and conditioning articles utilizing the skin conditioning compositions of Examples 27 through 31 in the following manner.

The cleansing component of Example 11 is applied to one side of a first substrate by extruding it through a coating head continuously in four lines separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The cleansing component is extruded at a rate to yield 4.4 grams of cleansing component per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second substrate web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the surfactant –containing ayer. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core

and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). A third substrate web which is the same as the second substrate web is continuously fed over the second substrate web placing it in contact with the second substrate. The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. Skin conditioning composition is slot coated from a hot reservoir pumped through a slot dye onto both sides of the substrate web at a rate equal to 3 grams of skin conditioning composition per finished article (about 140 gsm add-on per side), and passed across a cooling fan so the composition cools quickly on the article outer surfaces. The web is cut into individual articles measuring about 120 mm x 90 mm rectangles with rounded corners.

Examples 125-145

Prepare representative skin cleansing and conditioning articles utilizing the skin conditioning compositions of Examples 32 through 52 in the following manner.

The cleansing component of Example 11 is applied to one side of a first substrate by extruding it through a coating head continuously in four lines separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The cleansing component is extruded at a rate to yield 4.4 grams of cleansing component per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second substrate web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the surfactant-containing layer. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). A third substrate web which is the same as the second substrate web is continuously fed over the second substrate web placing it in contact with the second substrate. The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. Skin conditioning composition is slot coated from a hot reservoir pumped through a slot dye onto both sides of the substrate web at a rate equal to 3 grams of skin conditioning composition per finished article (about 140 gsm add-on per side), and passed across a cooling fan so the composition cools quickly on the article outer surfaces. The slot coating reservoir is continuously mixed to maintain stability of the emulsion. The web is cut into individual articles measuring about 120 mm x 90 mm rectangles with rounded corners.

Examples 146-147

Prepare representative skin cleansing and conditioning articles utilizing the skin cleansing and conditioning compositions of Examples 71 and 74 in the following manner.

A first substrate and a second substrate are cut to about 12 inch by 9 inch rectangles. The first substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. The second substrate is a batting comprising a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The substrates are sealed together in a windowpane design with a heat sealing die utilizing a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA with sufficient temperature and pressure to cause the batting to melt and flow into the first layer and hence form an adequate seal, usually about 300 degrees Fahrenheit and 30 psi machine pressure sealing for 6-10 seconds is sufficient. The seal is continuous around the edges and has a single windowpane cross-member in each X- and Y-direction measuring about 2 mm width. After cooling the article is trimmed to about 11 inches by 8.5 inches, and 10 grams of skin cleansing and conditioning composition is brushed onto the outer surfaces of both sides, about half the composition per side. The composition is dried and the article is stored until ready for use.

Examples 148-149

Prepare representative skin cleansing and conditioning articles utilizing the skin cleansing and conditioning compositions of Examples 72 and 73 in the following manner.

A first substrate and a second substrate are cut to about 12 inch by 9 inch rectangles. The first substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. The second substrate is a batting comprising a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The substrates are sealed together in a windowpane design with a heat sealing die utilizing a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA with sufficient temperature and pressure to cause the batting to melt and flow into the first layer and hence form an adequate seal, usually about 300 degrees Fahrenheit and 30 psi machine pressure sealing for 6-10 seconds is sufficient. The seal is continuous around the edges and has a single windowpane cross-member in each X- and Y-direction measuring about 2 mm width. After cooling the article is trimmed to about 11 inches by 8.5 inches, and 8 grams of skin cleansing and conditioning composition is slot coated onto the articles, 4 grams per side evenly distributed on the article surfaces using an X-Y table, which is a programmable controlled metering system comprising a heated reservoir maintained at about 70°C, a pump, an on-off valve, a slot head and a motorized X-Y coordinate control system for the coating head. The composition cools quickly on the surface of the articles. The articles are packaged until ready for use.

Examples 150-152

Prepare a representative skin cleansing and conditioning article in the following manner.

Prepare liquid cleansing components which include the following components:

Component	Example 150	Example 151	Example 152
Sodium laureth 3 sulfate			3.60
Sodium C13/C14 methyl branched sulfate	5.00	5.60	4.50
Sodium paraffin Sulfonate		6.40	
Sodium alpha olefin sulfonate			5.20
Sodium lauryl sulfate	5.50		
Sodium lauroamphoacetate	4.50	5.30	3.65
Cocamide MEA	3.55	3.20	2.80
Succinic acid	2.80	5.70	6.00
Sodium succinate	0.10	0.14	0.30
Citric acid	3.00	4.30	5.00
Sodium citrate	1.60	1.10	1.40
Malonic acid	4.00	2.20	
Glycerine	10.00	15.00	8.50
Palm kernel 12-18 fatty acid	2.00		3.00
Perfume	1.00	1.20	1.00
MgSO4-7H2O	0.89	0.90	0.80
Water	54.21	47.61	52.25
Salicylic acid	1.85		
Triclosan		0.25	
Trichlorocarbanilide		1.10	
Zinc pyrithione			2.00

The cleansing components are applied to one side of a first substrate by brushing onto one side of the substrate until 10 grams of composition have been added to a 11 inch by 8.5 inch section. The substrate is a lofty, low density batting comprising a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 gsm. The first substrate is dried. A second substrate is laminated to the untreated side of the first substrate using an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web at 2 cm intervals. The second substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. The skin conditioning composition of Example 19 is slot coated evenly onto entire surface of the

second substrate at a rate of about 3 grams of composition per article, allowed to cool, and packaged until ready for use. The article confers sustained antiviral, antifungal and antibacterial activity against both gram negative and gram positive microorganisms, lathers well, and is relatively mild to the skin.

Example 153

Prepare a representative skin cleansing and conditioning article in the following manner.

Four grams of the cleansing component of Example 11 is spread evenly by hand across a lofty batting. The batting is a 4 oz/sq yd polyester batting cut to a size of 130 mm by 175 mm, comprising polyester fibers of about 30 microns average diameter and is adhesive bonded, available for example as Mountain Mist Extra Heavy Batting #205 from Stearns Textiles, Cincinnati, OH. A layer of fibrous nonwoven which is a hydroentangled blend of 55% cellulose and 45% polyester having a basis weight of about 65 gsm (available as Technicloth II from The Texwipe Company, Saddle River, NJ) is placed over the surfactant coated side of the batting. The layers are sealed together using interlocking sealing plates using an unheated plate having inverted thimble-shaped reservoirs spaced evenly in a hexagonal grid pattern. The thimble shaped reservoirs are about 1.2 cm diameter at the base and are spaced about 1.5 cm apart, center-to-center. The land area between the dimples on the unheated plate is convex upwards by several mm, forming an interconnected ridge. The heated plate has an external trough which fits precisely onto the ridge of the unheated plate. The heated plate contacts the cellulose/polyester substrate and a heat seal is effected using a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA. The resulting unfinished article has topographical features on both sides, assisting lather generation and also making it easy to grip and slide across the skin surface during use. The article is cut into a rectangle about 120 mm by 160 mm.

A skin conditioning inverse emulsion paste is prepared for use with the article, as follows:

Component	Per cent
PEG 30-dipolyhydroxystearate	3.0
SEFA cottonate	20.0
Petrolatum	4.0
Tribehenin	5.0
C10-C30 Cholesterol/Lanosterol Esters	13.0
SEFA behenate	5.0
Glycerin	50.0

The lipid soluble ingredients are heated to 70°C while stirring. Glycerin is slowly added with vigorous stirring. The composition is homogenized. Three grams of the skin conditioning inverse emulsion paste is pipetted hot into the depressed zones on the cellulose/polyester side of the article. The composition quickly cools to a semi-solid paste. The article is packaged until ready for use.

Examples 154-158

Prepare representative skin conditioning articles in the following manner using the skin conditioning compositions of Examples 19, 29, 34, 55, and 60.

The conditioning composition is applied to one side of a first substrate by extruding it through a coating head continuously in four strips, each 5 mm wide, separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The composition is extruded at a rate to yield 3 grams of composition per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the first substrate on the side containing no skin conditioning composition. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. The web is cut into individual articles measuring about 120 mm x 160 mm rectangles with rounded corners, which has a total of about 51 sealing points per article.

Examples 159-163

Prepare representative skin conditioning articles in the following manner using the skin conditioning compositions of Examples 19, 28, 34, 55, and 69.

The conditioning composition is applied to one side of a first substrate by extruding it through a coating head continuously in four strips, each 5 mm wide, separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The composition is extruded at a rate to yield 1.1 grams of composition per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the first substrate on the side containing no skin conditioning composition. The batting comprises a blend of 10% 15 denier PET fibers, 50% 3 denier bicomponent fibers with PET core and PE sheath, and 40% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 80 grams per square meter (gsm). The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. The web is cut into individual articles measuring about 120 mm x 90 mm rectangles with rounded corners, which has a total of about 51 sealing points per article. The article is convenient for application to smaller areas of skin, for example the face, elbows, neck and/or feet.

Example 164

Prepare a representative skin cleansing article in the following manner.

The cleansing component of Example 11 is applied to one side of a first substrate by extruding it through a coating head continuously in four lines separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The cleansing component is extruded at a rate to yield 0.40 grams of cleansing component per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second substrate web which is an airlaid, low density batting is continuously fed over the first substrate placing it in contact with the surfactant layer. The batting comprises a blend of 10% 15 denier PET fibers, 50% 3 denier bicomponent fibers with PET core and PE sheath, and 40% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 80 grams per square meter (gsm). A third substrate web which is the same as the second substrate web is continuously fed over the second substrate web placing it in contact with the second substrate. The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. The web is cut into individual articles measuring about 120 mm x 90 mm rectangles with rounded corners.

Example 165-169

Prepare representative skin cleansing and conditioning articles utilizing the skin conditioning compositions of Examples 19, 28, 34, 55, and 69.

The cleansing component of Example 11 is applied to one side of a first substrate by extruding it through a coating head continuously in four lines separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The cleansing component is extruded at a rate to yield 0.52 grams of cleansing component per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second substrate web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the surfactant layer. The batting comprises a blend of 10% 15 denier PET fibers, 50% 3 denier bicomponent fibers with PET core and PE sheath, and 40% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 80 grams per square meter (gsm). A third substrate web which is the same as the second substrate web is continuously fed over the second substrate web placing it in contact with the second substrate. The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. Skin conditioning composition is slot coated from a hot reservoir pumped through a slot dye onto both sides of the substrate web at a rate equal to 1.25 grams of skin conditioning composition per finished article (about 55 gsm add-on per side), and passed across a

cooling fan so the composition cools quickly on the article outer surfaces. The web is cut into individual articles measuring about 120 mm x 90 mm rectangles with rounded corners.

Example 170

Prepare representative skin cleansing and conditioning kits in the following manner.

A skin cleansing article is prepared. The cleansing component of Example 11 is applied to one side of a first substrate by extruding it through a coating head continuously in four lines separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The cleansing component is extruded at a rate to yield 4.4 grams of cleansing component per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the surfactant-containing layer. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. The web is cut into individual articles measuring about 120 mm x 480 mm rectangles with rounded corners.

A skin conditioning article is prepared. The conditioning composition of Example 34 is applied to one side of a first substrate by extruding it through a coating head continuously in four strips, each 5 mm wide, separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The composition is extruded at a rate to yield 3 grams of composition per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the first substrate on the side containing no skin conditioning composition. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. The web is cut into individual articles measuring about 120 mm x 160 mm rectangles with rounded corners, which has a total of about 51 sealing points per article.

The skin cleansing article and the skin conditioning article are packaged together in a single package.

Example 171

Prepare representative skin cleansing and conditioning kits in the following manner.

A skin cleansing article is prepared. The cleansing component of Example 11 is applied to one side of a first substrate by extruding it through a coating head continuously in four lines separated by a distance of 20 mm, 40 mm, and 20 mm respectively, measuring widthwise across the web, making a pair of parallel lines on each side of the web. The cleansing component is extruded at a rate to yield 4.4 grams of cleansing component per finished article. The substrate is a spunlace blend of 70% rayon and 30% PET fibers, bonded with a styrene-butadiene adhesive, which is hydroapertured to form holes about 2 mm in diameter and having a basis weight of about 70 gsm. A second web which is an airlaid, lofty, low density batting is continuously fed over the first substrate placing it in contact with the surfactant layer. The batting comprises a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100 grams per square meter (gsm). The webs are continuously fed to an ultrasonic sealer which seals a dot pattern comprising a grid of 4 mm diameter sealing points spaced evenly across the web. The web is cut into individual articles measuring about 120 mm x 480 mm rectangles with rounded corners.

A skin conditioning article is prepared. A substrate is prepared which is a hydroentangled blend of fibers, having softer, finer denier fibers on one side and coarser fibers on the second side. The substrate is prepared by airlaying two webs comprising 10 denier polyester (PET) fibers, one web on top of the other, each having a basis weight of about 20 gsm. A web of polypropylene scrim having a diameter about 100 microns, laced at about 0.8 cm intervals is fed over the fibrous webs continuously as a third web. Fourth and fifth webs comprising 3 denier polyester fibers are airlaid at about 20 gsm each on top of the web. The webs are hydroentangled and to fix them into a single web unit, and dried on drying cans until moisture free and about 20% shrinkage due to relaxation of the scrim has occurred. A low T_g (about 5°C) waterborne acrylic adhesive copolymer is added to the coarse fiber side of the web by kiss roll application at a rate of about 7 gsm wet add-on rate, and dried. The skin conditioning composition of Example 21 is continuously added to the web by slot coating the composition evenly across both sides of the web at a rate of about 25 gsm on each side. The substrate web is cut into individual articles measuring about 120 mm x 100 mm rectangles with rounded corners using a hot cutting roll causing the scrim fibers to shrink back slightly from the edge of the article as they are cut.

The skin cleansing article and the skin conditioning article are packaged together in a single package.

Example 172

Prepare representative skin cleansing and conditioning article in the following manner.

A first substrate is prepared. The first substrate is an airlaid, lofty, low density batting comprising a blend of 30% 15 denier PET fibers, 35% 3 denier bicomponent fibers with PET core and PE sheath, and 35% 10 denier bicomponent fibers of the same core-sheath composition, and has a basis weight of about 100

grams per square meter (gsm). The batting is embossed with a shaped, heated embossing roll leaving an imprinted land area surrounding raised, button-like repeating units which are shaped like light bulbs and which forms a material representative of a loop portion of a hook-and-loop type fastening system. Such a material is available from PGI Nonwovens, Benson, NC. 4.4 grams of the skin cleansing composition of Example 11 is applied evenly to the back (flat side) of a 10 inch by 8.5 inch rectangle of the first substrate. A second substrate which is a lofty, high wet strength, adhesive bonded cellulose paper towel with a basis weight of about 53 gsm is cut to a size of about 10 inches by 8.5 inches. A useful towel is available from The Procter & Gamble Company and marketed as Bounty Rinse & Reuse ®, which retains its Z-direction height when wet, and which has a thickness of about 0.047 inches at 5 gsi, a Loft/Soft ratio of about 1.28, and a high Crepe Ratio by being wet-formed on a shaped belt. The substrates are heat bonded at the edge and 4 dots in the article center (5 mm diameter, spaced evenly from each other and the nearest edge) using a pressure-platen heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA. The article is trimmed, and 3 grams of the skin conditioning composition of Example 18 is applied hot by brushing onto both sides of the article. The article is cooled and packaged until ready for use.

Example 173

Prepare a representative skin cleansing and conditioning article in the following manner.

A first side is prepared. A first layer of the first side is prepared which is a polyester batting having a basis weight of 2 oz/yd^2 and is comprised of a blend of fibers of about 23 microns and 40 microns average diameter, at least some of which are crimped. The thickness of the batting is about 0.23 in. measured at 5 gsi. The batting has an air permeability of about 1270 cfm/ft^2 and a foam permeability critical pressure of about 2.7 cm H_2O. The batting is believed to be heat-bonded, utilizing no adhesive. The batting is cut into a 10 inch square. A second layer of the first side is prepared which is a 10 inch square sheet of microapertured 100 mesh formed film prepared by forming hydroapertures at high pressure on a drum comprising a 100 mesh forming screen (e.g., as disclosed in U. S. Patent No. 4,629,643). The sheet is laid on the first layer with the male apertured side facing up. Twenty-five grams of the skin cleansing composition of Example 1 is placed on the center of the first side. The composition is slightly flattened, shaped to be about ½ inch thick and several inches in diameter. A layer of an impermeable polyethylene film is placed across the composition, measuring the same 10 inch square dimension as the first layer. Twenty-five grams of the skin conditioning composition of Example 63 is shaped the same as the cleansing composition, and placed on top of the film in the same x-y position as the surfactant. A layer of a microapertured and macroapertured formed film which (also disclosed in U. S. Patent No. 4,629,643) is placed with the male side of the macroapertures facing towards the composition and the male side of the microapertures facing up. The layer is also cut to a 10 inch square. A last layer is prepared which is a hydroentangled blend of fibers, having soft, fine denier fibers. The layer is prepared by airlaying two webs comprising 3 denier polyester (PET) fibers, one web on top of the other, each having a basis weight of about

17 gsm. A web of an elastomeric scrim having fibers of about 100 micron diameter in one direction laced with fibers of about 40 micron diameter in the other direction, laced at about 1.0 cm intervals, is fed over the fibrous webs continuously as a third web. Such a web is available from Conwed Plastics, Minneapolis, MN. Fourth and fifth webs comprising 3 denier polyester fibers are airlaid at about 17 gsm each on top of the web. The webs are hydroentangled to fix them into a single web unit, and dried on drying cans until moisture free. The web is creped due to web tension during the hydroentangling and drying process and subsequent relaxation after processing. A piece of the layer is cut to a size of about 10 inches by 10 inches and placed over the top of the other layers. The layers are sealed together with a pressure-platen type heat sealing device such as a Sentinel Model 808 heat sealer available from Sencorp, Hyannis, MA. A recessed (unheated) bottom plate is used which is shaped to contain the composition, and a recessed (heated) top plate which matches the bottom plate around the circular sealing rim is used to effect a heat seal. Typical sealing conditions are 300° C for about 3.5 seconds dwell time with a supply pressure of about 30 psig to the machine, but will vary according to the sealing apparatus used. The article is trimmed and packaged until ready for use.

WHAT IS CLAIMED IS:

1. A substantially dry, disposable personal care article suitable for cleansing characterized in that said article comprises:
   a) a water insoluble substrate comprising:
      1) a non-scouring, lofty, low-density batting layer comprising synthetic fibers; and
      2) a non-lofty, fluid-permeable nonwoven layer which is disposed adjacent to said batting layer; and
   b) a cleansing component disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a lathering surfactant.

2. The article of Claim 1 wherein said batting layer comprises fibers selected from the group consisting of multiconstituent fibers, multicomponent fibers, and combinations thereof.

3. The article of Claim 1 wherein said nonwoven layer comprises materials selected from the group consisting of cellulosic nonwovens, non-lofty nonwovens, formed films, non-lofty battings, foams, sponges, reticulated foams, vacuum-formed laminates, scrims, polymeric nets, and combinations thereof.

4. The article of Claim 1 wherein said cleansing component is disposed between said batting layer and said nonwoven layer of said water insoluble substrate.

5. The article of Claim 1 wherein said batting layer and said nonwoven layer are spot bonded to one another.

6. A method of cleansing the skin and hair which comprise the steps of:
   a) wetting the article of Claim 1; and
   b) contacting the skin or hair with the wetted article.

7. A substantially dry, disposable personal care article suitable for conditioning characterized in that said article comprises:
   a) a water insoluble substrate comprising:
      1) a non-scouring, lofty, low-density batting layer comprising synthetic fibers; and
      2) a non-lofty, fluid-permeable nonwoven layer which is disposed adjacent to said batting layer; and

b) a therapeutic benefit component, disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a therapeutic benefit agent .

8. The article of Claim 7 wherein the therapeutic benefit agent is selected from the group consisting of hydrophobic conditioning agents, hydrophilic conditioning agents, structured conditioning agents, and combinations thereof.

9. A substantially dry, disposable personal care article suitable for both cleansing and conditioning characterized in that said article comprises:

a) a water insoluble substrate comprising:

1) a non-scouring, lofty, low-density batting layer comprising synthetic fibers; and

2) a non-lofty, fluid-permeable nonwoven layer which is disposed adjacent to said batting layer;

b) a cleansing component disposed adjacent to said batting layer, wherein said component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a lathering surfactant; and

c) a therapeutic benefit component, disposed adjacent to said water insoluble substrate, wherein said component comprises from about 10% to about 1000%, by weight of the water insoluble substrate, of a therapeutic benefit agent.

10. A personal care kit comprising the article of Claim 1 and an additional article that comprises a substrate and a therapeutic benefit component.