(54) Title: GEL COMPOSITION AND METHODS OF USE

(57) Abstract: There is provided a gel composition having a silica powder and a non-volatile compound. The silica powder particles are spherical and porous. The silica powder has a specific gravity about 0.09 to about 0.6, and is present in an amount about 10 wt% to about 50 wt%. The non-volatile compound is present from about 35 wt% to about 90 wt%. The composition has less than about 5 wt% water. There is also provided a method for imparting a powdery feel to the skin, and a method for treating a cosmetic or medical condition of the skin, nail/cuticle, lips or hair.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
GEL COMPOSITION AND METHODS OF USE

BACKGROUND OF THE INVENTION

1. **Field of the Invention**

The present invention relates to a substantially anhydrous gel composition that imparts a powdery, non-oily feel to the skin. The present invention also relates to a gel composition useful as a vehicle or base for cosmetic, skin care, and medicinal ingredients.

2. **Description of the Prior Art**

Gel compositions are employed in the cosmetic and skin care industries to impart or deliver a variety of cosmetic and skin care ingredients to the skin. Gel compositions have proven desirable because they are easy to manufacture and can be formulated to be translucent or transparent.

A problem with employing gel compositions is that they sometimes impart an oily feel to the surface of the skin or leave a perceptible film-like residue. Another problem is that they frequently employ significant concentration of volatile organic compounds that may require explosion-proof equipment and/or special handling in the manufacturing process.

U.S. Patent No. 5,679,361 relates to a make-up composition having a fatty phase and a pulverulent phase. The pulverulent phase has silica or thermoplastic microspheres with a specific gravity not exceeding 0.07. The fatty phase may be fatty oils of animal, vegetable, mineral or synthetic
origin, as well as waxes. The fatty phase includes oils, such as hydrocarbon oils and silicone oils. There is no disclosure that the composition is in gel form, or that it imparts a powdery feel upon application to skin.

U.S. Patent No. 5,976,560 relates to a replacement for petroleum jelly as a base for skin care products. The base has a vegetable oil and a fumed silica. There is no disclosure that the composition imparts a powdery feel upon application to skin.

Thus, there is still a need for a gel composition that imparts a powdery feel to the skin upon application. It is also desired to have a gel composition that is substantially free of volatile organic compounds. It would also be desirable to have a gel composition that is useful as a vehicle or base for cosmetic, skin care, and medicinal ingredients.

SUMMARY OF THE INVENTION

It is an object of the present invention to have a gel composition that imparts a powdery, non-oily feel to the skin upon application.

It is another object of the present invention to have a gel composition that is substantially free of volatile compounds.

It is still another object of the present invention to have a gel composition that is useful as a vehicle or base for cosmetic, skin care, and medicinal ingredients.
It is a further object of the present invention to have a gel composition that has less than about 5 wt% of a volatile compound.

It is still a further object of the present invention to have a gel composition that has less than about 5 wt% water.

These and other objects and advantages are achieved by a gel composition of the present invention. The gel composition has a silica powder and a non-volatile compound. The silica powder particles are spherical and porous. The silica powder has a specific gravity about 0.09 to about 0.6, and is present in an amount about 10 wt% to about 50 wt%.

The non-volatile compound is present in an amount about 35 wt% to about 90 wt%.

The present invention also includes a cosmetic for application to the skin. The preferred cosmetic is a composition, preferably having a gel matrix, with a silica powder and a non-volatile hydrocarbon oil, and a color pigment. The present invention also provides a method for imparting a powdery feel to the skin that includes applying the composition to the skin. The present invention further provides a method for treating a cosmetic or medical condition of the skin, nail/cuticle, lips or hair that includes applying an amount of the composition to the affected area.

DETAILED DESCRIPTION OF THE INVENTION

It was found surprising that a composition, that is in a gel form in a container, could impart a pleasant, powdery feel to the skin upon
application. It was also surprising that the gel composition could be formulated without a volatile organic compound. It was also surprising that such a gel composition could be used as a vehicle or base for cosmetic or skin care ingredients.

In the present invention, a silica powder and a non-volatile compound are processed to form a gel matrix that is spongy and soft to the touch. When applied to the skin, the matrix in the form of a composition imparts a powdery feel to the surface thereof, without any oily film residue.

The silica powder functions as a gelling agent in the composition to form a gel matrix with the non-volatile compound. The silica powder has particles that are spherical and porous.

The silica powder has a specific gravity of about 0.09 to about 0.6, preferably about 0.2 to about 0.5, and most preferably about 0.3 to about 0.4. The silica powder has an average particle size about 2 microns (µm) to about 20 µm, preferably about 3 µm to about 15 µm, and more preferably about 3 µm to about 5 µm. A most preferred average particle size is about 3µm.

The silica powder preferably has an oil absorption about 100 to about 300 grams of oil, more preferably about 120 to about 170 grams of oil, and most preferably about 150 grams of oil, per 100 grams of silica.

The silica powder preferably has a specific surface area about 100 m² to about 1,000 m², more preferably about 600 m² to about 800 m², and
most preferably about 700 m², per gram of silica powder. The silica powder is preferably non-fumed.

The silica powder is present in the gel composition in an amount about 10 percentage by weight or weight percent (wt%) to about 50 wt% of the total weight of the composition. Preferably, the silica powder is present in an amount about 15 wt% to about 45 wt%, and more preferably about 25 to about 35 wt%, of the total weight of the composition.

A non-volatile compound useful in the present composition is preferably one with a viscosity less than about 50 centistokes (cst) at 25°C, preferably less than about 30 cst, more preferably less than about 20 cst, and most preferably less than about 10 cst. Preferred non-volatile compounds include one or more non-volatile hydrocarbon compounds, particularly oil, such as hydrocarbon oil. Such hydrocarbon oils include, but are not limited to, squalane, liquid paraffin, C_{12-15} alcohol benzoates, hydrogenated polyisobutene, and hydrogenated polydecene. Squalane is preferred.

The non-volatile compound is present in the composition in an amount about 35 wt% to about 90 wt% of the total weight of the composition. The non-volatile compound is preferably present in an amount about 40 wt% to about 70 wt%, and more preferably about 45 wt% to about 65 wt%, of the total weight of the composition.

The gel composition is substantially anhydrous or free of water. The composition preferably has less than about 5 wt% water. More preferably,
the composition has less than about 1 wt% water based on the total weight
of the composition. Most preferably, the composition is free of water.

A surprising, unexpected attribute of the present invention is its
translucent/transparent appearance. The composition may further be
colored with the addition of a pigment or colorant. The superiority in clarity
of the base of the composition provides a finished product that is more true
to the pigment/colorant shade.

The present composition may optionally include a non-aqueous
vehicle in addition to the non-volatile compound. Suitable vehicles and/or
vehicle components include, but are not limited to, one or more vegetable
oils; esters such as octyl palmitate, isopropyl myristate and isopropyl
palmitate; ethers such as dicapryl ether and dimethyl isosorbide; fatty
alcohols such as cetyl alcohol, stearyl alcohol and behenyl alcohol;
isoparaffins such as isoctane, isododecane and isohexadecane; silicone
oils such as dimethicone and polysiloxane; hydrocarbon oils such as
petrolatum, isoecosane and polyisobutene; polyols such as propylene
glycol, glycerin, butylene glycol, pentaerythrytol glycol and hexylene glycol; or
any combinations of the foregoing.

The composition may also have a volatile organic compound, but
preferably has less than about 5 wt%, and more preferably less than about
1 wt%, of one or more volatile compounds, based on the total weight of the
composition. Most preferably, the composition is substantially free of
volatile compounds. Volatile compounds as defined herein have a vapor
pressure of greater than about 0.01 Kpa at 25°C and atmospheric pressure.

Optionally, the present composition may have one or more of the following additional ingredients: anesthetics, anti-allergenics, antifungals, antimicrobials, anti-inflammatory, antiseptics, emulsifiers (either anionic or nonionic), botanical extracts, chelating agents, colorants, depigmenting agents, emollients, exfollients, film formers, fragrances, humectants, insect repellents, lubricants, moisturizers, pharmaceutical agents, preservatives, skin protectants, skin penetration enhancers, stabilizers, surfactants, thickeners, viscosity modifiers, or vitamins.

The composition may be manufactured by mixing ingredients in a device such as a mixer or extruder, heating the mixture to a temperature of about 175°F to about 200°F and continuing to mix for about 10 to about 20 minutes until the mixture becomes colorless. If an opaque composition is desired, the ingredients are mixed without heating.

The composition is useful by itself as a cosmetic for application to the skin. It is also useful as a vehicle or a base for a dye, color pigment, or other cosmetic ingredient to form a cosmetic composition for application to the skin. Such cosmetic compositions or cosmetics include blush, foundation, eyeshadow, and lip color.

The composition may optionally have an active ingredient. The active ingredient may be useful for any medical, therapeutic, or cosmetic purpose known in the art. Examples of such ingredients include, but are
not limited, to retinoid and ascorbic acid. The active ingredient may be useful in arresting, ameliorating, diminishing, inhibiting, preventing or treating medical and/or cosmetic conditions of the skin, nail/cuticle, lips or hair. Such conditions include, but are not limited to, acne, psoriasis, eczema, seborrhea, dermatitis, skin and hair fragility, hair loss, hirsutism, rosacea, pruritis, calluses, warts, corns, dry skin, chapped skin, dandruff, skin blemishes, age spots, hyperpigmentation or hypopigmentation, thinning skin, cellulite, stretch marks, dark circles under the eyes, freckles, yellowing, roughness, keratosis, inflammation, discoloration, skin atrophy, wrinkles, lines, hyperplasia, spider veins (telangiectasia), hair loss, bruising, enlarged pores, fibrosis, sunburn, dermatological aging (chronological aging, hormonal aging and/or actinic aging), viral infection, fungal infection, and bacterial infection. An active ingredient may also be useful in enhancing the general health, vitality and appearance of the skin, nail/cuticle, lips and hair.

The composition can have one or more active ingredients that improve the aesthetic and/or cosmetic appearance of skin. Such improvements can be manifested by: reduction in dermatological signs of aging due to, for example, chronological aging, hormonal aging, and photoaging; reduction in skin fragility; reduction in pore size; prevention and/or reversal of loss of collagen and/or elastin; ameliorating the effects of estrogen imbalance; prevention of skin atrophy; prevention and/or reduction in appearance and/or depth of lines and/or wrinkles; improvement
in skin tone, radiance, luster, brightness, clarity and/or tautness; prevention, reduction, and amelioration of skin sagging; improvement in skin firmness, thickness, plumpness, texture, suppleness, elasticity and/or softness; minimization of dermatological signs of fatigue and stress; retardation of cellular aging; minimization of skin dryness and/or improvement in skin moisturization; minimization of skin discoloration, including dark eye circles; promotion and/or acceleration of cell turnover; improvement in microcirculation; and decrease and/or prevention in cellulite formation.
EXAMPLES

Example 1 (Eyeshadow)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>wt%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica Micro Sphere (MSS 500/3 by Kobo)</td>
<td>30%</td>
</tr>
<tr>
<td>Squalane</td>
<td>q.s.</td>
</tr>
<tr>
<td>Pigment/colorant</td>
<td>15% to 20%</td>
</tr>
<tr>
<td>Preservative</td>
<td>0.5% to 1%</td>
</tr>
</tbody>
</table>

Example 2 (Blush with a sunscreen)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>wt%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica Micro Sphere (MSS 500/3 by Kobo)</td>
<td>27%</td>
</tr>
<tr>
<td>Hydrogenated Polyisobutene</td>
<td>q.s.</td>
</tr>
<tr>
<td>Octyl Methoxycinnamate</td>
<td>3%</td>
</tr>
<tr>
<td>Pigment/colorant</td>
<td>15% to 20%</td>
</tr>
<tr>
<td>Titanium Dioxide</td>
<td>8%</td>
</tr>
<tr>
<td>Preservative</td>
<td>0.5% to 1%</td>
</tr>
</tbody>
</table>

Example 3 (Lip color)

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>wt%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silica Micro Sphere (MSS 500/3 by Kobo)</td>
<td>30%</td>
</tr>
<tr>
<td>Squalane</td>
<td>q.s.</td>
</tr>
<tr>
<td>Pigment/colorant</td>
<td>15% to 18%</td>
</tr>
<tr>
<td>Water (Deionized)</td>
<td>2%</td>
</tr>
<tr>
<td>Preservative</td>
<td>0.5% to 1%</td>
</tr>
</tbody>
</table>

It should be understood that the foregoing description is only illustrative of the present invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications and variances that fall within the scope of the appended claims.
WHAT IS CLAIMED IS

1. A gel composition comprising:
   about 10 to about 50 wt% of a powder of porous, spherical silica, the
   silica powder having a specific gravity of about 0.09 to about 0.6; and
   about 35 to about 90 wt% of a non-volatile compound having a
   viscosity less than about 50 centistokes, wherein the composition has less
   than about 5 wt% water.

2. The composition of claim 1, wherein the silica powder is
   present in an amount about 15 to about 45 wt% of the total weight of the
   composition.

3. The composition of claim 1, wherein the silica powder is
   present in an amount about 25 wt% to about 35 wt% of the total weight of
   the composition.

4. The composition of claim 1, wherein the compound is present
   in an amount about 40 wt% to about 70 wt% of the total weight of the
   composition.
5. The composition of claim 1, wherein the compound is present in an amount about 45 wt% to about 65 wt% of the total weight of the composition.

6. The composition of claim 1, wherein the silica powder has a specific gravity about 0.2 to about 0.5.

7. The composition of claim 1, wherein the silica powder has a specific gravity about 0.35 to about 0.4.

8. The composition of claim 1, wherein the silica powder is non-fumed.

9. The composition of claim 1, wherein the silica powder has an average particle size about 2 \( \mu \text{m} \) to about 20 \( \mu \text{m} \).

10. The composition of claim 1, wherein the silica powder has an average particle size about 3 \( \mu \text{m} \) to about 15 \( \mu \text{m} \).

11. The composition of claim 1, wherein the silica powder has an oil absorption about 100 to about 300 grams of oil per 100 grams of silica.
12. The composition of claim 1, wherein the silica powder has an oil absorption about 120 to about 170 grams of oil per 100 grams of silica.

13. The composition of claim 1, wherein the silica powder has a surface area about 100 m$^2$ to about 1000 m$^2$ per gram of silica powder.

14. The composition of claim 1, wherein the silica powder has a surface area of about 600 m$^2$ to about 800 m$^2$ per gram of silica powder.

15. The composition of claim 1, wherein the compound is a hydrocarbon compound.

16. The composition of claim 15, wherein the hydrocarbon compound is a hydrocarbon oil.

17. The composition of claim 16, wherein the hydrocarbon oil is selected from the group consisting of squalane, liquid paraffin, C$_{12-15}$ alcohol benzoates, hydrogenated polyisobutene, hydrogenated polydecene, and any combinations thereof.

18. The composition of claim 17, wherein the hydrocarbon oil is squalane.
19. The composition of claim 1, wherein the composition is translucent or transparent.

20. The composition of claim 1, wherein the composition has less than about 1 wt% water.

21. The composition of claim 1, wherein the composition has less than about 1 wt% of a volatile compound.

22. The composition of claim 1, wherein the composition is selected from the group consisting of blush, eyeshadow, foundation, and lip color.

23. A gel composition comprising:

   a powder of porous, non-fumed, spherical silica, the silica powder having a specific gravity about 0.09 to about 0.6; and
   a non-volatile compound having a viscosity less than about 50 centistokes.
24. A cosmetic composition comprising:

a gel matrix, wherein the gel matrix consists essentially of about 10 to about 50 wt% of a powder of porous, spherical silica, the silica powder having a specific gravity about 0.09 to about 0.6; and

about 35 to about 90 wt% of a non-volatile compound having a viscosity less than about 50 centistokes.

25. A method for imparting a powdery, non-oily feel to the skin comprising:

applying to the skin an amount of the composition of claim 1; and allowing the composition to set.

26. A method for treating a cosmetic or medical condition of the skin, nail/cuticle, lips or hair comprising applying to the affected area a composition having an effective amount of active ingredient, about 10 to about 50 wt% of a powder of porous, spherical silica with the silica powder having a specific gravity about 0.09 to about 0.6, and about 35 to about 90 wt% of a non-volatile compound having a viscosity less than about 50 centistokes, wherein the composition has less than about 5 wt% water.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A01N 25/26, 25/28; A61K 6/00, 7/00, 7/32, 9/00, 51/00; A61M 36/14; C08J 3/00; C08K 3/34; C08L 57/02
US CL : 424/1.29, 65, 400, 401, 417, 421; 523/105; 524/492, 493, 494, 499

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 424/1.29, 65, 400, 401, 417, 421; 523/105; 524/492, 493, 494, 499

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST search terms: spherical silica, hydrocarbon, cosmetic, squalene, polyisobutylene, silica microspheres

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<td>Y</td>
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</tr>
<tr>
<td>X, P</td>
<td>US 2002/0106385 A (VATTER et al.) 08 August 2002 (08.08.2002), See the entire document.</td>
<td>1-26</td>
</tr>
<tr>
<td>Y, P</td>
<td></td>
<td>1-26</td>
</tr>
</tbody>
</table>

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search: 09 March 2003 (09.03.2003)

Date of mailing of the international search report: 19 MAR 2003

Name and mailing address of the ISA/US Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231
Facsimile No. (703)305-3230

Authorized officer: Patrick Noland
Telephone No. 703-308-0661

Form PCT/ISA/210 (second sheet) (July 1998)
### INTERNATIONAL SEARCH REPORT

**Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)**

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. □ Claim Nos.:
   because they relate to subject matter not required to be searched by this Authority, namely:

2. □ Claim Nos.:
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. □ Claim Nos.:
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

1. □ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. □ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. □ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. □ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest**

- □ The additional search fees were accompanied by the applicant’s protest.
- □ No protest accompanied the payment of additional search fees.