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(54) Title: COMPOSITION

(57) Abstract: Hair conditioner comprising silicone and a conditioning gel phase, said phase obtainable by heating a fatty alcohol and an oil until they are molten, separately heating a cationic surfactant in water until it is dissolved/suspended, then adding the molten fatty alcohol and oil mix to the cationic surfactant before adding any remaining ingredients.



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COMPOSITION

The present invention relates to an improved conditioning composition.

5 Despite the prior art there remains a need for improved conditioning compositions.

Accordingly, there is provided a hair conditioner comprising silicone and a conditioning gel phase, said phase obtainable by heating a fatty alcohol and an oil until they are molten, separately heating a cationic surfactant in water until it is
10 dissolved/suspended, then adding the molten fatty alcohol and oil mix to the cationic surfactant before adding any remaining ingredients.

Surprisingly, the conditioner according to the invention is capable of delivering silicone to the hair surface and thereby produce a desirable conditioning benefit.
15

Preferably, the oil is a light mineral oil. Preferably, the light mineral oil has a density of from 0.7 to 0.85 g/ml.

Preferably, the composition as a whole comprises less than 2% wt. anionic
20 surfactant.

Preferably, the composition as a whole comprises substantially no anionic surfactant.

25 Such a conditioning gel phase is common in the art and means an arrangement of cationic surfactant and fatty materials which are capable of conditioning hair. Silicones are also be present in the formulation but are typically not part of the conditioning gel phase.

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The conditioning surfactants are cosmetically acceptable and suitable for topical application to the hair.

Suitable conditioning surfactants are selected from cationic surfactants, used singly
5 or in admixture. Examples include quaternary ammonium hydroxides or salts thereof, e.g. chlorides.

Suitable cationic surfactants for use in hair conditioners of the invention include
10 cetyltrimethylammonium chloride, behenyltrimethylammonium chloride, cetylpyridinium chloride, tetramethylammonium chloride, tetraethylammonium chloride, octyltrimethylammonium chloride, dodecyltrimethylammonium chloride, hexadecyltrimethylammonium chloride, octyldimethylbenzylammonium chloride, decyldimethylbenzylammonium chloride, stearyldimethylbenzylammonium chloride, didodecyldimethylammonium chloride, dioctadecyldimethylammonium chloride,
15 tallowtrimethylammonium chloride, cocotrimethylammonium chloride, and the corresponding hydroxides thereof. Further suitable cationic surfactants include those materials having the CTFA designations Quaternium-5, Quaternium-31 and Quaternium-18. Mixtures of any of the foregoing materials may also be suitable. A particularly useful cationic surfactant for use in hair conditioners of the invention is
20 cetyltrimethylammonium chloride, available commercially, for example as DEHYQUART, ex Henkel.

In conditioners of the invention, the level of cationic surfactant is preferably from 0.01 to 10%, more preferably 0.05 to 5%, most preferably 0.1 to 2% by weight of the
25 composition.

The conditioning gel phase of the invention advantageously incorporates a fatty alcohol material. The combined use of fatty alcohol materials and cationic surfactants in conditioning compositions is believed to be especially advantageous,

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because this leads to the formation of a lamellar phase, in which the cationic surfactant is dispersed.

Representative fatty alcohols comprise from 8 to 22 carbon atoms, more preferably
5 16 to 20. Examples of suitable fatty alcohols include cetyl alcohol, stearyl alcohol and mixtures thereof. The use of these materials is also advantageous in that they contribute to the overall conditioning properties of compositions of the invention.

The level of fatty alcohol material in conditioners of the invention is conveniently from
10 0.01 to 10%, preferably from 0.1 to 5% by weight of the composition. The weight ratio of cationic surfactant to fatty alcohol is suitably from 10:1 to 1:10, preferably from 4:1 to 1:8, optimally from 1:1 to 1:4.

The resulting formulation comprising a conditioning gel phase also comprises a
15 silicone.

The silicone is insoluble in the aqueous matrix of the composition and so is present in an emulsified form, with the silicone present as dispersed particles.

20 Suitable silicones include polydiorganosiloxanes, in particular polydimethylsiloxanes which have the CTFA designation dimethicone. Also suitable for use compositions of the invention (particularly shampoos and conditioners) are polydimethyl siloxanes having hydroxyl end groups, which have the CTFA designation dimethiconol. Also suitable for use in compositions of the
25 invention are silicone gums having a slight degree of cross-linking, as are described for example in WO 96/31188. These materials can impart body, volume and stylability to hair, as well as good wet and dry conditioning.

The viscosity of the emulsified silicone itself (not the emulsion or the final hair
30 conditioning composition) is typically at least 10,000 cst. In general we have

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found that conditioning performance increases with increased viscosity. Accordingly, the viscosity of the silicone itself is preferably at least 60,000 cst, most preferably at least 500,000 cst, ideally at least 1,000,000 cst. Preferably the viscosity does not exceed 10^9 cst for ease of formulation.

5

Emulsified silicones for use in hair shampoos and conditioners of the invention will typically have an average silicone particle size in the composition of less than 30, preferably less than 20, more preferably less than 10 microns. We have found that reducing the particle size generally improves conditioning performance. Most
10 preferably the average silicone particle size of the emulsified silicone in the composition is less than 2 microns, ideally it ranges from 0.01 to 1 micron. Silicone emulsions having an average silicone particle size of ≤ 0.15 microns are generally termed microemulsions.

15 Particle size may be measured by means of a laser light scattering technique, using a 2600D Particle Sizer from Malvern Instruments.

Suitable silicone emulsions for use in the invention are also commercially available in a pre-emulsified form.

20

Examples of suitable pre-formed emulsions include emulsions DC2-1766, DC2-1784, and microemulsions DC2-1865 and DC2-1870, all available from Dow Corning. These are all emulsions/microemulsions of dimethiconol. Cross-linked silicone gums are also
25 available in a pre-emulsified form, which is advantageous for ease of formulation. A preferred example is the material available from Dow Corning as DC X2-1787, which is an emulsion of cross-linked dimethiconol gum. A further preferred example is the material available from Dow Corning as DC X2-1391, which is a microemulsion of cross-linked dimethiconol gum.

30

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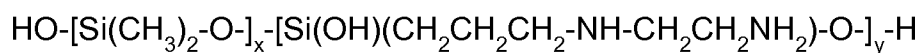
A further preferred class of silicones for inclusion in shampoos and conditioners of the invention are amino functional silicones. By "amino functional silicone" is meant a silicone containing at least one primary, secondary or tertiary amine group, or a quaternary ammonium group.

5

Examples of suitable amino functional silicones include:

- (i) polysiloxanes having the CTFA designation "amodimethicone", and the general formula:

10



in which x and y are numbers depending on the molecular weight of the polymer, generally such that the molecular weight is between about 5,000 and 500,000.

15

- (ii) polysiloxanes having the general formula:



20

in which:

G is selected from H, phenyl, OH or C₁₋₈ alkyl, e.g. methyl;

a is 0 or an integer from 1 to 3, preferably 0;

b is 0 or 1, preferably 1;

m and n are numbers such that (m + n) can range from 1 to 2000, preferably from 50 to 150;

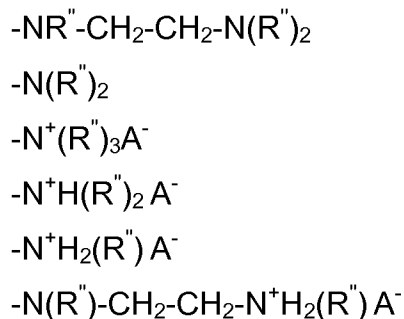
m is a number from 1 to 2000, preferably from 1 to 10;

n is a number from 0 to 1999, preferably from 49 to 149, and

30

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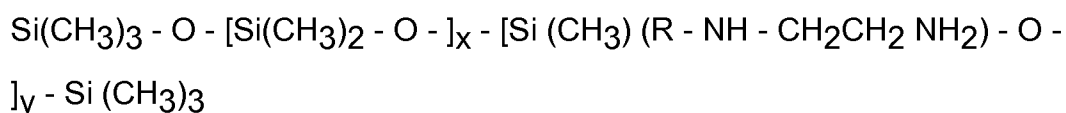
R' is a monovalent radical of formula $-C_qH_{2q}L$ in which q is a number from 2 to 8 and L is an aminofunctional group selected from the following:



in which R'' is selected from H, phenyl, benzyl, or a saturated monovalent hydrocarbon radical, e.g. C₁₋₂₀ alkyl, and;

A is a halide ion, e.g. chloride or bromide.

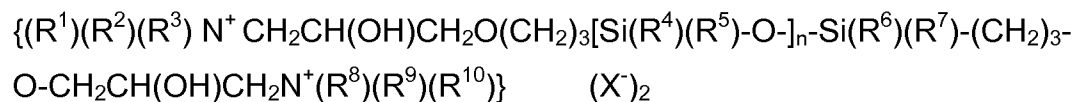
Suitable amino functional silicones corresponding to the above formula include those polysiloxanes termed "trimethylsilylamodimethicone" as depicted below, and which are sufficiently water insoluble so as to be useful in compositions of the invention:



wherein x + y is a number from about 50 to about 500, and wherein R is an alkylene group having from 2 to 5 carbon atoms. Preferably, the number x + y is in the range of from about 100 to about 300.

(iii) quaternary silicone polymers having the general formula:

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wherein R^1 and R^{10} may be the same or different and may be
 5 independently selected from H, saturated or unsaturated long or short
 chain alk(en)yl, branched chain alk(en)yl and C_5 - C_8 cyclic ring systems;

R^2 thru' R^9 may be the same or different and may be independently
 10 selected from H, straight or branched chain lower alk(en)yl, and C_5 - C_8
 cyclic ring systems;

n is a number within the range of about 60 to about 120, preferably about
 80, and

15 X^- is preferably acetate, but may instead be for example halide, organic
 carboxylate, organic sulphonate or the like.

Suitable quaternary silicone polymers of this class are described in
 EP-A-0 530 974.

20 Amino functional silicones suitable for use in shampoos and conditioners of the
 invention will typically have a mole % amine functionality in the range of from
 about 0.1 to about 8.0 mole %, preferably from about 0.1 to about 5.0 mole %,
 most preferably from about 0.1 to about 2.0 mole %. In general the amine
 25 concentration should not exceed about 8.0 mole % since we have found that too
 high an amine concentration can be detrimental to total silicone deposition and
 therefore conditioning performance.

The viscosity of the amino functional silicone is not particularly critical and can
 30 suitably range from about 100 to about 500,000 cst.

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Specific examples of amino functional silicones suitable for use in the invention are the aminosilicone oils DC2-8220, DC2-8166, DC2-8466, and DC2-8950-114 (all ex Dow Corning), and GE 1149-75, (ex General Electric Silicones).

- 5 Also suitable are emulsions of amino functional silicone oils with non ionic and/or cationic surfactant.

Suitably such pre-formed emulsions will have an average amino functional silicone particle size in the shampoo composition of less than 30, preferably less
10 than 20, more preferably less than 10 microns. Again, we have found that reducing the particle size generally improves conditioning performance. Most preferably the average amino functional silicone particle size in the composition is less than 2 microns, ideally it ranges from 0.01 to 1 micron. Silicone emulsions having an average silicone particle size of ≤ 0.15 microns are generally termed
15 microemulsions.

Pre-formed emulsions of amino functional silicone are also available from suppliers of silicone oils such as Dow Corning and General Electric. Specific examples include DC929 Cationic Emulsion, DC939 Cationic Emulsion, and the
20 non-ionic emulsions DC2-7224, DC2-8467, DC2-8177 and DC2-8154 (all ex Dow Corning).

An example of a quaternary silicone polymer useful in the present invention is the material K3474, ex Goldschmidt.
25

The total amount of silicone incorporated into compositions of the invention depends on the level of conditioning desired and the material used. A preferred amount is from 0.01 to about 10% by weight of the total composition although these limits are not absolute. The lower limit is determined by the minimum level

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to achieve conditioning and the upper limit by the maximum level to avoid making the hair and/or skin unacceptably greasy.

We have found that a total amount of silicone of from 0.3 to 5%, preferably 0.5 to 3%, by weight of the total composition is a suitable level.

Density of the mineral oil is also known as specific gravity and is measured according to ASTM D 4052 at 15.6C.

10 **EXAMPLE 1**

A composition according to an embodiment of the invention.

% w/w	Trade Name
1.25	Stearamidopropyl dimethylamine
86.59	WATER, CHLORINATED DEMINERALISED
1	Mineral oil
0.1	DISODIUM EDTA
1.25	Behenyl trimethyl ammonium chloride
5	Cetearyl alcohol
0.1	SODIUM CHLORIDE
0.06	CIT/MIT
0.5	Parfum
0.2	Methyl Paraben
0.38	Lactic Acid
3.57	DC 5-7134 9:1 600K/8566 CTAC 70%

15 **EXAMPLE 2**

A process for making a composition according to the invention.

- 10 -

1. Add mineral oil to side pot and heat to 50°C. Add cetearyl alcohol and melt out keeping T at 75°C.
2. Add water to mixer and start heating to 85°C.
- 5 3. Mix with Silverson.
4. Add methyl paraben and disperse then lactic acid and disperse.
5. At 60°C add stearamidopropyl dimethylammonium over top and disperse. At 80°C add behenyl trimethyl ammonium chloride and disperse.
6. At 85°C with mixing inject molten cetearyl alcohol and mineral oil mixture
10 into loop. Mix for 30mins.
7. Start jacket cooling to 30°C without mixing.
8. Add quench water then other ingredients such as perfumes, etc.

EXAMPLE 3

15

Evidence illustrating how the composition of the invention delivers more silicone than a comparative composition comprising heavy mineral oil.

	A	B	C
Silicone deposition (ppm)	2157.89	2197.47	1294.59

- 20 A: Control, no oil
B: Test sample, light mineral oil
C: Comparative, heavy mineral oil

Table shows that compositions according to the invention deliver more silicone
25 than compositions comprising heavy mineral oil.

CLAIMS

1. Hair conditioner comprising silicone and a conditioning gel phase, said phase obtainable by heating a fatty alcohol and an oil until they are molten,
5 separately heating a cationic surfactant in water until it is dissolved/suspended, then adding the molten fatty alcohol and oil mix to the cationic surfactant before adding any remaining ingredients.
2. Composition according to claim 1 wherein the oil is a mineral oil.
10
3. Composition according to claim 1 or 2 wherein the composition as a whole comprises less than 2% wt. anionic surfactant.
4. Composition according to any preceding claim wherein the composition as
15 a whole comprises substantially no anionic surfactant.
5. Composition according to any preceding claim wherein the oil is a light mineral oil.
- 20 6. Composition according to any preceding claim wherein the oil has a density of from 0.7 to 0.85 g/ml.

AMENDED CLAIMS

received by the International Bureau on 01 September 2010 (01.09.10)

CLAIMS

1. Hair conditioner comprising silicone and a conditioning gel phase, said phase obtainable by heating a fatty alcohol and a light mineral oil having a density of from 0.7 to 0.85 g/ml. until they are molten, separately heating a cationic surfactant in water until it is dissolved/suspended, then adding the molten fatty alcohol and oil mix to the cationic surfactant before adding any remaining ingredients.
2. Composition according to claim 1 wherein the oil is a mineral oil.
3. Composition according to claim 1 or 2 wherein the composition as a whole comprises less than 2% wt. anionic surfactant.
4. Composition according to any preceding claim wherein the composition as a whole comprises substantially no anionic surfactant.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2010/055590

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61K8/31 A61K9/34 A61K8/41 A61Q5/12 A61K8/04
ADD.

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A61K A61Q

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

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

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

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