d) de 0,01 a 0,4% en peso de un segundo polímero catiónico que tiene una densidad de carga media a pH 7 de 1,3 a 3,0 meq por gramo; y

e) más de 40% en peso de agua;

donde dichas composiciones se caracterizan porque el primero y segundo polímeros catiónicos consisten esencialmente de las mismas unidades monoméricas y los mismos sustituyentes catiónicos.

De lo anterior es indiscutible que el documento D1 no proporciona a la persona medianamente versada en la materia ninguna enseñanza en términos cualitativos o cuantitativos de una posible mezcla de polímeros catiónicos como parte de una composición para la limpieza del cabello. En otras palabras, es claro que D1 no enseña una composición para el lavado del cabello que incluya dos polímeros catiónicos, así como tampoco enseña que dichos polímeros deban caracterizarse por presentar una base monomérica idéntica y densidades de carga específicas.

Como prueba de lo anterior me permito destacar que en los ejemplos 1, 2 y 3 revelados en el documento D1 se enseñan composiciones que comprenden sólo un polímero de deposición (Jaguar C13S ó Polymer JR400). Dichas composiciones, de acuerdo con los autores de D1, se caracterizan porque son altamente traslúcidas y permiten lograr una deposición mejorada del agente acondicionador sobre el cabello.

Ahora bien, de acuerdo con el señor Examinador: *"la única diferencia con D1 es que esta solicitud menciona polímeros catiónicos dentro de la formulación. Pero estas no parecen conceder un efecto técnico inesperado porque esta formulación continúa siendo una composición cosmética para limpieza y acondicionamiento del cabello"*.

Lo anterior evidencia que durante el análisis de patentabilidad realizado por el señor Examinador, de ninguna manera se ha tenido en cuenta el problema técnico que fue solucionado a través de las composiciones reveladas en la presente invención, esto es, no se ha tenido en cuenta que las composiciones reveladas permiten disminuir la fricción y facilitar el peinado del cabello sin aumentar la sensación de cabello pesado y grasoso, sensación que sí se experimenta cuando se utilizan composiciones de champú que comprenden agentes acondicionadores aceitosos y combinan polímeros catiónicos con alta densidad de carga (página 2, líneas 13 a 22 de la descripción).

De conformidad con lo anterior, me permito señalar que en las páginas 22 a 25 de la descripción de la solicitud en estudio, el solicitante muestra los resultados de las pruebas experimentales realizadas para demostrar que las composiciones de champú reveladas en la presente invención no solamente permiten disminuir la fricción y facilitar el peinado del cabello, sino que adicionalmente evitan crear en el usuario la sensación de cabello pesado y grasoso.

Contrario a esto, a partir de los mismos datos mostrados por el solicitante se puede concluir que las composiciones de champú que no cumplen con las especificaciones técnicas de acuerdo con la presente invención (esto es, que no comprenden una combinación de dos polímeros catiónicos que consisten de las mismas unidades monoméricas y los mismos sustituyentes catiónicos, y en donde el primero de ellos tiene una densidad de carga media a pH 7 de 0,2 a 1,0 meq por gramo, y el segundo de ellos tiene una densidad de carga media a pH 7 de 1,3 a 3,0 meq por gramo), no permiten obtener las mismas ventajas técnicas mostradas por las composiciones reveladas en la solicitud de patente en cuestión, ya sea porque no permiten disminuir la fricción y facilitar el peinado del cabello (tal como ocurre con la muestra A - página 23 de la descripción) ó porque no permiten disminuir la sensación de cabello pesado y grasoso (tal como ocurre con la muestra B - página 24 de la descripción).

En consecuencia, me permito manifestar ante ese Despacho que la materia técnica revelada en la solicitud de patente en cuestión presenta un inequívoco carácter inventivo con respecto a las enseñanzas brindadas por el documento D1, toda vez que una persona medianamente versada en la materia no encuentra en dicha anterioridad indicación técnica alguna que le sugiera las composiciones de champú reveladas en la presente solicitud, así como tampoco encuentra alguna indicación que le sugiera que dichas composiciones permiten disminuir la fricción y facilitar el peinado del cabello sin aumentar la sensación de cabello pesado y grasoso.

3.2 **Consideraciones con respecto al documento WO 0066081 (D2)**

Por su parte, el documento D2 enseña básicamente una composición anti-caspa y acondicionadora del cabello que contiene:

a) entre 5 y 50% en peso de un surfactante aniónico;
b) entre 0,01 y 10% en peso de un agente acondicionador no volátil;
c) entre 0,1 y 4% en peso de un agente anti-caspa particulado;
d) entre 0,02% y 5% en peso de al menos un polímero catiónico;
e) entre 0,005 y 1,5% en peso un polialquilenglicol con fórmula: $H(OCH_2\text{-}CHR)_n\text{-}OH$; y,
f) agua

Con respecto al polímero catiónico, el documento D2 enseña composiciones que comprenden un sólo polímero, tal como goma guar con densidad de carga de 0,71 meq/g, o enseña composiciones que comprenden la combinación de una goma guar catiónica cuya densidad de carga es de 0.05-0,9 meq/g con una celulosa catiónica cuya densidad de carga es de 0,2-0,6 meq/g.

De lo anterior es claro entonces que si bien el documento D2 enseña una composición de champú que comprende dos polímeros catiónicos, dicha combinación de ninguna manera está compuesta por polímeros que consisten de las mismas unidades monoméricas y los mismos sustituyentes catiónicos, toda vez que la estructura de dichos polímeros resulta ser completamente diferente.

Asimismo, es evidente que las composiciones del documento D2 comprenden agentes adicionales a aquellos que hacen parte de las composiciones reveladas en la presente solicitud, tal como un agente anti caspa particulado y un polialquilenglicol.

En este sentido, resulta de gran importancia resaltar una vez más que el solicitante de la invención en cuestión ha demostrado mediante los ejemplos enseñados en la descripción de su solicitud, que sólo las composiciones de champú que cumplen con las características técnicas específicas reveladas en la presente invención permiten disminuir la fricción y facilitar el peinado del cabello sin aumentar la sensación de cabello pesado y grasoso.

Por lo tanto, me permito señalar que una persona medianamente versada en la materia tampoco encuentra en el documento D2 alguna indicación técnica que le sugiera todas las características técnicas de las composiciones de la solicitud en cuestión, y que adicionalmente lo conduzca a predecir que dichas novedosas formulaciones permiten disminuir la fricción del cabello, facilitar su peinado y evitar la sensación de cabello pesado y grasoso.

Finalmente, con base en lo planteado hasta el momento me permito manifestar que la materia técnica revelada en la solicitud de patente en cuestión presenta un inequívoco carácter inventivo con respecto a las enseñanzas de los documentos D1 y D2, cumpliendo por lo tanto a cabalidad con las disposiciones de patentabilidad establecidas en el artículo 18 de la Decisión 486 de 2000.

4. REPORTE DE EXAMEN PRELIMINAR INTERNACIONAL

Adicionalmente a lo planteado hasta el momento, considero de gran importancia resaltar que los documentos EP0529883 (D1) y WO0066081 (D2) fueron citados en el Reporte del Examen Preliminar Internacional realizado a la invención en cuestión (anexo i); sin embargo, dicho examen de patentabilidad concluyó que los documentos D1 y D2 únicamente hacen parte del estado general del arte, pero no resultan relevantes a la hora de analizar la novedad, el nivel inventivo y la aplicabilidad industrial de la presente solicitud.

5. **CONCESIÓN DE PATENTE EUROPEA**

Finalmente, me permito resaltar ante ese Despacho que la solicitud de patente en cuestión ha sido aceptada por la Oficina Europea de Patentes (EPO), y como consecuencia de ello, la patente correspondiente ha sido concedida bajo el código EP 1 560 559 B1 (anexo ii). Este hecho ilustra claramente que la materia revelada en la presente invención fue catalogada por los Examinadores técnicos de la EPO como novedosa, inventiva e industrialmente aplicable.

Ante todo, con el anterior comentario de ninguna manera pretendo desconocer la independencia de la que goza la Superintendencia de Industria y Comercio al momento de analizar los méritos de patentabilidad de una solicitud, de acuerdo con las disposiciones del Convenio de París para la protección de la propiedad industrial. Sin embargo, sí considero de gran importancia resaltar que si bien es cierto que existen claras diferencias en la normatividad vigente en materia de propiedad intelectual entre la Unión Europea y la Comunidad Andina de Naciones, tales diferencias no incluyen de ninguna manera los requisitos de novedad, nivel inventivo y aplicabilidad industrial, cuyo cumplimiento es *conditio sine qua non* a nivel mundial.

6. **CONCLUSIÓN**

Teniendo en cuenta los argumentos técnicos presentados en el presente escrito para demostrar el carácter inventivo de la presente invención frente a las enseñanzas de los documentos D1 y D2 señalados en el Concepto Técnico N° **048**, resulta completamente claro que se han superado satisfactoriamente todas las objeciones expuestas por el señor Examinador frente a la solicitud de patente en cuestión.

En este sentido, me permito manifestar que la presente solicitud cumple a cabalidad con los requisitos de patentabilidad estipulados en la Decisión 486 de 2000.

7. Anexo al presente memorial me permito presentar:

(i) Copia del Reporte del Examen Preliminar Internacional realizado a la solicitud de patente en cuestión; y

(ii) Copia de la carátula y el capítulo reivindicatorio de la patente EP 1 560 559 B1.

8. En vista de lo anterior, ruego a usted proceder a estudiar nuevamente la solicitud a la luz de los argumentos presentados y conceder el privilegio de patente solicitado.

Señor Superintendente,

ALICIA LLOREDA RICAURTE
T.P. 53.215

LLORENA & CIA., S.A.

Señor Superintendente,

ALEJANDRA LLORENA RICAURTE
T.P. 53.215

LLOREDA & CIA. S. A.
ABOGADOS

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
No. 05-044573- -00005-0000
Fecha: 2009-05-21 16:02:58 Dep. 2020 NUECREACIONI
Tra. 11 PATENTEIYII Eve: 379 FASENACIONALII
Act. 444 RESPUESTAREQUE Folios: 11

Señor
SUPERINTENDENTE DE INDUSTRIA Y COMERCIO
DIVISION DE NUEVAS CREACIONES
E. S. D.

Re: P1.-**UNILEVER N.V.**-Solicitud de Patente de Invención en Fase Nacional PCT para **"COMPOSICIONES PARA LAVAR Y ACONDICIONAR EL CABELLO"** .-Clase **A61K 7/06**.-Expediente número **05-044.573.-**

1. Me refiero al auto dictado por ese Despacho notificado por fijación en lista el 27 de Febrero de 2009.

2. Con el fin de responder a las objeciones expuestas por el señor Examinador en el Concepto Técnico No. **048** bajo el acápite de Nivel Inventivo, atentamente me permito presentar los siguientes argumentos técnicos, por medio de los cuales no sólo se superan dichas objeciones, sino que además se demuestra en forma contundente la patentabilidad de la presente solicitud.

3. **EVALUACIÓN DEL NIVEL INVENTIVO**

El señor Examinador afirma en su Concepto Técnico que el capítulo reivindicatorio de la presente solicitud carece de nivel inventivo frente a las enseñanzas de los siguientes documentos:

D1 → EP 0529883
D2 → WO 0066081

En este sentido, el señor Examinador argumenta básicamente que la única diferencia con D1 es que en la solicitud de patente en cuestión se mencionan polímeros catiónicos dentro de la formulación. Sin embargo, de acuerdo con el señor Examinador dichas diferencias no parecen conceder un efecto técnico inesperado porque la formulación revelada continúa siendo una composición cosmética para limpieza y acondicionamiento del cabello.

Adicionalmente, el señor Examinador afirma que en el documento D2 ya se habían divulgado composiciones con uno o más polímeros catiónicos, por lo que una persona conocedora de la materia motivada por tal sugerencia lograría las composiciones de la solicitud por obvia combinación de los documentos D1 y D2.

Ahora bien, en respuesta a lo anterior y con el ánimo de demostrar el inequívoco carácter inventivo que presenta la solicitud de patente en cuestión frente a las enseñanzas de los documentos D1 y D2, a continuación me permito realizar un análisis comparativo detallado entre la materia técnica revelada en la presente solicitud y las enseñanzas de cada una de las anterioridades señaladas por el señor Examinador en su Concepto Técnico.

3.1 **Consideraciones con respecto al documento EP 0529883 (D1)**

En términos generales, el documento D1 enseña composiciones cosméticas conformadas por:

a) entre 0,01 y 50% de un surfactante, el cual es seleccionado entre surfactantes aniónicos, catiónicos, no-iónicos, anfotéricos y zwitteriónicos;
b) entre 0,01 y 50% de partículas microemulsificadas de un aceite acondicionador con un tamaño de partícula menor o igual a 0,15 micras;
c) entre 0,01% y 10% de un polímero de deposición, el cual es escogido entre un derivado de goma guar catiónico y un derivado de éter de celulosa catiónico;
d) entre 20 y 99% de agua; y
e) otros ingredientes opcionales.

Asimismo, de la atenta lectura del documento D1 es claro que el objetivo técnico de dicha anterioridad es obtener un champú con altos niveles de transparencia óptica y estabilidad mecánica (página 2, líneas 28 a 30 de D1), así como mejorar el beneficio acondicionador de éste, hecho que se asocia con la capacidad de deposición del aceite acondicionador sobre el cabello (página 2, líneas 25 a 27).

Ahora, de manera completamente contraria a lo anterior, en la presente solicitud se revelan composiciones para el lavado del cabello que comprenden:

a) de 1 a 50% en peso de un surfactante limpiador;
b) de 0,1 a 10% en peso de gotas de un aceite acondicionador insoluble en agua con un diámetro medio ($D_{3,2}$) de 4 micrómetros o menos;
c) de 0,01 a 0,5% en peso de un primer polímero catiónico que tiene una densidad de carga media a pH 7 de 0,2 a 1,0 meq por gramo;

PATENT COOPERATION TREATY

REC'D 15 JUL 2004
WIPO PCT

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/EP 03/12066	International filing date *(day/month/year)* 30.10.2003	Priority date *(day/month/year)* 12.11.2002
International Patent Classification (IPC) or both national classification and IPC A61K7/06		
Applicant UNILEVER PLC et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

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13. 08. 2004
103

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
22.03.2004	14.07.2004
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Giese, H-H Telephone No. +49 89 2399-8488

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP [illegible]	International filing date (day/month/year) 30.10.2003	Priority date (day/month/year) 12.11.2002
International Patent Classification (IPC) or both national classification and IPC [illegible]		
Applicant [illegible]		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

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These annexes consist of a total of [illegible] sheets.

3. This report contains indications relating to the following items:

I ☒ Basis of the opinion

II ☐ Priority

III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

IV ☐ Lack of unity of invention

V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

VI ☐ Certain documents cited

VII ☐ Certain defects in the international application

VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
25.03.2004	14.07.2004
Name and mailing address of the International Preliminary Examining Authority: [illegible]	Authorized Officer [illegible]
	Telephone No. +49 89 2399 8658

Form PCT/IPEA/409 (cover sheet) (January 2004)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/12066

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-25 as originally filed

Claims, Numbers

1-14 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:
- ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/12066

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-14
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-14
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	

2. Citations and explanations

see separate sheet

PR

INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

International application No. PCT/EP 00/12009

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 1-14
No: Claims

Inventive step (IS) Yes: Claims 1-14
No: Claims

Industrial applicability (IA) Yes: Claims 1-14
No: Claims

2. Citations and explanations

see separate sheet

Form PCT/IPEA/409 (January 2001)

Re Item V

Cited documents

1. The following documents (D) are referred to in this communication:

D1: EP-A-0 529 883 A
D2: WO 00/66081 A
D3: US 6 040 282
D4: US 6 090 773

2. Document D1 discloses a shampoo comprising (a) 0,01-50% of a surfactant, (b) 0.01-10% of a cationic polymer, (c) 0,01-50% of a conditioning oil and (d) 20-99% of water. The cationic polymer is either cationic guar gum derivative or a cationic cellulose ether derivative. This piece of prior art does not reveal the parallel use of two cationic polymers with the identical base monomer and specific charge densities.

Document D2 relates to a shampoo having (a) 5-50% of a surfactant, (b) 0,02-5% of a combination of a cationic guar gum with a charge density of 0,05-0,9 meq/g and a cationic cellulose with a charge density of 0,2-0,6 meq/g, (c) 0,01-10% of a silicone conditioning agent and (d) 20-94,75% of water. This document proposes to use two different cationic polymers without giving individual weight ranges.

Document D3 describes a shampoo for styling comprising (a) 5-50% of a surfactant, 0,025-3% of a cationic deposition polymer wihcih is a combination of guar gum and cellulose, (c) 0,1-3% of a silicone conditioning agent and (d) 22-93,4% of water. This document lacks in teaching two cationic polymers with the same base monomer.

Novelty (Article 33(2) PCT)

3. The present independent product claim 1 defines a hair-washing composition comprising (a) 1-50% of a surfactant, (b) 0.01-0,5% of a first cationic polymer, (c) 0,01-0,4% of a second polymer, (d) more than 40% of water and (d) 0,1-10% of a discrete, dispersed droplet of conditioning oil wherein the cationic polymers have the same monomeric units and the same cationic substituents. The present independent method claim 20 defines step (a) massaging the composition into the hair, (b) rinsing and (c) drying the hair.

4. None of the cited prior art documents teaches that two cationic polymers with the

Box V

Cited documents

1. The following documents (D) are referred to in this communication:
D1: EP-A-0 329 863 A
D2: WO 00/26281 A
D3: US 6 040 282
D4: US 6 090 773

2. Document D1 discloses a shampoo comprising (a) 0,01-50% of a surfactant, (b) 0,01-10% of a cationic polymer, (c) 0,01-50% of a conditioning oil and (d) 20-99% of water. The cationic polymer is either cationic guar gum derivative or a cationic cellulose ether derivative. This piece of prior art does not reveal the mutual use of two cationic polymers with the identical base monomer and specific charge densities.

Document D2 relates to a shampoo having (a) 5-30% of a surfactant, (b) 0,02-5% of a combination of a cationic guar with a charge density of 0,05-0,3 meq/g and a cationic cellulose with a charge density of 0,2-0,6 meq/g, (c) 0,01-10% of a silicone conditioning agent and (d) 20-94,75% of water. This document proposes to use two different cationic polymers without giving individual weight ranges.

Document D3 describes a shampoo for styling comprising (a) 5-50% of a surfactant, 0,025-5% of a cationic deposition polymer which is a combination of guar and cellulose, (c) 0,1-3% of a silicone conditioning agent and (d) 22-90,4% of water. This document lacks to teaching two cationic polymers with the same base monomer.

Novelty (Article 33(2) PCT)

3. The present independent product claim 1 defines a hair-washing composition comprising (a) 1-50% of a surfactant, (b) 0,01-0,5% of a first cationic polymer, (c) 0,01-0,5% of a second polymer, (d) more than 40% of water and (e) 0,1-10% of a silicone, dispersed droplet of conditioning oil wherein the cationic polymers have the monomeric units and the same cationic substituents. The present independent method claim 20 defines step (a) massaging the composition into the hair, (b) rinsing and (c) drying the hair.

4. None of the cited prior art documents teaches that two cationic polymers with the

Form PCT/ISA/237 (Separate Sheet) (April 2005)

same monomeric units are comprised in a shampoo which each have different charge densities.
Therefore, present claims 1 to 14 are considered to be novel (Article 33(2) PCT).

Inventive Step (Article 33(3) PCT)

5. The problem to be solved in present application was to make the hair easier to comb when wet and more manageable when dry and to provide low friction and ease of combing for dry hair (see page 1, lines 23-29). The solution proposed by the present application is the claimed specific combination of cationic polymers (see page 2, lines 11-20).

6. The same technical problem as defined in the present application appears to be solved by the disclosure in document D4 (see col. 3, lines 50-54). The solution proposed by D4 is to use two cationic conditioning polymers selected from (a) cationic cellulose, (b) cationic guar and (c) cationic polyacrylamide (see claim 1). This document does not propose or leads the skilled man to use two cationic polymers of the same monomeric unit with the same cationic substituents but different charge densities.

Therefore, present claims involve an inventive step (Article 33(3) PCT).

[illegible]same monomeric units are comprised in a chitosan which have different [illegible]charge densities.

[illegible]Therefore, present claims 1 to 14 are considered to be novel (Article 33(2) PCT).

[illegible]nventive Step (Article 33(3) PCT)

6. [illegible]The problem to be solved in present application was to make the hair easier to [illegible]comb when wet and more manageable when dry and to provide low friction and [illegible]ease of combing for dry hair (see page 1, lines 23-29). The solution proposed by [illegible]the present application is the claimed specific combination of cationic polymers (see page 2, lines 11-20).

6. [illegible]The same technical problem as defined in the present application appears to be [illegible]solved by the disclosure in document D4 (see col. 3, lines 50-54). The solution [illegible]proposed by D4 is to use two cationic conditioning polymers selected from (a) [illegible]cationic celluloses, (b) cationic guar and (c) cationic polyvinylamide (see claim 1). [illegible]This document does not proposes or leads the skilled man to uses two cationic [illegible]polymers of the same monomeric unit with the same cationic substituents but [illegible]different charge densities.

[illegible]Therefore, present claims involve an inventive step (Article 33(3) PCT).

(19) Europäisches Patentamt
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(54) COMPOSITIONS FOR WASHING AND CONDITIONING HAIR

ZUSAMMENSETZUNGEN ZUM WASCHEN UND KONDITIONIEREN VON HAAR

COMPOSITIONS DE LAVAGE ET DE REVITALISATION CAPILLAIRES

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US-A- 6 040 282

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(54) COMPOSITIONS FOR WASHING AND CONDITIONING HAIR

ZUSAMMENSETZUNGEN ZUM WASCHEN UND KONDITIONIEREN VON HAAR

COMPOSITIONS DE LAVAGE ET DE REVITALISATION CAPILLAIRES

(84) Designated Contracting States:
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US-A- 5 543 074 US-A- 6 042 [illegible]
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Claims

1. A hair-washing composition comprising

   a) from 1 to 50% by weight of a cleansing surfactant,
   b) from 0.01 to 0.5% by weight of a first cationic polymer having a mean charge density at pH7 from 0.2 to 1.0 meq per gram,
   c) from 0.01 to 0.4% by weight of a second cationic polymer having a mean charge density at pH7 from 1.3 to 3.0 meq per gram,
   d) more than 40% by weight of water, and
   e) from 0.1 to 10% by weight of discrete, dispersed droplets of a water-insoluble conditioning oil with a mean diameter ($D_{3,2}$) of 4 micrometres or less,

   wherein both the first cationic polymer and the second cationic polymer consist essentially of the same monomeric units and cationic substituents.

2. A composition according to claim 1 wherein the first and second cationic polymers are both cationically substituted guar gums.

3. A composition according to claim 2 wherein the first and second cationic polymers are both guar hydroxypropyltrimethylammonium chlorides.

4. A composition according to claim 1 wherein the first and second cationic polymers are both cationically substituted hydroxyethyl celluloses.

5. A composition according to claim 1 wherein the first and second cationic polymers are both cationic polyacrylamides.

6. A composition according to any preceding claim wherein the cleansing surfactant is selected from the group consisting of anionic surfactants, amphoteric surfactants, zwitterionic surfactants, nonionic surfactants and mixtures thereof.

7. A composition according to any preceding claim wherein the water-insoluble conditioning oil comprises a silicone oil.

8. A composition according to claim 7 wherein the silicone oil comprises

   (i) from 50 to 95% by weight of the total weight of silicone oil of a polydimethylsiloxane gum having a molecular weight of 200,000 unified mass units or more and
   (ii) from 5 to 50% by weight of the total weight of silicone oil of a second silicone which is an amino-functionalised polydimethylsiloxane having a molecular weight of less than 200,000 unified mass units.

9. A composition according to claim 8, in which the polydimethylsiloxane gum has a viscosity of 500,000 mm^2/sec or more at 25°C

10. A composition according to claim 8 or claim 9, in which the amino-functional polydimethylsiloxane has a viscosity of less than 500,000 mm^2/sec at 25°C.

11. A composition according to any one of claims 8 to 10, in which the amino-functionalised silicone has a mole percent amino functionality from 0.3 to 8.

12. A composition according to any of claims 8 to 11, in which the weight ratio of the polysdimethylsiloxane gum to the amino-functional polydimethylsiloxane is from 15:1 to 1:1.

13. A composition according to any preceding claim, in which the water-insoluble conditioning oil is in the form of a mechanically generated emulsion.

14. A method of washing and conditioning hair by massaging a composition according to any preceding claim into the hair followed by rinsing prior to drying the hair.

1. A conditioning composition comprising

(i) from 1 to 50% by weight of a cleansing surfactant,

(ii) from 0.01 to 0.4% by weight of a first cationic polymer having a mean charge density at pH7 from 0.5 to 1.0 meq per gram,

(iii) from 0.01 to 0.4% by weight of a second cationic polymer having a mean charge density at pH7 from 1.3 to 2.0 meq per gram,

(iv) more than 40% by weight of water, and

(v) from 0.1 to 10% by weight of dimethicone, dispersed droplets of a water insoluble conditioning oil with a mean diameter ($D_{3,2}$) of 4 micrometre or less,

wherein both the first cationic polymer and the second cationic polymer comprise residues of the same monomer and wherein the cationic substituents

2. A composition according to claim 1 wherein the first and second cationic polymers are both quaternised guar gums.

3. A composition according to claim 2 wherein the first and second cationic polymers are both hydroxypropyltrimonium chlorides.

4. A composition according to claim 1 wherein the first and second cationic polymers are both cationically substituted polyvinylalcohols.

5. A composition according to any preceding claim wherein the cleansing surfactant is selected from the group consisting of anionic surfactants, amphoteric surfactants, zwitterionic surfactants, nonionic surfactants and mixtures thereof.

6. A composition according to any preceding claim wherein the water-insoluble conditioning oil comprises a silicone oil.

7. A composition according to claim 6 wherein the silicone oil comprises

(i) from 50 to 95% by weight of the total weight of silicone oil of a polydimethylsiloxane gum having a molecular weight of 200,000 up to one million mass units and

(ii) from 5 to 50% by weight of the total weight of silicone oil of a second silicone which is an amino functionalised polydimethylsiloxane having a molecular weight of less than 200,000 unified mass units.

8. A composition according to claim 8, in which the polydimethylsiloxane gum has a viscosity of 500,000 mm^2/sec or more at 25°C.

9. A composition according to claim 8 or claim 8, in which the amino-functional polydimethylsiloxane has a viscosity of 5,000 mm^2/sec or less at 25°C.

10. A composition according to any one of claims 8 to 10, in which the amino-functionalised silicone has a mole percent amine functionality from 0.3 to 8.

11. A composition according to any of claims 8 to 11, in which the weight ratio of the polydimethylsiloxane gum to the amino functional polydimethylsiloxane is from 15:1 to 1:1.

12. A composition according to any preceding claim, in which the water-insoluble conditioning oil is in the form of a pre-formed emulsion.

13. A method of washing and conditioning hair by massaging a composition according to any preceding claim into the hair followed by rinsing prior to drying the hair.

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(54) STYLING SHAMPOO COMPOSITIONS CONTAINING CATIONIC STYLING POLYMERS

STYLING-SHAMPOO-ZUSAMMENSETZUNGEN ENTHALTEND KATIONISCHE STYLING POLYMERE

COMPOSITIONS DE SHAMPOOING DONNANT DU CORPS AUX CHEVEUX ET CONTENANT DES POLYMERES DE COIFFAGE CATIONIQUE

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(54) STYLING SHAMPOO COMPOSITIONS CONTAINING CATIONIC STYLING POLYMERS

STYLINGSHAMPOO ZUSAMMENSETZUNGEN ENTHALTEND KATIONISCHE STYLING POLYMERE

COMPOSITIONS DE SHAMPOOING DONNANT DU CORPS AUX CHEVEUX ET CONTENANT DES POLYMERES DE COIFFAGE CATIONIQUE

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to styling shampoo compositions which contain select combinations of cationic deposition polymer and cationic styling polymers to improve the styling performance of the composition, especially when used in select surfactant matrices such as combinations of zwitterionic and anionic surfactants.

BACKGROUND OF THE INVENTION

[0002] Many hair shampoo compositions provide acceptable cleaning but provide little or no styling benefits, e.g., body, hold, curl retention, stiffness. To realize such benefits, separate cleaning and styling products are often used.

[0003] Recently, hair shampoo compositions have been developed which can provide cleaning and styling performance from a single product. Many of these products contain styling polymers in a compatible shampoo base. To prepare such products, styling polymers can be incorporated into the shampoo base by first dissolving the polymer in a liquid carrier and then adding the polymer/liquid carrier premix to the surfactant phase of the composition. Alternatively, the styling polymer can be dispersed in the surfactant phase of the shampoo composition, and deposited onto the hair to form a thin film on the hair shaft. The polymers provide improved hairstyle benefits such as body, hold, and curl retention. However, some styling polymers, whether deposited onto the hair via a liquid carrier or by dispersion, leave the hair feeling sticky or tacky.

[0004] It has now been found that a combination of cationic deposition polymers and select organic cationic styling polymers can be incorporated into shampoo compositions containing select surfactant matrices to improve the styling performance of such compositions. This combination is especially effective in providing both conditioning and styling performance without leaving the hair feeling unduly coated, dirty, sticky, or tacky to the touch. The organic cationic styling polymers defined herein are especially effective in helping provide wet hair conditioning as well as hair styling performance when used in combination with the shampoo matrix defined herein.

[0005] In view of the foregoing, it is therefore an object of the present invention to provide a styling shampoo composition with improved styling performance. It is a further object of the present invention to provide improved hairstyle benefits such as hold, body, and curl retention from a styling shampoo composition containing a combination of cationic deposition polymer and organic cationic styling polymer. It is yet another object of the present invention to provide such a composition that also provides some hair conditioning benefits without leaving the hair feeling unduly coated, dirty, sticky or tacky to the touch.

SUMMARY OF THE INVENTION

[0006] The present invention is directed to styling shampoo compositions which comprise from (a) from about 5% to about 50% by weight of a surfactant component selected from the group consisting of a combination of an anionic surfactant and an amphoteric surfactant, and a combination of an anionic surfactant and a zwitterionic surfactant; (b) from about 0.025% to about 3% by weight of a cationic deposition polymer having a cationic charge density of from about 0.2 meq/gram to about 2 meq/gram and which is selected from the group consisting of cationic cellulose polymers, cationic guar gum derivatives, and mixtures thereof; (c) from about 2% to about 10% by weight of an organic cationic hair styling polymer having a cationic charge density of greater than about 2 meq/gram to less than about 4.75 meq/gram; and (d) from about 27% to about 94.5% by weight water.

[0007] It has been found that select organic cationic styling polymers, preferably Polyquaternium-16, can provide improved styling performance from a shampoo composition when used in combination with a cationic deposition polymer, especially when the cationic polymer combination is also used in combination with select surfactant combinations in the shampoo composition defined herein. The organic cationic styling polymers provide styling benefits such as improved body, hold, and curl retention.

[0008] Shampoo and cleaning compositions comprising mixtures of cationic polymers are disclosed in US 5, 580,494, WO 98/18433, WO 97/26860, WO 97/25975 and WO 97/29736.

DETAILED DESCRIPTION OF THE INVENTION

[0009] The styling shampoo compositions of the present invention comprise organic cationic styling polymers which provide the composition with improved styling performance. The stylings polymers herein are soluble in water or dispersible in the surfactant phase of the shampoo composition.

[0010] The term "water-soluble" as used herein refers to any material that is sufficiently soluble in water to form a substantially clear solution to the naked eye at a concentration of about 0.2% by weight, preferably at about 0.5% by

Description

FIELD OF THE INVENTION

[0001] The present invention relates to styling shampoo compositions which contain select combinations of cationic deposition polymers and cationic styling polymers to improve the styling performance of the composition, especially when used in select surfactant matrices such as combinations of zwitterionic and anionic surfactants.

BACKGROUND OF THE INVENTION

[0002] Many hair shampoo compositions provide acceptable cleaning but provide little or no styling benefits, e.g., body, hold and retention, stiffness. To realize such benefits, separate cleaning and styling products are often used.

[0003] Recently, hair shampoo compositions have been developed which can provide cleaning and styling performance from a single product. Many of these products contain styling polymers in a compatible shampoo base. To prepare such products, styling polymers can be incorporated into the shampoo base by first dissolving the polymer in a liquid carrier and then adding the polymer/liquid carrier premix to the surfactant phase of the composition. Alternatively, the styling polymer can be dispersed in the surfactant phase of the shampoo composition, and deposited onto the hair to form a thin film on the hair shaft. The polymers provide improved hairstyle benefits such as body, hold, and curl retention. However, some styling polymers, whether deposited onto the hair via a liquid carrier or by dispersion, leave the hair feeling sticky or tacky.

[0004] It has now been found that a combination of cationic deposition polymers and select organic cationic styling polymers can be incorporated into shampoo compositions containing select surfactant matrices to improve the styling performance of such compositions. This combination is especially effective in providing both conditioning and styling performance without leaving the hair feeling unduly coated, oily, sticky, or tacky to the touch. The organic cationic styling polymers defined herein are especially effective in helping provide wet hair conditioning as well as hair styling performance when used in combination with the shampoo matrix defined herein.

[0005] In view of the foregoing, it is therefore an object of the present invention to provide a styling shampoo composition with improved styling performance. It is a further object of the present invention to provide improved hairstyle benefits such as hold, body, and curl retention from a styling shampoo composition containing a combination of cationic deposition polymer and organic cationic styling polymer. It is yet another object of the present invention to provide such a composition that also provides some hair conditioning benefits without leaving the hair feeling unduly coated, oily, sticky or tacky to the touch.

SUMMARY OF THE INVENTION

[0006] The present invention is directed to styling shampoo compositions which comprise from (a) from about 5% to about 50% by weight of a surfactant component selected from the group consisting of a combination of an anionic surfactant and an amphoteric surfactant, and a combination of an anionic surfactant and a zwitterionic surfactant; (b) from about 0.025% to about 3% by weight of a cationic deposition polymer having a cationic charge density of from about 0.2 meq/gram to about 2 meq/gram and which is selected from the group consisting of cationic cellulose polymers, cationic guar gum derivatives, and mixtures thereof; (c) from about 0.1% to about 10% by weight of an organic cationic polymer having a cationic charge density of greater than about 2 meq/gram to less than about 4.75 meq/gram; and (d) from about 27% to about 94.8% by weight water.

[0007] It has been found that select organic cationic styling polymers, preferably polyquaternium-16, can provide improved styling performance from a shampoo composition when used in combination with a cationic deposition polymer, especially when the cationic polymer combination is also used in combination with select surfactant combinations in the shampoo composition defined herein. The organic cationic styling polymers provide styling benefits such as improved body, hold, and curl retention.

[0008] Shampoo and cleaning compositions comprising mixtures of cationic polymers are disclosed in US 5,580,494, WO 98/18453, WO 97/26860, WO 97/28976 and WO 97/20626.

DETAILED DESCRIPTION OF THE INVENTION

[0009] The styling shampoo compositions of the present invention comprise organic cationic styling polymers which provide the composition with improved styling performance. The styling polymers herein are soluble in water or dispersible in the surfactant phase of the shampoo composition.

[0010] The term "water-soluble" as used herein refers to any material that is sufficiently soluble in water to form a substantially clear solution to the naked eye at a concentration of about 0.2% by weight, preferably at about 0.5% by

weight, even more preferably at about 1.0% by weight of the material in water at 25°C.

[0011] The term "water-insoluble "as used herein refers to any material that is not sufficiently soluble in preferably at about 0.1% by weight of the insoluble material at 25°C.

[0012] The styling shampoo compositions of the present invention can comprise, consist of, or consist essentially of the element and limitations of the invention herein, as well as any of the additional or optional ingredients, components, or limitations described herein.

[0013] All percentages, parts and ratios are by weight of the total composition, unless otherwise specified. All such weights as they pertain to listed ingredients are based on the specific ingredient level and, therefore, do not include carriers or by-products that may be includes in commercially available materials, unless otherwise specified.

Surfactant Component

[0014] The styling shampoo compositions of the present invention comprise a surfactant component to provide cleaning performance to the composition. The surfactant component in turn comprises a combination of an anionic surfactant and a zwitterionic surfactant, or a combination of an anionic surfactant and an amphoteric surfactant. Such surfactants should be physically and chemically compatible with the essential components described herein, or should not otherwise unduly impair product stability, aesthetics or performance.

[0015] Suitable anionic surfactants for use in the styling shampoo composition herein include those which are known for use in hair care or other personal care cleansing compositions. The concentration of the anionic surfactant in the styling shampoo composition should be sufficient to provide the desired cleaning and lather performance, and generally ranges from about 5% to about 50%, preferably from about 6% to about 30%, more preferably from about 7% to about 25%, even more preferably from about 8% to about 18%, by weight of the composition.

[0016] Preferred anionic surfactants suitable for use in the styling shampoo compositions are the alkyl and alkyl ether sulfates. These materials have the respective formulae $ROSO_3M$ and $RO(C_2)H_4O)_xSO_3M$, wherein R is alkyl or alkenyl of from about 8 to about 18 carbon atoms, x is an integer having a value of from 1 to 10, and M is a cation such as ammonium, alkanolamines, such as triethanolamine, monovalent metals, such as sodium and potassium, and polyvalent metal cations, such as magnesium, and calcium. Solubility of the surfactant will depend upon the particular anionic surfactants and cations chosen.

[0017] Preferably, R has from about 8 to about 18 carbon atoms, more preferably from about 10 to about 16 carbon atoms, even more preferably from about 12 to about 14 carbon atoms, in both the alkyl and alkyl ether sulfates. 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. The alcohols can be synthetic or they can be derived from fats, e.g., coconut oil, palm kernel oil, tallow. Lauryl alcohol and straight chain alcohols derived from coconut oil or palm kernel oil are preferred. Such alcohols are reacted with between about 0 and about 10, preferably from about 2 to about 5, more preferably about 3, molar proportions of ethylene oxide, and the resulting mixture of molecular species having, for example, an average of 3 moles of ethylene oxide per mole of alcohol, is sulfated and neutralized.

[0018] Specific nonlimiting examples of alkyl ether sulfates which may be used in the styling shampoo compositions of the present invention include sodium and ammonium salts of coconut alkyl triethylene glycol ether sulfate, tallow alkyl triethylene glycol ether sulfate, and tallow alkyl hexaoxyethylene sulfate. Highly preferred alkyl ether sulfates are those comprising a mixture of individual compounds, wherein the compounds in the mixture have an average alkyl chain length of from about 10 to about 16 carbon atoms and an average degree of ethoxylation of from about 1 to about 4 moles of ethylene oxide.

[0019] Other suitable anionic surfactants are the water-soluble salts of organic, sulfuric acid reaction products conforming to the formula [R^1-SO_3-M] where R^1 is a straight or branched chain, saturated, aliphatic hydrocarbon radical having from about 8 to about 24, preferably about 10 to about 18, carbon atoms; and M is a cation described hereinbefore. Nonlimiting examples of such surfactants are the salts of an organic sulfuric acid reaction product of a hydrocarbon of the methane series, including iso-, neo-, and n-paraffins, having from about 8 to about 24 carbon atoms, preferably about 12 to about 18 carbon atoms and a sulfonating agent. e.g., SO_3, H_2SO_4, obtained according to known sulfonation methods, including bleaching and hydrolysis. Preferred are alkali metal and ammonium sulfonated C_{10} to C_{18} n-paraffins.

[0020] Still other suitable anionic surfactants are the reaction products of fatty acids esterified with isethionic acid and neutralized with sodium hydroxide where, for example, the fatty acids are derived from coconut oil or palm kernel oil; sodium or potassium salts of fatty acid amides of methyl tauride in which the fatty acids, for example, are derived from coconut oil or palm kernel oil. Other similar anionic surfactants are described in U.S. Patent 2,486,921; U.S. Patent 2,486,922; and U.S. Patent 2,396,278.

[0021] Other anionic surfactants suitable for use in the styling shampoo compositions are the succinnates, examples of which include disodium N-octadecylsulfosuccinnate; disodium lauryl sulfosuccinate; diammonium lauryl sulfosuccinate; tetrasodium N-(1,2-dicarboxyethyl)-N-octadecylsulfosuccinnate: diamyl ester of sodium sulfosuccinic acid; dihexyl ester of sodium sulfosuccinic acid: and dioctyl of sodium sulfosuccinic acid.

weight, even more preferably at about 1.0% by weight of the mixture, in water at 25°C.

[0012] The term "water insoluble" as used herein to any material that is not sufficiently soluble to provide at least about 0.1% by weight of the insoluble material at 25°C.

[0013] The shampoo compositions of the present invention can comprise, consist of, or consist essentially of the elements and limitations of the invention herein, as well as any of the additional or optional ingredients, components, or limitations described herein.

[0014] All percentages, parts and ratios are by weight of the total composition, unless otherwise specified. All such weights as they pertain to listed ingredients are based on the specific ingredient level and, therefore, do not include carriers or by-products that may be included in commercially available materials, unless otherwise specified.

Surfactant Component

[0015] The shampoo compositions of the present invention comprise a surfactant component to provide cleaning performance to the composition. The surfactant component in turn comprises a combination of an anionic surfactant and a zwitterionic surfactant, or a combination of an anionic surfactant and an amphoteric surfactant. Such surfactants should be physically and chemically compatible with the essential components described herein, or should not otherwise unduly impair product stability, aesthetics or performance.

[0016] Suitable anionic surfactants for use in the shampoo compositions herein are known for use in hair care or personal care cleansing compositions. The concentration of the anionic surfactant in the shampoo composition should be sufficient to provide the desired cleaning and lather performance, and generally ranges from about 5% to about 50%, preferably from about 8% to about 30%, more preferably from about 10% to about 25%, even more preferably from about 12% to about 18%, by weight of the composition.

[0017] Preferred anionic surfactants suitable for use in the shampoo compositions are the alkyl and alkyl ether sulfates. These materials have the respective formulas $ROSO_3M$ and $RO(C_2H_4O)_xSO_3M$, wherein R is alkyl or alkenyl of from about 8 to about 18 carbon atoms, x is an integer having a value of from 1 to 10, and M is a cation such as ammonium, alkanolamines, such as triethanolamine, monovalent metals, such as sodium and potassium, and polyvalent metal cations, such as magnesium, and calcium. Suitably, at the surfactant will depend upon the particular anionic surfactants and cations chosen.

[0018] Preferably, R has from about 8 to about 18 carbon atoms, more preferably from about 10 to about 16 carbon atoms, even more preferably from about 12 to about 14 carbon atoms, in both the alkyl and alkyl ether sulfates. 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. The alcohols can be synthetic or they can be derived from fats, e.g., coconut oil, palm kernel oil, tallow. Lauryl alcohol and straight chain alcohols derived from coconut oil or palm kernel oil are preferred. Such alcohols are reacted with between about 0 and about 10, preferably from about 2 to about 5, more preferably about 3 moles, on the average, of ethylene oxide, and the resulting mixture of molecules having, for example, an average of 2, 3 or 4 moles of ethylene oxide per mole of alcohol, is sulfated and neutralized.

[0019] Specific non-limiting examples of alkyl ether sulfates which may be used in the shampoo compositions of the present invention are sodium and ammonium salts of coconut alkyl triethylene glycol ether sulfate, tallow alkyl hexaoxyethylene sodium sulfate, and alkyl tetraoxyethylene sodium sulfate. Mixtures of tallow alkyl triethoxy and pentaoxyethyl sodium sulfate can also be used.

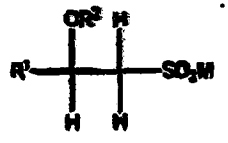
[0020] Other suitable anionic surfactants are the water soluble salts of organic, sulfuric acid reaction products conforming to the formula $[R^1-SO_3-M]$ where R^1 is a straight or branched chain, saturated, aliphatic hydrocarbon radical having from about 8 to about 24, preferably about 10 to about 18, carbon atoms; and M is a cation described hereinbefore. Examples of such surfactants are the salts of an organic sulfuric acid reaction product of a hydrocarbon of the methane series, including iso-, neo-, and n-paraffins, having from about 8 to about 24 carbon atoms, preferably from about 12 to about 18 carbon atoms and a sulfonating agent, e.g., SO_3, H_2SO_4, obtained according to known sulfonation methods, including bleaching and hydrolysis. Preferred are alkali and ammonium sulfonated C_{10} to C_{18} n-paraffins.

[0021] Still other suitable anionic surfactants are the reaction products of fatty acids esterified with isethionic acid and neutralized with sodium hydroxide where, for example, the fatty acids are derived from coconut oil or palm kernel oil. Other similar anionic surfactants are described in U.S. Patent 2,486,921; U.S. Patent 2,486,922; and U.S. Patent 2,396,278.

[0022] Other anionic surfactants suitable for use in the styling shampoo compositions are the succinnates, examples of which include disodium N-octadecylsulfosuccinate; disodium lauryl sulfosuccinate; diammonium lauryl sulfosuccinate; tetrasodium N-(1,2-dicarboxyethyl)-N-octadecylsulfosuccinnate; diamyl ester of sodium sulfosuccinic acid; dihexyl ester of sodium sulfosuccinic acid; and dioctyl ester of sodium sulfosuccinic acid.

[0022] Other suitable anionic surfactants include olefin sulfonates having about 10 to about 24 carbon atoms. In this context, the term "olefin sulfonates" refers to compounds which 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 sulfones which have been formed in the reaction are hydrolyzed to give the corresponding hydroxy-alkanesulfonates. The sulfur trioxide can be liquid or gaseous, and is usually, but not necessarily, diluted by inert diluents, for example by liquid SO_2, chlorinated hydrocarbons, etc., when used in the liquid form, or by air, nitrogen, gaseous SO_2, etc., when used in the gaseous form. The alpha-olefins from which the olefin sulfonates are derived are mono-olefins having from about 10 to about 24 carbon atoms, preferably from about 12 to about 16 carbon atoms. Preferably, they are straight chain olefins. In addition to the true alkene sulfonates and a proportion of hydroxy-alkanesulfonates, the olefin sulfonates can contain minor amounts of other materials, such as alkene disulfonates depending upon the reaction conditions, proportion of reactants, the nature of the starting olefins and impurities in the olefin stock and side reactions during the sulfonation process. A nonlimiting example of such an alpha-olefin sulfonate mixture is described in U.S. Patent 3,332,880.

[0023] Another class of anionic surfactants suitable for use in the styling shampoo compositions are the beta-alkyloxy alkane sulfonates. These surfactants conform to the formula



where R^1 is a straight chain alkyl group having from about 6 to about 20 carbon atoms. R^2 is a lower alkyl group having from about 1 to about 3 carbon atoms, preferably 1 carbon atom, and M is a water-soluble cation as described hereinbefore.

[0024] Preferred anionic surfactants for use in the styling shampoo compositions include ammonium lauryl sulfate, ammonium laureth sulfate, triethylamine lauryl sulfate, triethylamine laureth sulfate, triethanolamine lauryl sulfate, triethanolamine laureth sulfate, monoethanolamine lauryl sulfate, monoethanolamine laureth sulfate, diethanolamine lauryl sulfate, diethanolamine laureth sulfate, lauric monoglyceride sodium sulfate, sodium lauryl sulfate, sodium laureth sulfate, potassium lauryl sulfate, potassium laureth sulfate, sodium lauroyl sarcosinate, lauryl sarcosine, cocoyl sarcosine, ammonium cocoyl sulfate, ammonium lauroyl sulfate, sodium cocoyl sulfate, sodium lauroyl sulfate, potassium cocoyl sulfate, potassium lauryl sulfate, monoethanolamine cocoyl sulfate, sodium tridecyl benzene sulfonate, sodium dodecyl benzene sulfonate, and combination thereof.

[0025] Suitable amphoteric or zwitterionic surfactants for use in the styling shampoo composition herein include those which are known for use in hair care or other personal care cleansing compositions. Concentrations of such amphoteric surfactants preferably range from about 0.5 % to about 20%, preferably from about 1% to about 10%, by weight of the composition. Nonlimiting examples of suitable zwitterionic or amphoteric surfactants are described in U.S. Patents 5,104,646 (Bolich Jr. et al.), U.S. Patent 5,106,609 (Bolich Jr.et al.).

[0026] Amphoteric surfactants suitable for use in the styling shampoo composition are well known in the art, and these surfactants are most effective when used in combination with the anionic surfactants described herein. Nonlimiting of suitable amphoteric surfactants include those surfactants broadly described as derivatives of aliphatic secondary and tertiary amines in which the aliphatic radical can be straight or branched chain and wherein one of the aliphatic substituents contains from about 8 to about 18 carbon atoms and one contains an aniotic water solubilizing group such as carboxy, sulfonate, sulfate, phosphate, or phosphonate. Preferred amphoteric surfactants for use in the styling shampoo composition of the present invention include cocoamphoacetate, cocoamphodiacetate, lauroamphoacetate, lauroamphodiacetate, and mixtures thereof. Lauroamphoacetate is the most preferred.

[0027] Zwitterionic surfactants suitable for use in the styling shampoo composition at well known in the art. Preferably the zwitterionic surfactants are used in combination with the cationic surfactants described herein, and include those surfactants broadly described as derivatives of aliphatic quaternary ammonium, phosphonuim, and sulfonium compounds, in which the aliphatic radicals can be straight or branched chain, and wherein one of the aliphatic substituents contains from about 8 to about 18 carbon atoms and one contains an anionic group such as carboxy, sulfonate, sulfate, phosphate or phosphonate. Nonlimiting examples of suitable zwitterionic surfactants are the betaines including the high alkyl betaines, such as coco dimethyl carboxymethyl betaine, cocoamidopropyl betaine, cocobetaine, lauryl amidapropyl betaine, oleyl betaine, lauryl dimethyl carboxymethyl betaine, lauryl dimethyl alphacarboxyethyl betaine, cetyl dimethyl carboxymethyl betaine, lauryl bis-(2-hydroxyethyl) carboxymethyl betaine, stearyl bis-(2-hydroxypropyl) carboxymethyl betaine, oleyl dimethyl gamma-carboxypropyl betaine, and lauryl bis-(2-hydroxypropyl)alpha-carboxyethyl betaine. The sulfobetaines may be represented by coco dimethyl sulfopropyl betaine, stearyl dimethyl sulfopropyl betaine, lauryl dimethyl sulfoethyl betaine, lauryl bis-(2-hydroxyethyl) sulfopropyl betaine and the like; amidobetaines and amidosulfobetaines wherein the $RCONH(CH_2)_3$ radical is attached to the nitrogen atom of the betaine are also useful in this invention.

[0023] Other suitable anionic surfactants include olefin sulfonates having about 10 to about 24 carbon atoms. In this context, the term "olefin sulfonates" refers to compounds which 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 hydroxy-alkanesulfonates. The sulfur trioxide can be liquid or gaseous, and is usually, but not necessarily, diluted by inert diluents, for example by liquid SO_2, chlorinated hydrocarbons, etc., when used in the liquid form, or by air, nitrogen, gaseous SO_2, etc., when used in the gaseous form. The alpha-olefins from which the olefin sulfonates are derived are mono-olefins having from about 10 to about 24 carbon atoms, preferably from about 12 to about 16 carbon atoms. Preferably, they are straight chain olefins. In addition to the true alpha-olefins used as a proportion of hydroxy-alkanesulfonates, the olefin sulfonates can contain minor amounts of other isomers, such as alkene disulfonates depending upon the reaction conditions, proportion of reactants, the nature of the starting olefins and impurities in the olefin stock and side reactions during the sulfonation process. A nonlimiting example of such a mixture is described in U.S. Patent 3,332,880.

[0024] Another class of anionic surfactants suitable for use in the drying shampoo compositions are the alkyl ether sulfates. These materials have the formula

wherein R is a straight chain alkyl group having from about 8 to about 20 carbon atoms, x is a lower alkyl group having from about 1 to about 3 carbon atoms, and M is a water-soluble cation as described hereinbefore.

[0025] Preferred anionic surfactants for use in the drying shampoo compositions include ammonium lauryl sulfate, triethanolamine lauryl sulfate, triethylamine lauryl sulfate, triisopropylamine lauryl sulfate, monoethanolamine lauryl sulfate, diethanolamine lauryl sulfate, monoethanolamine lauryl sulfate, dimethylamine lauryl sulfate, diethanolamine n-butyl sulfate, diethanolamine n-hexyl sulfate, dimethylamine cyclohexyl sulfate, morpholine n-dodecyl sulfate, triethanolamine n-octadecyl sulfate, potassium lauryl sulfate, potassium lauryl ether sulfate, sodium lauryl sarcosinate, lauryl sarcosine, morpholine cocoyl sulfate, ammonium lauryl ether, monoethanolamine cocoyl sulfate, sodium lauryl sulfate, potassium cocoyl sulfate, potassium lauryl ether sulfate, sodium cocoyl sulfate, sodium hexyl cetyl sulfate, diethanolamine n-butyl stearyl sulfate, sodium lauryl sarcosinate, lauryl sarcosine, cocoyl sarcosine, ammonium cocoyl sarcosinate, ammonium lauryl sarcosinate, triethanolamine lauryl sarcosinate, triethanolamine cocoyl sarcosinate, monoethanolamine cocoyl sarcosinate, and combination thereof.

[0026] Certain amphoteric or zwitterionic surfactants for use in the drying shampoo composition herein include those which are known for use in hair care or other personal care cleansing compositions. Concentrations of such amphoteric surfactants range from about 0.5 % to about 20%, preferably from about 1% to about 10%, by weight of the composition. Nonlimiting examples of suitable zwitterionic or amphoteric surfactants are described in U.S. Patents 5,104,646 (Bolich, Jr. et al.) U.S. Patent 5,106,609 (Bolich, Jr. et al.)

[0027] Amphoteric surfactants suitable for use in the drying shampoo compositions are well known in the art, and include those surfactants broadly described as derivatives of aliphatic secondary and tertiary amines in which the aliphatic radical can be straight or branched chain and wherein one of the aliphatic substituents contains from about 8 to about 18 carbon atoms and one contains an anionic water solubilizing group, e.g., carboxy, sulfonate, sulfate, phosphate, or phosphonate. Preferred amphoteric surfactants for use in the drying shampoo compositions are those which are known for use in hair care or other personal care cleansing compositions. Concentration of such amphoteric surfactants range from about 0.5 % to about 20%, preferably from about 1% to about 10%, by weight of the composition. Nonlimiting examples of amphoteric surfactants are described in U.S. Patents 5,104,646 (Bolich, Jr. et al.) and 5,106,609 (Bolich, Jr. et al.).

[0028] Amphoteric surfactants suitable for use in the drying shampoo compositions are well known in the art, and include those surfactants broadly described as derivatives of aliphatic secondary and tertiary amines in which the aliphatic radical can be straight or branched chain, and wherein one of the aliphatic substituents contains from about 8 to about 18 carbon atoms and one contains an anionic group such as carboxy, sulfonate, sulfate, phosphate, or phosphonate. Preferred amphoteric surfactants for use in the drying shampoo compositions are those which are known for use in hair care or other personal care cleansing compositions. Concentration of such amphoteric surfactants range from about 0.5 % to about 20%, preferably from about 1% to about 10%, by weight of the composition. Nonlimiting examples of amphoteric surfactants are described in U.S. Patents 5,104,646 (Bolich, Jr. et al.) and 5,106,609 (Bolich, Jr. et al.).

[0029] Zwitterionic surfactants suitable for use in the drying shampoo compositions are well known in the art. Examples of zwitterionic surfactants are used in combination with the anionic surfactants described herein, and betaine surfactants. Typically described as derivatives of aliphatic quaternary phosphonium, and sulphonium compounds, in which the aliphatic radicals can be straight or branched chain, and wherein one of the aliphatic substituents contains from about 8 to about 18 carbon atoms and one contains an anionic group such as carboxy, sulfonate, sulfate, phosphate or phosphonate. Zwitterionic surfactants are the betaines, including the alkyl betaines, alkylamidopropyl betaine, cocoamidopropyl betaine, lauryl amidopropyl betaine, alkyl betaines, such as cocoa dimethyl carboxymethyl betaine, lauryl dimethyl carboxymethyl betaine, lauryl dimethyl alpha-carboxyethyl betaine, cetyl dimethyl carboxymethyl betaine, lauryl bis-(2-hydroxyethyl) carboxy methyl betaine, stearyl bis-(2-hydroxypropyl) carboxymethyl betaine, oleyl dimethyl gamma-carboxypropyl betaine, and lauryl bis-(2-hydroxypropyl)-carboxyethyl betaine. The sulphobetaines may be represented by cocodimethyl sulphopropyl betaine, stearyl dimethyl sulphopropyl betaine, lauryl dimethyl sulphoethyl betaine, lauryl bis-(2-hydroxyethyl) sulfopropyl betaine and the like; amidobetaines, amidosulfobetaines, wherein the RCONH(CH$_2$)$_3$ radical is attached to the nitrogen atom of the betaine are also useful in this invention.

Most preferred for use herein is cocoamidopropyl betaine.

[0028] Most preferred are surfactant systems comprising a surfactant combination of ammonium laureth sulfate and cocoamidopropyl betaine, especially when used in combination with Polyquaternium-16 as a cationic styling polymer and Polyquaternium-10 as a cationic deposition Polymer (both polymers described in detail hereinafter). The surfactant combination of ammonium laureth sulfate and cocoamidopropyl betaine is preferably included in the styling shampoo composition at a weight ratio of ammonium laureth sulfate to cocoamidopropyl betaine of at last about 1.5:1, more preferably at least about 2:1, but preferably not more than about 5:1, more preferably not more than about 10:1.

[0029] The styling shampoo compositions of the present invention may further comprise additional surfactants for use in combination with the anionic surfactant component described hereinbefore. Suitable optional surfactants include nonionic surfactants. Any such surfactant known in the art for use in hair or personal care products may be used, provided that the optional additional surfactant is also chemically and physically compatible with the essential components of the styling shampoo composition, or does not otherwise unduly impair product performance, aesthetics or stability. The concentration of the optional additional surfactants in the styling shampoo composition may vary with the cleansing or lather performance desired, the optional surfactant selected, the desired product concentration, the presence of other components in the composition, and other factors well known in the art.

[0030] Nonlimiting examples of other anionic, zwitterioric, amphoteric or optional additional surfactants suitable for use in the styling shampoo compositions are described in McCutcheon's, Emulsifiers and Detergents, 1989 Annual published by M. C. Publishing Co., and U.S. Patent 3,929,678, U.S. Patent 2,658,072; U.S. Patent 2,438,091; U.S. Patent 2,528,378.

Cationic Deposition Polymer

[0031] The styling shampoo composition of the present invention comprise an organic cationic deposition polymer as a deposition aid for the styling polymer component described hereinafter. Concentrations of the cationic deposition polymer preferably range from about 0.025% to about 3%, more preferably from about 0.05% to about 2%, even more preferably from about 0.1% to about 1%, by weight of the composition.

[0032] The cationic deposition polymer, excluding the cationic hair styling polymers described hereinafter, for use in the styling shampoo composition of the present invention contains cationic nitrogen-containing moieties such as quaternary ammonium or cationic protonated amino moiedties. The cationic protonated amines can be primary, secondary, or tertiary amines (preferably secondary or tertiary) depending upon the particular species and the selected pH of the styling shampoo composition. The average molecular weight of the cationic deposition polymer is between about 10 million and about 5,000, preferably at least about 100,000, more preferably at least about 200,000, but preferably not more than about 2 million, more preferably not more than about 1.5 million. The polymers also have a cationic charge density ranging from about 0.2 meq/gm to about 5 meq/gm, preferably at least about 0.4 meq/gm more preferably at least about 0.6 meq/gm, but also preferably less than about 3 meq/gm, more preferably less than about 2 meq/gm, at the pH of intended use of the styling shampoo composition, which pH will generally range from about pH 4 to about pH 9, preferably between about pH 5 and about pH 8.

[0033] The charge density can be controlled and adjusted in accordance with techniques well known in the art. As used herein the "charge density" of the cationic polymers is defined as the number of cationic sites per polymer gram atomic weight (molecular weight), and can be expressed in terms of meq/gram of cationic charge. In general adjustment of the proportions of amine or quaternary ammonium moieties in the polymer, as well as pH of the styling shampoo composition in the case of the amines, will affect the charge density.

[0034] Any anionic counterious can be use in association with the cationic deposition polymers so long as the polymers remain soluble in water, in the styling shampoo composition, or in a coacervate phase of the styling shampoo composition, and so long as the counterious are physically and chemically compatible with the essential components of the styling shampoo composition or do not otherwise unduly impair product performance, stability or aesthetics. Nonlimiting examples of such counterious include halides (e.g, chlorine, fluorine, brimine, iodine), sulfate and methysulfate.

[0035] The cationic nitrogen-containing moiety of the cationic deposition polymer is generally present as a substituent on all, or more typically on some, of the monomer units thereof. Thus, the cationic deposition polymer for use in the styling shampoo composition includes homopolymers, copolymers, terpolymers, and so forth, of quaternary ammonium or cationic amino-substituted monomer units, optionally in combination with non-cationic monomers referred to herein as spacer monomers. Nonlimiting examples of such polymer are described in the *CTFA Cosmetic Ingredient Dictionary*, 3rd edition, edited by Estrin, Crosley, and Haynes, (The Cosmetic, Toiletry, and Fragrance Association, Inc., Washington, D.C. (1982)).

[0036] Nonlimiting examples of cationic deposition polymers for use in the styling shampoo composition include polysaccharide polymers, such as cationic cellulose derivatives. Suitable cationic polysaccharide polymers include those which conform to the formula

Most preferred for use herein is cocoamidopropyl betaine.

[0025] Most cleaned are surface comprising a substantial combination of ammonium laureth sulfate and cocoamidopropyl betaine, especially when used in conjunction with Polyquaternium-10 as a cationic styling polymer and Polyquaternium-10 as a cleaning conditioning Polymer (both polymers described in detail). The surfactant combination of ammonium laureth sulfate and cocoamidopropyl betaine is preferably included in the styling shampoo compositions at a weight ratio of ammonium laureth sulfate to cocoamidopropyl betaine of at least about 1:1, more preferably at least about 2:1, but preferably not more than about 5:1, more preferably not more than about 10:1.

[0026] The styling shampoo compositions of the present invention may further comprise additional surfactants for use in combination with the anionic surfactant component described hereinbefore. Suitable optional surfactants include nonionic surfactants. Any such surfactant known in the art for use in hair or personal care products may be used, provided that the optional additional surfactant is also chemically and physically compatible with the essential components of the styling shampoo composition, or does not otherwise unduly impair product performance, aesthetics or stability. The concentration of the optional additional surfactants in the styling shampoo composition may vary with the cleansing or lather performance desired, the optional surfactant selected, the desired product consistency, the presence or absence of other components in the composition, and other factors well known in the art.

[0027] Non-limiting examples of other anionic, zwitterionic, amphoteric or optional additional surfactants suitable for use in the styling shampoo compositions are described in McCutcheon's Emulsifiers and Detergents, North American Edition published by M.C. Publishing Co., and U.S. Patent 3,929,678, U.S. Patent 2,658,072, U.S. Patent 2,438,091, U.S. Patent 2,528,378.

Cationic Deposition Polymer

[0028] The styling shampoo composition of the present invention comprises an organic cationic deposition polymer as a deposition aid for the styling polymer component described hereinafter. Concentrations of the cationic deposition polymer may typically range from about 0.025% to about 3%, more preferably from about 0.05% to about 2%, most preferably from about 0.1% to about 1%, by weight of the composition.

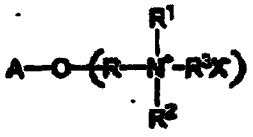
[0029] The cationic deposition polymer, excluding the cationic hair styling polymers described hereinafter, for use in the styling shampoo composition of the present invention contains cationic nitrogen-containing moieties such as quaternary ammonium or cationic protonated amino moieties. The cationic protonated amines can be primary, secondary, or tertiary amines (preferably secondary or tertiary), depending upon the particular species and the selected pH of the styling shampoo composition. The average molecular weight of the cationic deposition polymer is between about 10 million and about 5,000, preferably at least about 100,000, more preferably at least about 200,000, but preferably not more than about 2 million, more preferably not more than about 1.5 million. The polymers also have a cationic charge density ranging from about 0.2 meq/gm to about 5 meq/gm, preferably at least about 0.4 meq/gm, more preferably at least about 0.6 meq/gm, but also preferably less than about 3 meq/gm, more preferably less than about 2 meq/gm, at the pH of intended use of the styling shampoo composition, which pH will generally range from about pH 4 to about pH 9, preferably between about pH 5 and about pH 8.

[0030] The average density can be controlled and adjusted in accordance with techniques well known in the art. As used herein the "charge density" of the cationic polymers is defined as the number of cationic sites per polymer given molecular weight), and can be expressed in terms of meq/gram of cationic charge. In general, adjustments of the proportions of amine or quaternary ammonium moieties in the polymer, as well as pH of the styling shampoo composition in the case of the amines, will affect the charge density.

[0031] Any cationic deposition can be used in association with the cationic deposition polymers as long as the polymers have sufficient cationic charge density and molecular weight to provide the desired deposition of the styling polymer component on the hair, in the styling shampoo composition or in accordance with the styling shampoo composition, and as long as the monomers are physically and chemically compatible with the essential components of the styling shampoo composition or do not otherwise unduly impair product performance, stability or aesthetics. Non-limiting examples of such optional monomers include (e.g. chlorine, fluorine, bromine, iodine), sulfate and methylsulfate.

[0032] The cationic nitrogen-containing moiety of the cationic deposition polymer is generally present as a substituent on all, or more typically on some, of the monomer units thereof. Thus, the cationic deposition polymer for use in the styling shampoo composition includes homopolymers, copolymers, terpolymers, and so-forth, of quaternary ammonium or cationic amino substituted monomer units, optionally in combination with non-cationic monomers referred to herein as spacer monomers. Non-limiting examples of such polymers are described in the CTFA Cosmetic Ingredient Directory, 3rd edition, edited by Estin, Cheney, and Hopkins, (The Cosmetic, Toiletry, and Fragrance Association, Inc., Washington, D.C. (1982)).

[0033] Non-limiting examples of cationic deposition polymers for use in the styling shampoo composition include polysaccharide polymers, such as cationic cellulose derivatives, cationic starch derivatives, and cationic guar gum derivatives. Preferred deposition polymers which conform to the formula



wherein A is an anhydroglucose residual group, such as a cellulose anhydroglucose residual; R is an alkylene oxyalkylene, polyoxyalkylene, or hydroxyalkylene group, or combination thereof; R1, R2, and R3 independently are alkyl; aryl, alkylaryl, arylalkyl, alkoxyalkyl, or alkoxyaryl groups, each group containing up to about 18 carbon atoms, and the total number of carbon atoms for each cationic moiety (i.e., the sum of carbon atoms in R1, R2 and R3) preferably being about 20 or less; and X is an anionic counterion as described in hereinbefore.

[0037] Preferred cationic cellulose polymers are the salts of hydroxyethyl cellulose reacted with trimethyl ammonium substituted epoxide, referred to in the industry (CTFA) as Polyquaternium 10 which are available from Amerchol Corp. (Edison, NJ, USA) in their Polymer JR and LR series of polymers with the most preferred being JR30M.

[0038] Other suitable cationic deposition polymers include cationic guar gum derivatives, such as guar hydroxypropyltrimonium chloride, specific examples of which include the Jaguar series (preferably Jaguar C-17) commercially available from Rhone-Poulenc Incorporated.

[0039] The cationic polymers herein are either soluble in the styling shampoo composition, or preferably are soluble in a complex coacervate phase in the styling shampoo composition formed by the cationic deposition polymer and the anionic surfactant component described hereinbefore. Complex coacervates of the cationic deposition polymer can also be formed with other charged materials in the styling shampoo composition.

[0040] Coacervate formation is dependent upon a variety of criteria such as molecular weight, component concentration, and ratio of interacting ionic components, ionic strength (including modification of ionic strength for example, by addition of salts), charge density of the cationic and anionic components, pH and temperature. Coacervate systems and the effect of these parameters have been described, for example, by J. Caelles, et al "Anionic and Cationic Compounds in Mixed Systems". *Cosmetics & Toiletries* Vol. 106, April 1991, pp 49-54, C. J. van Oss. "Coacervation, Complex-Coasservation and Flocculation", *J. Dispersion Science and Technology*. Vol. 9 (5,6), 1988-89, pp 561-573, and D. J. Burgess. "Practical Analysis of Complex Coacervate Systems", *J. of Colloid and Interface Science*, Vol. 140, No. I, November 1990, pp 227-238.

[0041] It is believed to be particularly advantageous for the cationic deposition polymer to be present in the styling shampoo composition in a coacervate phase, or to form a coacervate phase upon application or rinsing of the shampoo to or from the hair. Complex coacervates are believed to more readily deposit on the hair which results in improved deposition of the styling polymer. Thus, in general, it is preferred that the cationic deposition polymer exist in the styling shampoo composition as a coacervate phase or form a coacervate phase upon dilution. If not already a coacervate in the styling shampoo composition, the cationic deposition polymer will preferably exist in a complex coacervate form in the shampoo upon dilution with water.

[0042] Techniques for analysis of formation of complex coacervates are known in the art. For example, microscopic analyses of the styling shampoo compositions, at any chosen stage of dilution can be utilized to identify whether a coacervate phase has formed. Such coacervate phase will be identifiable as an additional emulsified phase in the composition. The use of dyes can aid in distinguishing the coacervate phase from other insoluble phases dispersed in the styling shampoo composition.

Cationic Styling Polymer

[0043] The styling shampoo compositions of the present invention comprise an organic cationic hair styling polymer suitable for application to human hair or skin, which is used in combination with the cationic deposition polymer described hereinbefore. The polymer can be soluble in water or dispersible in the surfactant components described hereinabove. These styling polymers for use herein are not unduly sticky or tacky to the touch, and provide hair styling such as improved body and longer lasting curl. Concentrations of the styling polymer range from about 2% to about 10%, preferably from about 2% to about 8%, more preferably from about 2% to about 6%, and even more preferably from about 2,5% to about 5% by weight of the composition.

[0044] The organic cationic hair styling polymers useful herein have an open chain backbone which contains quaternary ammonium or cationic amino moieties, or combinations thereof. In order to achieve the optimal balance between styling performance and hair feel, the cationic charge density of the hair styling polymer should be less than about 4.75 meq/gram, preferably less than about 3.75 meq/gram, more preferably less than about 3 meq/gram. Furthermore, the charge density should be of a level such that efficient substantivity between the polymer and the hair can be attained, thereby preventing the hair from becoming unduly coated, sticky, or having an undesirably dirty feel. Preferably, the polymer has a cationic charge density of at least about 2 meq/gram, at the pH of the shampoo composition.

wherein A is a polymeric backbone, such as a cellulose ether or cellulose residue; R is an alkylene oxy group, polyoxyalkylene group, or combination thereof; R_1, R_2, and R_3 are independently selected from alkyl, hydroxyalkyl, alkoxyalkyl, or arylalkyl group, each group containing up to about 5 carbon atoms, and the letter number of carbon atoms for each radical moiety (i.e., the sum of carbon atoms in R_1, R_2 and R_3) independently being equal to or less than 20; and X is an anionic counterion as described in the art; and

[0027] The preferred cationic cellulose polymers are the salts of hydroxyethyl cellulose reacted with trimethyl ammonium substituted epoxide, referred to in the industry (CTFA) as Polyquaternium 10 which are available from Amerchol Corp. (Edison, NJ), Celanese Corp. in their Celquat and LR series of polymers with the most preferred being JR30M.

[0028] Other suitable cationic deposition polymers include cationic guar gum derivatives, such as guar hydroxypropyltrimonium chloride, specific examples of which include the Jaguar series (preferably Jaguar C-17) commercially available from Rhone-Poulenc Incorporated.

[0029] The cationic polymer when present are all or soluble in the styling phase composition, or product, and suitable in a solid/gel phase with styling surfactant and comprise an ionene class of internal cationic deposition polymer and the ionene class of internal cationic deposition polymers. Complex coacervates of the cationic deposition polymer can also be formed with other charged materials in the styling phase composition.

[0030] Coacervate formation is dependent upon a variety of criteria such as molecular weight, component concentration, ratio of interacting ionic components, ionic strength (including modification of ionic strength for example, by addition of salts), charge density of the cationic and anionic components, pH and temperature. Coacervate systems and the impact of these parameters have been described, for example, by J. Caelles, et al "Anionic and Cationic Compounds in Mixed Systems", Cosmetics & Toiletries Vol. 106, April 1991, pp 49-54, C. J. van Oss, "Coacervation, Complex Coacervation and Flocculation", J. Dispersion Science and Technology Vol. 9 (5,6), 1988, pp 561-573 and D. J. Burgess, "Practical Analysis of Complex Coacervate Systems", J. of Colloid and Interface Science Vol. 140, No. 1, November 1990, pp 227-238.

[0031] It is believed to be particularly advantageous for the cationic deposition polymer to be present in the styling emulsion composition in a coacervate phase or to form a coacervate phase upon application or rubbing of the skin to or from the hair. Complex coacervates are believed to more readily deposit on the hair which results in improved deposition of the styling polymer. Thus, in general, it is preferred that the cationic deposition polymer exist in the styling phase composition as a separate phase or form a coacervate phase upon dilution. If not already a coacervate in the styling emulsion composition, the cationic deposition polymer will preferably exist as a complex coacervate form in the styling phase upon dilution with water.

[0032] Techniques for analysis of formation of complex coacervates are known in the art. For example, microscopic analysis of the styling emulsion compositions, at any chosen stage of dilution can be utilized to identify whether a coacervate phase forms. Such coacervate phase will be identifiable as an additional emulsion phase in the composition. The use of dyes can aid in identifying the coacervate phase from other insoluble phases dispersed in the styling emulsion.

Cationic Styling Polymer

[0033] The styling shampoo compositions of the present invention comprise an organic cationic hair styling polymer at a concentration sufficient to nurture hair or skin, which is used in combination with the cationic deposition polymer described hereinbefore. The polymer can be soluble in water or dispersible in the surfactant component hereinabove. These styling polymers for use herein are not unduly sticky or tacky to the touch, and provide hair styling over as typical range and longer lasting curl. Concentrations of the styling polymer range from about 2% to about 10%, preferably from about 2% to about 5%, more preferably from about 3% to about 5%, and even more preferably from about 2% to about 3% by weight of the composition.

[0034] The organic cationic hair styling polymers useful herein have an operation boundary conditions which contain ammonium or cationic amino moieties, or combinations thereof, in order to achieve the desired styling performance and have the cationic charge density of the hair styling polymer should be less than about 4 meq/g, preferably less than about 2 meq/g, more preferably less than about 1 meq/gm. Furthermore, the charge density should be of a level such that sufficient balance between the polymer and the hair can be attained, thereby preventing the hair from becoming unduly oriented, sticky, or having an unpleasantly oily feel. Preferably, the polymer has a cationic charge density of at least about 2 meq/gram, at the pH of the shampoo composition.

[0045] A nonlimiting example of suitable cationic hair styling polymers include copolymers of vinyl monomers having cationic amine or quaternary ammonium functionalities with water soluble space monomers such as N-vinylpyrrolidone.

[0046] Other suitable estionic hair styling polymers include those cationic polymers containing or derived from quaternary ammonium monomers such as vinyl quaternary ammonium monomers having cyclic cationic nitrogen-containing rings such as imidazolium e.g., alkyl vinyl imidazolium. The alkyl portions of these monomers are preferably lower alkyls such as the C_1-C_3 alkyls, more preferably C_1 and C_2 alkyls.

[0047] Preferred cationic hair styling polymers include copolymers of 1-vinyl-2-pyrrolidone and 1-vinyl-3-methylimidazolium salt (e.g., chloride salt) (referred to in the industry as Polyquaternium-16), such as those commercially available from BASF Wyandotte Corp. (Parsippany, NJ, USA) under LUVIQUAT tradename (e.g, LUVIQUAT FC 370, and LUVIQUAT FC 550). The most preferred cationic hair styling polymer is LUVIQUAT FC 370.

Water

[0048] The styling shampoo compositions of the present invention are aqueous systems which comprise from about 27% to about 94.5%, preferably from about 35% to about 85%, more preferably from about 60% to about 75%, of water by weight of the styling shampoo composition.

Optional Components

[0049] The styling shampoo compositions of the present invention may further comprise one or more optional component known or otherwise effective for use in hair care or personal care products, provided that the optional components are physically and chemically compatible with the essential component described herein, or do not otherwise unduly impair product stability, aesthetics or performance. Individual concentrations of such optional components may range form about 0.001% to about 10% by weight of the styling shampoo compositions.

[0050] Nonlimiting examples of optional components for use, in the styling shampoo composition include perfumes, anti dandruff agents, hair conditioning agents (hydrocarbon oils, fatty esters, silicones), dyes, pearlescent aids, foam boosters, additional surfactants or nonionic cosurfactants, pediculocides pH adjusting agents, preservatives, proteins, skin active agents, sunscreens, vitamins, and viscosity adjusting agents.

[0051] The styling shampoo composition of the present invention preferably further comprises a suspending or thickening agent. Suitable suspending agents for such materials are well known in the art, and include crystalline and polymeric suspending or thickening agents. Crystalline suspending agents are preferred, and include known acyl derivatives and are describes in US. Patent 4,741,855.

[0052] Nonlimiting example of optional polymeric thickening agents for use in the styling shampoo composition include carboxyvinyl polymer, cellulose ethers, guar gum, polyvinyl alcohol, polyvinyl pyrrolidose, hydrozypropyl guar gum, starch and starch derivatives, and xantham gum. Suspending or thickening agents are described in U.S. Patent 2,798,053, U.S. Patent 4,686,254, U.S. Patent 4,788,006, and U.S. Patent 5,275,761. The optional suspending or thickening agent are described in more detail hereinafter.

[0053] The styling shampoo composition of the present invention may further comprise a silicone hair conditioning agent, preferably a silicone hair conditioning agent in combination with an optional suspending agent for the silicone. The silicone hair conditioning agent is preferably non volatile, and is preferably present in the styling shampoo composition at concentrations ranging from about 0.01% to about 10% by weight of the styling shampoo composition. Nonlimiting examples of suitable silicone hair conditioning agents, and optional suspending agents for the silicone, are described in U.S. Reissue Patent 34,584 (Grote et al.), U.S. Patents 5,104,646 (Bolich Jr. et al.), U.S. Patent 5,106,609 (Bolich Jr. et al.). The optional silicone hair conditioning agent, and optional suspending agents for the optional silicone, are described in more detail hereinafter.

Optional Silicone Hair Conditioning Agent

[0054] The styling shampoo compositions of the present invention may further comprise an optional silicone hair conditioning agent at concentrations effective to provide hair conditioning benefits. Such concentrations range from about 0.01% to about 10%, preferably from about 0.1% to about 5%, more preferably from about 0.15% to about 3%, most preferably from about 0.2% to about 1%, by weight of the styling shampoo compositions.

[0055] The optional silicone hair conditioning agents are insoluble in the styling shampoo compositions, and are preferably nonvolatile. Typically it will be intermixed in the styling shampoo composition so as to be in the form of a separate, discontinuous phase of dispersed, insoluble particles, also referred to as droplets. These droplets are typically suspended with an optional suspending agent described hereinafter. The optional silicone hair conditioning agent phase will comprise a silicone fluid hair conditioning agent such as a silicone fluid and can also comprise other ingredients, such as a silicone resin to improve silicone fluid deposition efficiency or enhance glossiness of the hair (especially when

[0046] A nonlimiting example of suitable cationic hair styling polymers include copolymers of vinyl monomers having cationic amine or quaternary ammonium functionalities with water soluble spacer monomers such as N-vinylpyrrolidone.

[0047] Other suitable cationic hair styling polymers include those cationic polymers containing or derived from quaternary ammonium monomers such as vinyl quaternary ammonium monomers having cyclic cationic nitrogen-containing rings such as imidazolium (e.g., alkyl vinyl imidazolium. The alkyl portions of these monomers are preferably lower alkyls such as the C_1-C_3 alkyls, more preferably C_1 and C_2 alkyls.

[0047] Preferred cationic hair styling polymers include copolymers of 1-vinyl-2-pyrrolidone and 1-vinyl-3-methylimidazolium salt (e.g., chloride salt) (referred to in the industry as Polyquaternium-16), such as those commercially available from BASF Wyandotte Corp. (Parsippany, NJ, USA) under LUVIQUAT tradename (e.g. LUVIQUAT FC 370 and LUVIQUAT FC 550). The most preferred cationic hair styling polymer is LUVIQUAT FC 370.

Water

[0048] The styling shampoo compositions of the present invention are aqueous systems which comprise from about 20% to about 94.89%, preferably from about 50% to about 90%, more preferably from about 60% to about 85%, of water, by weight of the styling shampoo composition.

Optional Components

[0049] The styling shampoo compositions of the present invention may further comprise one or more optional components known or otherwise effective for use in hair care or personal care products, provided that the optional components are physically and chemically compatible with the essential component described herein, or do not otherwise unduly impair product stability, aesthetics or performance. Individual concentrations of such optional components may range from about 0.001% to about 10% by weight of the styling shampoo compositions.

[0050] Nonlimiting examples of optional components for use in the styling shampoo composition include perfumes, anti-dandruff agents, hair conditioning agents (hydrocarbon oils, fatty esters, silicones), dyes, pearlescent aids, foam boosters, additional surfactants or nonionic cosurfactants, pediculocides, pH adjusting agents, preservatives, proteins, skin active agents, sunscreens, vitamins, and viscosity adjusting agents.

[0051] The styling shampoo composition of the present invention preferably further comprises a suspending or thickening agent. Suitable suspending agents for such materials are well known in the art, and include crystalline and polymeric suspending or thickening agents. Crystalline suspending agents are preferred, and include known acyl derivatives and are described in U.S. Patent 4,741,855.

[0052] Nonlimiting examples of optional polymeric thickening agents for use in the styling shampoo composition include carboxyvinyl polymer, cellulose ethers, guar gum, polyvinyl alcohol, polyvinyl pyrrolidone, hydroxypropyl guar gum, starch and starch derivatives, and xanthan gum. Suspending or thickening agents are described in U.S. Patent 2,798,053, U.S. Patent 4,686,254, U.S. Patent 4,788,006, and U.S. Patent 5,275,761. The optional suspending or thickening agent are described in more detail hereinafter.

[0053] The styling shampoo composition of the present invention may further comprise a silicone hair conditioning agent, preferably a silicone hair conditioning agent in combination with an optional suspending agent for the silicone. The silicone hair conditioning agent is preferably non volatile, and is preferably present in the styling shampoo composition at concentrations ranging from about 0.01% to about 10% by weight of the styling shampoo composition. Nonlimiting examples of suitable silicone hair conditioning agents, and optional suspending agents for the silicone, are described in U.S. Reissue Patent 34,584 (Grote et al.), U.S. Patents 5,104,646 (Bolich Jr. et al.), U.S. Patent 5,106,609 (Bolich Jr. et al.). The optional silicone hair conditioning agent, and optional suspending agents for the optional silicone, are described in more detail hereinafter.

Optional Silicone Hair Conditioning Agent

[0054] The styling shampoo compositions of the present invention may further comprise an optional silicone hair conditioning agent at concentrations effective to provide hair conditioning benefits. Such concentrations range from about 0.01% to about 10%, preferably from about 0.1% to about 8%, more preferably from about 0.15% to about 5%, most preferably from about 0.2% to about 3%, by weight of the styling shampoo compositions.

[0055] The optional silicone hair conditioning agents are insoluble in the styling shampoo compositions, and are preferably nonvolatile. Typically it will be intermixed in the styling shampoo composition so as to be in the form of a separate, discontinuous phase of dispersed, insoluble particles, also referred to as droplets. These droplets are typically suspended with an optional suspending agent described hereinafter. The optional silicone hair conditioning agent phase will comprise a silicone fluid hair conditioning agent such as a silicone fluid and can also comprise other ingredients, such as a silicone resin to improve silicone fluid deposition efficiency or enhance glossiness of the hair (especially when

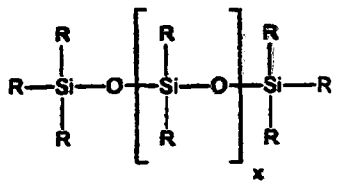
high refractive index (e.g. above about 1.46)) silicone conditioning agents are used (e.g. highly phenylated silicones).

[0056] The optional silicone hair conditioning agent phase may comprise volatile silicone, nonvolatile silicone, or combinations thereof. Typically, if volatile silicones are present, it will be incidental to their use as a solvent or carrier for commercially available forms of nonvolatile silicone materials ingredients, such as silicone gums and resins.

[0057] The optional silicone hair conditioning agents for use in the styling shampoo compositions preferably have a viscosity of from about 20 to about 2,000,000 centistokes, more preferably from about 1,000 to about 1,800,000 centistokes, even more preferably from about 50,000 to about 1,500,000 centistokes, most preferably from about 100,000 to about 1,500,000 centistokes as measured at 25°C.

[0058] Optional silicone fluids include silicone oils which are flowable silicone materials having a viscosity of less than, 1,000,000 centistokes, preferably between about 5 and 1,000,000 centistockes, more preferably between about 10 and about 100,000 centistokes, at 23°C. Suitable silicone oils include polyalkyl siloxanes, polyaryl siloxanes, polyalkylaryl siloxanes, polyether siloxane copolymers and combinations thereof. Other insoluble, nonvolatile silicone fluids having hair conditioning properties can also be used.

[0059] Optional silicone oils include polyalkyl or polyaryl siloxanes which conform to the following formula (I)



where R is aliphatic, preferably alkyl or alkenyl, or aryl, R can be substituted or unsubstituted, and x is an integer from 1 to about 8,000. Suitable unsubstituted R groups include alkoxy, aryloxy, arylalkyl, arylalkenyl, alkylamine, and ether-substituted, hydroxyl-substituted, and halogen-substituted aliphatic and aryl groups. Suitable R groups also include cationic amines and quaternary ammonium groups.

[0060] The aliphatic or aryl groups substituted on the siloxane chain may have any structure so long as the resulting silicones remain fluid at room temperature, are hydrophobic, are neither irritating, toxic nor otherwise harmful when applied to the hair, are compatible with the other components of the styling shampoo compositions, are chemically stable under normal use and storage conditions, are insoluble in the styling shampoo compositions herein, and are capable of being deposited on and conditioning the hair.

[0061] The two R groups on the silicon atom of each monomeric silicone unit may represent the same or different groups. Preferably, the two R groups represent the same group.

[0062] Preferred alkyl and alkenyl substituents are C_1-C_5 alkyls and alkenyls, more preferably from C_1-C_4, most preferably from C_1-C_2. The aliphatic portions of other alkyl-, alkenyl-, or alkynyl-containing groups (such as alkoxy, arylalkyl, and alkylamino) can be straight or branched chains and preferably have from one to five carbon atoms, more preferably from one to four carbon atoms, even more preferably from one to three carbon atoms, most preferably from one to two carbon atoms. As discussed above, the R substituents hereof can also contain amino functionalities, e.g. alkamino groups, which can be primary, secondary or tertiary amines or quaternary ammonium. These include mono-, di- and tri- alkylamino and alkoxyamino groups wherein the aliphatic portion chain length is preferably as described above. The R substituents can also be substituted with other groups, such as halogens (e.g. chloride, fluoride, and bromide), halogenated aliphatic or aryl groups, and hydroxy (e.g. hydroxy substituted aliphatic groups). Suitable halogenated R groups could include, for example, tri-halogenated (preferably fluoro) alkyl groups such as $-R^1-C(F)_3$, wherein R^1 is C_1-C_3 alkyl. Examples of such polysiloxanes include polymethyl -3,3,3 trifluoropropylsiloxane.

[0063] Suitable R groups include methyl, ethyl, propyl, phenyl, methylphenyl and phenylmethyl. The preferred silicones are polydimethyl siloxane, polydiethylsiloxane, and polymethylphenylsiloxane. Polydimethylsiloxane is especially preferred. Other suitable R groups include methyl, methoxy, ethoxy, propoxy, and aryloxy. The three R groups on the end caps of the silicone may also represent the same or different groups.

[0064] The nonvolatile polyalkylsiloxane fluids that may be used include, for example, polydimethylsiloxanes. These siloxanes are available, for example, from the General Electric Company in their Viscasil R and SF 96 series, and from Dow Corning in their Dow Corning 200 series.

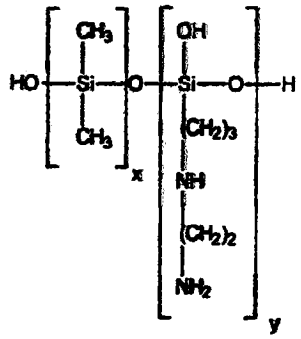
[0065] The polyalkylaryl siloxane fluids that may be used, also include, for example, polymethylphenylsiloxanes. These siloxanes are available, for example, from the General Electric Company as SF 1075 methyl phenyl fluid or from Dow Corning as 556 Cosmetic Grade Fluid.

[0066] The polyether siloxane copolymers that may be used include, for example, a polypropylene oxide modified polydimethylsiloxane (e.g., Dow Corning DC-1248) although ethylene oxide or mixtures of ethylene oxide and propylene oxide may also be used. The ethylene oxide and polypropylene oxide concentrations must be sufficiently low to prevent

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solubility in water and the composition hereof.

[0067] Suitable alkylamino substituted silicones include those which conform to the following structure (II)



wherein x and y are integers. This polymer is also known as "amodimethicone".

[0068] Suitable cationic silicone fluids include those which conform to the formula (III) $(R_1)_aG_{3-a}$-Si-(-OSiG$_2$)$_n$-(-OSiG$_b$ $(R_1)_{2-b}$)$_m$-O-Si$G_{3-a}(R_1)_a$, wherein G is selected from the group consisting of hydrogen, phenyl, hydroxy, C_1-C_8 alkyl and preferably methyl; a is 0 or an integer having a value from 1 to 3, preferably 0; b is 0 or 1, preferably 1; the sum n+m is a number from 1 to 2,000 and preferably from 50 to 150, n being able to denote a number from 0 to 1,999 and preferably from 49 to 149 and m being able to denote an integer from 1 to 2,000 and preferably from 1 to 10; R_1 is a monovalent radical conforming to the formula $C_qH_{2q}L$ in which q is an integer having a value of from 2 to 8 and L is selected from the following groups:

$-N(R_2)CH_2-CH_2-N(R_2)_2$

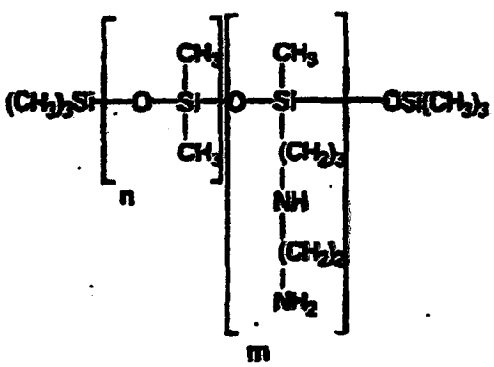
$-N(R_2)_2$

$-N(R_2)_3A^-$

$-N(R_2)CH_2-CH_2-NR_2H_2A^-$

in which R_2 is selected from the group consisting of hydrogen, phenyl, benzyl, a saturated hydrocarbon radical, preferably an alkyl radical containing from 1 to 20 carbon atoms, and A^- is a halide ion.

[0069] An especially preferred cationic silicone corresponding to formula (III) is the polymer known as "trimethylsilylamodimethicone", of formula (IV):



[0070] Other silicone cationic polymers which can be used in the styling shampoo compositions are represented by the formula (V):

solubility in water and the opposite is true.

[0067] Silicone emulsions containing substituted siloxane fluids which conform to the following structure (II)

wherein x and y are integers. This polymer is also known as "amodimethicone".

[0068] Silicone resins useful herein include those which conform to the formula (III) $(R_1)_3SiO_{1/2}$ $(R_1)_2SiO_{2/2}$ $(R_1)SiO_{3/2}$ $SiO_{4/2}$ wherein G is selected from the group consisting of hydrogen, phenyl, hydroxy, C_1-C_4 alkyl and preferably methyl; a is 0 or an integer having a value from 1 to 3; preferably 0; b is 0 or 1; preferably 1; the sum of a+b is a number from 1 to 2,000 and preferably from 50 to 150, n being able to denote a number from 0 to 1,000 and preferably from 40 to 150 and m being able to denote an integer from 1 to 2,000 and preferably from 1 to 10; R_1 is a monovalent radical conforming to the formula $CqH_{2q}L$ in which q is an integer having a value of from 2 to 8 and L is selected from the following groups

$-N(R_2)CH_2-CH_2-N(R_2)_2$

$-N(R_2)_2$

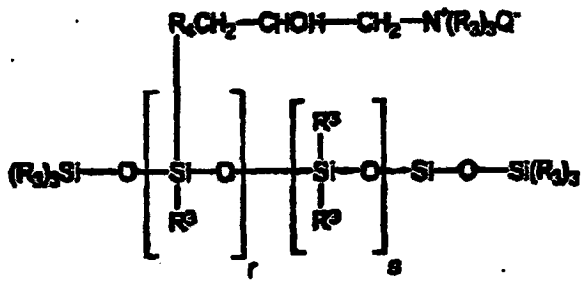
$-N^+(R_2)_3A^-$

$-N(R_2)CH_2-CH_2-N^+R_2H_2A^-$

in which R_2 is selected from the group consisting of hydrogen, phenyl, benzyl, a saturated hydrocarbon radical, preferably an alkyl radical containing from 1 to 20 carbon atoms, and A is a halide ion.

[0069] A cationic polymer corresponding to formula (III) is the polymer known as "trimethylsilylamodimethicone", of formula (IV):

[0070] Other silicone cationic polymers which can be used in the styling shampoo compositions are represented by the formula (V):

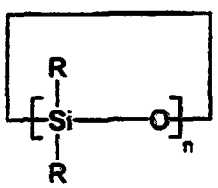


when: R^3 denotes a monovalent hydrocarbon radical having from 1 to 18 carbon atoms, preferably an alkyl or alkenyl radical such as methyl; R_4 denotes a hydrocarbon radical, preferably a C_1-C_{18} alkylene radical or a C_1-C_{18}, and more preferably C_1-C_8 alkyleneoxy radical; Q^- is a halide ion, preferably chloride; r denotes an average statistical value from 2 to 20, preferably from 2 to 8; s denotes an average statistical value from 20 to 200. and preferably from 20 to 50. A preferred polymer of this class is available from Union Carbide under the name "UCAR SILICONE ALE 56."

[0071] Other optional silicone fluids are the insoluble silicone gums. These gums are polyorganosiloxane materials having a viscosity at 25°C of greater than or equal to 1,000,000 centistokes. Silicone gums are described in U.S. Patent 4,152,416; Noll and Walter, Chemistry and Technology of Silicones, New York: Academic Press 1968; and in General Electric Silicone Rubber Product Data Sheets SE 30, SE 33, SE 54 and SE 76. The silicone gums will typically have a mass molecular weight in excess of about 200,000, generally between about 200,000 and about 1,000,000, specific examples of which include polydimethylsiloxane, (polydimethylsiloxane) (methylvinylsiloxane) copolymer, poly(dimethylsiloxane) (diphenyl siloxane)(methylvinylsiloxane) copolymer, and mixtures thereof.

[0072] Another category of nonvolatile, insoluble silicone fluid conditioning agents are the high refractive index silicones, having a refractive index of at least about 1.46, preferably at least about 1.48, more preferably at least about 1.52, most preferably at least about 1.55. The refractive index of the polysiloxane fluid will generally be less than about 1.70, typically less than about 1.60. In this context, polysiloxane "fluid" includes oils as well as gums.

[0073] The high refractive index polysiloxane fluid includes those represented by general Formula (I) above, as well as cyclic polysiloxanes such as those represented by Formula (VI) below:



wherein R is as defined above, n is from about 3 to about 7, preferably from 3 to 5.

[0074] The high refractive index polysiloxane fluids contain a sufficient amount of aryl-containing R substituents to increase the refractive index to the desired level, which is described above. In addition. R and n must be selected so that the material is nonvolatile, as defined above.

[0075] Aryl-containing substituents contain alicyclic and heterocyclic five and six membered aryl rings, and substituents containing fused five or six membered rings. The aryl rings themselves can be substituted or unsubstituted. Substituents include aliphatic substituents, and can also include alkoxy substituents, acyl substituents, ketones, halogens (e.g., Cl and Br), amines, etc. Exemplary aryl-containing groups include substituted and unsubstituted arenes, such as phenyl, and phenyl derivatives such as phenyls with C_1-C_5 alkyl or alkenyl substituents, e.g., allylphenyl, methyl phenyl and ethyl phenyl, vinyl phenyls such as styrenyl, and phenyl alkynes (e.g. phenyl C_2-C_4 alkynes). Heterocyclic aryl groups include substituents derived from furan, imidazole, pyrrole, pyridine, etc. Fused aryl ring substituents include, for example, napthalene, coumarin, and purine.

[0076] In general, the high refractive index polysiloxane fluids will have a degree of aryl-containing substituents of at least about 15%, preferably at least about 20%, more preferably at least about 25%, even more preferably at least about 35%, most preferably at least about 50%. Typically, although it is not intended to necessarily limit the invention, the degree of aryl substitution will be less than about 90%, more generally less than about 85%, preferably from about 55% to about 80%.

[0077] The polysiloxane fluids are also characterized by relatively high surface tensions as a result of their aryl substitution. In general, the polysiloxane fluids hereof will have a surface tension of at least about 24 dynes/cm^2, typically

at least about 27 dynes/cm^2. Surface tension, for purposes hereof, is measured by a de Nouy ring tensiometer according to Dow Corning Corporate Test Method CTM 0461, November 23, 1971. Changes in surface tension can be measured according to the above test method or according to ASTM Method D 1331.

[0078] Preferred high refractive index polysiloxane fluids have a combination of phenyl or phenyl derivative substituents (preferably phenyl), with alkyl substituents, preferably C_1-C_4 alkyl (most preferably methyl), hydroxy, C_1-C_4 alkylamino (especially -R^1NHR^2NH2 where each R^1 and R^2 independently is a C_1-C_3 alkyl, alkenyl, and/or alkoxy. High refractive index polysiloxanes are available from Dow Corning Corporation (Midland, Michigan, U.S.A.) Huls America (Piscataway, New Jersey, U.S.A.), and General Electric Silicones (Waterford, New York. U.S.A.).

[0079] References disclosing examples of some suitable silicone fluids for use in the styling shampoo compositions include U.S. Patent 2,826,551, U.S. Patent 3,964,500, U.S. Patent 4,364,837, British Patent 849,433, and Silicon Compounds, Petrarch Systems, Inc. (1984).

[0080] Silicone resins can be included in the silicone conditioning agent. These resins are highly crosslinked polymeric siloxane systems. The crosslinking is introduced through the incorporation of trifunctional and tetrafunctional silanes with monofunctional or difunctional or both, silanes during manufacture of the silicone resin. As is well understood in the art, the degree of crosslinking that is required in order to result in a silicone resin will vary according to the specific silane units incorporated into the silicone resin. In general, silicone materials which have a sufficient level of trifunctional and tetrafunctional siloxane monomer units (and hence, a sufficient level of crosslinking) such that they dry down to a rigid, or hard, film are considered to be silicone resins. The ratio of oxygen atoms to silicon atoms is indicative of the level of crosslinking in a particular silicone material. Silicone matereials which have at least about 1.1 ozygen atoms per silicon atom will generally be silicone resins herein. Preferably, the ratio of oxygen:silicon atoms is at least about 1.2:1.0. Silanes used in the manufacture of silicone resins include monomethyl-, dimethyl-, trimethyl-, monophenyl-, diphenyl, methylphenyl-, monovinyl-, and methylvinyl-chlorosilanes, and tetrachlorosilane, with the methyl-substituted silanes being most commonly utilized. Preferred resins are offered by General Electric as GE SS4230 and SS4267. Commercially available silicone resins will generally be supplied in a dissolved form in a low viscosity volatile or nonvolatile silicone fluid. The silicone resins for use herein should be supplied and incorporated into the present compositions in such dissolved form, as will be readily apparent to those skilled in the art.

[0081] Background material on silicones including sections discussing silicone fluids, gums, and resins, as well as manufacture of silicones, can be found in Encyclopedia of Polymer Science and Engineering. Volume 15, Second Edition, pp 204-308, John Wiley & Sons, Inc., 1989.

[0082] Silicone materials and silicone resins in particular, can conveniently be identified according to a shorthand nomenclature system well known to those skilled in the art as "MDTQ" nomenclature. Under this system, the silicone is described according to presence of various siloxane monomer units which make up the silicone. Briefly, the symbol M denotes the monofunctional unit $(CH_3)_3SiO_5$; D denotes the difunctional unit $(CH_3)_2SiO$; T denotes the trifunctional unit $(CH_3)SiO_{1.5}$; and Q denotes the quadri- or tetra-functional unit SiO_2. Primes of the unit symbols, e.g., M', D', T, and Q' denote substituents other than methyl, and must be specifically defined for each occurrence. Typical alternate substituents include groups such as vinyl, phenyl, amines, hydroxyls, etc. The molar ratios of the various units, either in terms of subscripts to the symbols indicating the total number of each type of unit in the silicone (or an average thereof) or as specifically indicated ratios in combination with molecular weight complete the description of the silicone material under the MDTQ system. Higher relative molar amounts of T, Q, T' and/or Q' to D, D', M and/or M' in a silicone resin is indicative of higher levels of crosslinking. As discussed before, however, the overall level of crosslinking can also be indicated by the oxygen to silicon ratio.

[0083] The silicone resins for use herein which are preferred are MQ, MT, MTQ, MDT and MDTQ resins. Thus, the preferred silicone substituent is methyl. Especially preferred are MQ resins wherein the M:Q ratio is from about 0.5:1.0 to about 1.5:1.0 and the average molecular weight of the resin is from about 1000 to about 10,000.

[0084] The weight ratio of the nonvolatile silicone fluid, having refractive index below 1.46, to the silicone resin component, when used, is preferably from about 4:1 to about 400:1, preferably this ratio is from about 9:1 to about 200:1, more preferably from about 19:1 to about 100:1, particularly when the silicone fluid component is a polydimethylsiloxane fluid or a mixture of polydimethylsiloxane fluid and polydimethylsiloxane gum as described above. Insofar as the silicone resin forms a part of the same phase in the compositions hereof as the silicone fluid, i.e. the conditioning active, the sum of the fluid and resin should be included in determining the level of silicone conditioning agent in the composition.

Optional Suspending Agent

[0085] The styling shampoo compositions of the present invention may further comprise a suspending agent at concentrations effective for suspending the optional silicone hair conditioning agent, or other water-insoluble material, in dispersed form in the styling shampoo compositions. Such concentrations range from about 0.1% to about 10%, preferably from about 0.3% to about 5.0%, by weight of the styling shampoo compositions.

[0086] Optional suspending agents include crystalline suspending agents that can be categorized as acyl derivatives,

at least about 27 dynes/cm. Surface tension, for purposes hereof, is measured by a de Nouy ring tensiometer according to Dow Corning Corporate Test Method CTM 0461, November 23, 1971. Changes in surface tension can be measured according to the above test method or according to ASTM Method D 1331.

[0025] Preferred hydrolyzable polydiorganosiloxanes are polymers or copolymers that have a viscosity of from about 5 (easily pourable) with any suitable viscosity up to 1,000,000 centipoise at 25°C. Suitable hydrolyzable polydiorganosiloxanes include those having the general formula

$$R_{3-a}(X)_aSiO(R_2SiO)_nSi(X)_aR_{3-a}$$

wherein each R is independently a C_1-C_{60} alkyl, alkenyl, alkoxy, alkoxyalkylene, cycloalkyl, or aryl group, each of which is unsubstituted or substituted with substituents inert to and stable in the emulsion and during storage thereof, such as halogen, cyano, and the like. Preferably, at least 40% of the R groups are methyl groups, more preferably at least 80%, most preferably at least 90%. Each X is a hydrolyzable group, such as, for example, amino (e.g., $-NH_2$, $-NHR$, $-NR_2$ wherein R is as defined above), amido (e.g., $-NR-C(=O)-R$ wherein R is as defined above), aminoxy (e.g., $-ONR_2$ wherein R is as defined above), oximino (e.g., $-O-N=CR_2$ wherein R is as defined above), hydrocarbonoxy (e.g., $-OR$ wherein R is as defined above), hydrocarbonoxyalkylene (e.g., $-R'-OR$ wherein R and R' are as defined above), acyloxy (e.g., $-OC(=O)R$ wherein R is as defined above), and the like. Each a is independently 1, 2, or 3. Each n is independently a number sufficient to provide a polydiorganosiloxane having a viscosity of from about 5 to about 1,000,000 centipoise at 25°C. Preferably, n is sufficient to provide a polydiorganosiloxane having a viscosity of from about 100 to about 100,000 centipoise at 25°C. More preferably, n is sufficient to provide a polydiorganosiloxane having a viscosity of from about 1,000 to about 50,000 centipoise at 25°C. Most preferably, n is sufficient to provide a polydiorganosiloxane having a viscosity of from about 5,000 to about 15,000 centipoise at 25°C. Suitable hydrolyzable polydiorganosiloxanes are available from Dow Corning Corporation (Midland, Michigan, U.S.A.), Huls America (Piscataway, New Jersey, U.S.A.), and General Electric Silicones (Waterford, New York, U.S.A.).

[0026] Various procedures and examples of some suitable silicone fluids for use in the slurry silicone compositions are set out in U.S. Patent 2,490,357, U.S. Patent 2,801,990, U.S. Patent 4,584,355, British Patent 849,433, and Silicon Compounds, Petrarch Systems, Inc. (1984).

[0027] Silicone resins can be included in the silicone coating agent. These resins are highly crosslinked polymeric siloxane systems. The crosslinking is introduced through the incorporation of trifunctional and tetrafunctional silanes with monofunctional or difunctional or both silanes during manufacture of the silicone resin. As is well understood in the art, the degree of crosslinking that is required in order to result in a silicone resin will vary according to the specific silane functional units incorporated into the silicone resin. In general, silicone materials which have a sufficient level of trifunctional and tetrafunctional siloxane monomer units (and hence, a sufficient level of crosslinking) such that they dry down to a rigid, non-tacky coating are preferred to be silicone resins. The ratio of oxygen atoms to silicon atoms is a indicator of the level of crosslinking in a particular silicone material. Silicone materials which have at least about 1.1 oxygen atoms per silicon atom will generally be silicone resins herein. Preferably, the ratio of oxygen:silicon atoms is at least about 1.2:1.0. Silanes used in the manufacture of silicone resins include monomethyl-, dimethyl-, trimethyl-, monophenyl-, diphenyl-, methylphenyl-, monovinyl-, and methylvinyl-chlorosilanes, and tetrachlorosilane, with the methyl-substituted silanes most commonly utilized. Preferred resins are offered by General Electric as GE SR-545 and SR-547. Other resinous siloxane materials are also suitable, such as those described in U.S. Patent 3,627,851, issued December 14, 1971, and U.S. Patent 3,197,389, issued July 27, 1965.

[0028] Fillers which can be included in the silicone coating agent may be any suitable reinforcing or filler agent known in the silicone elastomer art. Examples of such materials include, for example, aluminosilicates, precipitated and fumed silicas, calcium carbonate, diatomaceous earth, glass microballoons, and the like. Preferred fillers are those having a surface area of greater than about 50 m^2/g, more preferably greater than about 100 m^2/g. Fillers having surface areas of from about 150 to about 400 m^2/g are most preferred. Fillers are commercially available and known to those skilled in the art.

[0029] Silicone materials for use herein should be supplied and incorporated into the present compositions in such dispersed form as will be readily apparent to those skilled in the art.

[0030] Background materials on silicones, including sections discussing silicone fluids, gums, and resins, as well as manufacture of silicones, can be found in Encyclopedia of Polymer Science and Engineering, Volume 15, Second Edition, pp. 204 to 308, John Wiley & Sons, Inc., 1989.

[0031] Silicone materials and silicone resins in particular, can conveniently be identified according to a nomenclature system well known to those skilled in the art as "MDTQ" nomenclature. Under this system, the silicone is described according to presence of various siloxane monomer units which make up the silicone. Briefly, the symbol M denotes the monofunctional unit $(CH_3)_3SiO_{0.5}$; D denotes the difunctional unit $(CH_3)_2SiO$; T denotes the trifunctional unit $(CH_3)SiO_{1.5}$; and Q denotes the quadri- or tetrafunctional unit SiO_2. Primes of the unit symbols, e.g., M', D', T', and Q', denote substituents other than methyl, and must be specifically defined for each occurrence. Typical alternate substituents include groups such as vinyl, phenyl, amines, hydroxyls, etc. The molar ratios of the various units, either in terms of subscripts to the symbols indicating the total number of each type of unit in the silicone (or an average thereof) or as specifically indicated ratios in combination with molecular weight complete the description of the silicone material under the MDTQ system. Higher relative molar amounts of T, Q, T' and/or Q' to D, D', M and/or M' in a silicone resin is indicative of higher level of crosslinking. As discussed before, however, the overall level of crosslinking can also be affected by the overall molecular weight of the polymer or copolymer.

[0032] The silicone resins for use herein which are preferred are MQ, MT, MTQ, MDT and MDTQ resins. Thus, the preferred silicone substituent is methyl. Especially preferred are MQ resins wherein the M:Q ratio is from about 0.5:1.0 to about 1.5:1.0 and the average molecular weight of the resin is from about 1000 to about 10,000.

[0033] The weight ratio of the non-volatile silicone fluid, having reactive groups (e.g., terminal silanol groups) thereon, to the silicone resin component, when used, is preferably from about 4:1 to about 400:1, preferably this ratio is from about 9:1 to about 200:1, more preferably from about 19:1 to about 100:1, particularly when the silicone fluid component is a polydimethylsiloxane fluid or a mixture of polydimethylsiloxane fluid and polymethylphenylsiloxane gum as described above. Mixtures of the silicone resin with a part of the same phase in the composition (instead as the silicone fluid) i.e. the corresponding ratio of the fluid and resin should be adjusted to determining the level of silicone conditioning agent in the composition.

Optional Suspending Agent

[0034] The styling shampoo compositions of the present invention may further comprise a suspending agent at concentrations effective to suspend the optional silicone hair conditioning agent or other water-insoluble, undispersed material in the styling shampoo compositions. Such concentrations range from about 0.1% to about 10%, preferably from about 0.3% to about 5.0%, by weight of the styling shampoo compositions.

[0035] Optional suspending agents include crystalline suspending agents that can be categorized as acyl derivatives,

long chain amine oxides, or combinations thereof, concentrations of which range from about 0.1% to about 5.0%, preferably from about 0.5% to about 3.0%, by weight of the styling shampoo compositions. When used in the styling shampoo compositions, these suspending agents are present in crystalline form. These suspending agents are described in U.S. Patent 4,741,855, which description is incorporated herein by reference. These preferred suspending agents include ethylene glycol esters of fatty acids preferably having from about 16 to about 22 carbon atoms. More preferred are the ethylene glycol stearates, both mono and distearate, but particularly the distearate containing less than about 7% of the mono stearate. Other suitable suspending agents include alkanol amides of fatty acids, preferably having from about 16 to about 22 carbon atoms, more preferably about 16 to 18 carbon atoms, preferred examples of which include stearic monoethanolamide, stearic diethanolamide, stearic monoisopropanolamide and stearic monoethanolamide stearate. Other long chain acyl derivatives include long chain esters of long chain fatty acids (e.g., stearyl stearate, cetyl palmitate, etc.); glyceryl esters (e.g., glyceryl distearate) and long chain esters of long chain alkanol amides (e.g., stearamide diethanolamide distearate, stearamide monoethanolamide stearate). Long chain acyl derivatives, ethylene glycol esters of long chain carboxylic acids, long chain amine oxides, and alkanol amides of long chain carboxylic acids in addition to the preferred materials listed above may be used as suspending agents. For example, it is contemplated that suspending agents with long chain hydrocarbyls having C_8-C_{22} chains may be used.

[0087] Other long chain acyl derivatives suitable for use as suspending agents include N,N-dihydrocarbyl amido benzoic acid and soluble salts thereof (e.g., Na, K), particularly N,N-di(hydrogenated) C_{16}, C_{18} and tallow amido benzoic acid species of this family, which are commercially available from Stepan Company (Northfield, Illinois, USA).

[0088] Examples of suitable long chain amine oxides for use as suspending agents indude alkyl (C_{16}-C_{22}) dimethyl amine oxides, e.g., stearyl dimethyl amine oxide.

[0089] Other suitable suspending agents include xanthan gum at concentrations ranging from about 03% to about 3%, preferably from about 0.4% to about 1.2%, by weight of the styling shampoo compositions. The use of xanthan gum as a suspending agent in silicone containing shampoo compositions is described, for example, in U.S. Patent 4,788,006, which description is incorporated herein by reference. Combinations of long chain acyl derivatives and xanthan gum may also be used as a suspending agent in the styling shampoo compositions. Such combinations are described in U.S. Patent 4,704,272.

[0090] Other suitable suspending agents include carboxyvinyl polymers. Preferred among these polymers an the copolymers of acrylic acid crosslinked with polyallylsucrose as described in U.S. Patent 2,798,053. Examples of these polymers include Carbopol 934, 940,941, and 956, available from B. F. Goodrich Company.

[0091] Other suitable suspending agents include primary amines having a fatty alkyl moiety having at least about 16 carbon atoms, examples of which include palmitamine or stearamine, and secondary amines having two fatty alkyl moieties each having at least about 12 carbon atoms, examples of which include dipalmitoylamine or di(hydrogenated tallow)amine. Still other suitable agents include di(hydrogenated tallow)phthalic acid amide, and crosslinked maleic anhydride-methyl vinyl ether copolymer.

[0092] Other suitable suspending agents may be used in the styling shampoo compositions, including those that can impart a gel-libre viscosity to the composition, such as water soluble or colloidally water soluble polymers like cellulose ethers (e.g., methylcellulose, hydroxybutyl methylcellulose, hyroxypropylcellulose, hydroxypropyl methylcellulose, hydroxyethyl ethylcellulose and hydorxethylcellulose), guar gum, polyvinyl alcohol, polyvinyl pyrrolidone, hydroxypropyl guar gum, starch and starch derivatives, and other thickeners, viscosity modifiers, gelling agents, etc. Mixtures of these materials can also be used.

Method of Use

[0093] The styling shampoo compositions of the present invention are used in a conventional manner for cleansing and styling hair. An effective amount of the composition for cleansing and styling the hair is applied to the hair, that has preferably been wetted with water, and is then rinsed off. Such effective amounts preferably range from about 1gm to about 50gm, more preferably from about 3gm to about 20gm. Application to the hair typically includes working the composition through the hair such that most or all of the hair is contacted with the composition.

[0094] This method for cleansing and styling the hair comprises the steps of a) wetting the hair with water, b) applying an effective amount of the styling shampoo composition to the hair, c) shampooing the hair with the composition, and d) rinsing the composition from the hair with water. These steps can be repeated as many times as desired to achieve the cleansing and styling benefit desired. The method is preferably employed daily, every other day, or every third day, to provide and maintain the hair cleansing and styling performance described herein.

Examples

[0095] The following examples further describe and demonstrate embodiments within the scope of the present invention. The examples are given solely for the purpose of illustration and are not to be construed as limitations of the present

long chain amine oxides, or cetrimonium chloride at which range from about 0.1% to about 8.0%, preferably from about 0.5% to about 3.0%, by weight of the shampoo compositions. When used in the styling shampoo compositions, these suspending agents are selected from the group consisting of ethylene glycol esters of fatty acids having from about 16 to about 22 carbon atoms. More preferred is ethylene glycol stearate, both mono and distearate, but particularly the distearate containing less than about 7% of the monostearate. Other suitable suspending agents include alkanol amides of fatty acids, preferably having from about 16 to about 22 carbon atoms, more preferably about 16 to 18 carbon atoms, preferred examples of which include stearic monoethanolamide, stearic monoisopropanolamide and stearic monoethanolamide. Still other suitable suspending agents include long chain esters of long chain fatty acids (e.g., stearyl stearate), long chain esters of long chain alkanol amides (e.g., stearamide diethanolamide distearate, stearamide monoethanolamide stearate). Long chain acyl derivatives, long chain amine oxides, long chain esters of long chain alkanol amides, glycol esters of long chain carboxylic acids, long chain amine oxides, and alkanol amides of long chain carboxylic acids in addition to the preferred materials listed above may be used as suspending agents. For example, it is contemplated that suspending agents with long chain hydrocarbyls having C_8-C_{22} chains may be used.

[0047] Other long chain acyl derivatives suitable for use as suspending agents include N,N-dihydrocarbyl amido benzoic acid and soluble salts thereof (e.g. Na, K), particularly N,N-di(hydrogenated) C_{16}, C_{18} and tallow amido benzoic acid species of the foregoing agents, also available from Stepan Company (Northfield, Illinois, USA).

[0048] Examples of suitable long chain amine oxides for use as suspending agents include alkyl (C_{16}-C_{22}) dimethyl amine oxides, e.g., stearyl dimethyl amine oxide.

[0049] Other suitable suspending agents include xanthan gum at concentrations ranging from about 0.3% to about 3%, preferably from about 0.4% to about 1.2% by weight of the styling shampoo compositions. The use of xanthan gum as a suspending agent in silicone containing shampoo compositions is described for example in U.S. Patent 4,788,006, which description is incorporated herein by reference. Combinations of long chain acyl derivatives and xanthan gum may also be used as a suspending agent in the styling shampoo compositions. Such combinations are described in U.S. Patent 4,704,272.

[0050] Other suitable suspending agents include crosslinked polymers. Preferred among these polymers are the copolymers of acrylic acid cross-linked with polyallylsucrose as described in U.S. Patent 2,798,053. Examples of these polymers include Carbopol 934, 940, 941 and 950, available from B.F. Goodrich Company.

[0051] Other suitable suspending agents include primary amines having a fatty alkyl moiety having at least 16 carbon atoms, examples of which include palmitamine or stearamine, and secondary amines having two fatty alkyl moieties each having at least 12 carbon atoms, examples of which include dipalmitoylamine or distearylamine. Still other suitable suspending agents include di(hydrogenated tallow)phthalic acid amide, and crosslinked maleic anhydride-methyl vinyl ether copolymer.

[0052] Other suitable suspending agents may be used in the styling shampoo compositions, including those that contain a polymeric viscosity modifier such as water soluble or colloidally water soluble polymers like cellulose ethers (e.g., methylcellulose, hydroxybutyl methylcellulose, hydroxypropyl methylcellulose, hydroxyethylcellulose and hydroxybutylcellulose), guar gum, polyvinyl alcohol, polyvinyl pyrrolidone, hydroxypropyl guar gum, starch and starch derivatives, and other thickeners, viscosity modifiers, gelling agents, etc. Mixtures of these materials can also be used.

Method of Use

[0053] The styling shampoo compositions of the present invention are used in a conventional manner for cleansing and styling hair. An effective amount of the composition for cleansing and styling the hair is applied to dry hair that has previously been wetted with water, and is then rinsed off. Such effective amounts generally range from about 1g to about 20g. Application to the hair typically includes working the composition through the hair such that all of the hair is contacted with the composition.

[0054] The method for cleansing and styling the hair comprises the steps of a) wetting the hair with water, b) applying an effective amount of the styling shampoo composition to the hair, c) massaging the hair with the composition, and d) rinsing the composition from the hair with water. These steps can be repeated as many times as desired to achieve the cleansing and styling benefit desired. It is preferred a method used daily, every other day, or every third day, to provide and maintain the hair cleaning and styling benefits described herein.

Examples

[0055] The following examples further describe and demonstrate embodiments within the scope of the present invention. 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. The exemplified embodiments of the styling shampoo composition of the present invention provide both conditioning and styling performance without leaving the hair feeling unduly coated, dirty, sticky, or tacky to the touch. Ingredients are herein identified by chemical, trade, or CTFA name.

[0096] The styling shampoo compositions illustrated in Examples I-V are prepared by conventional formulation and mixing techniques, an example of which is set forth hereinbelow. All exemplified amounts are listed as weight percents and exclude minor materials such as diluents, filler, and so forth, unless otherwise specified.

Preparation

[0097] The styling shampoo compositions of the present invention may be prepared using conventional formulation and mixing techniques. The solid components are dispersed directly into a premix of the surfactants, or some portion of the surfactants which has been heated to melt the solid components, e.g., about 72°C. This mixture is then pumped through a high shear mill and cooled, and then the remaining components, including the cationic deposition polymer and the cationic styling polymer, are mixed in. The composition should have a final viscosity of from about 2,000 to about 15,000 cps, preferably from about 4,000 to about 10,000 cps. The viscosity of the composition can be adjusted using sodium chloride or ammonium xylenesulfonate as needed.

Component	Weight %				
	I	II	III	IV	V
Ammonium Laureth Sulfate	9.5	9.0	9.3	9.3	9.5
Ammonium Lauryl Sulfate	1.0	3.0	—	—	1.0
Lauroamphoacetate	7.5	6.0	—	—	7.5
Cocamidopropyl Betaine FB (4)	—	—	4.7	4.7	—
Polyquaternium-16 (Luviquat FC 370) (1)	2.0	3.0	3.0	2.0	3.0
Monosodium Phosphate	0.1	0.1	0.1	0.1	0.1
Disodium Phosphate	0.2	0.2	0.2	0.2	0.2
Glycol Distearate	2.0	2.0	2.0	2.0	2.0
Cocomonoethanol amide	0.6	0.6	0.6	0.6	0.6
Fragrance	1.0	1.0	1.0	1.0	1.0
Cetyl Alcohol	0.07	—	0.42	0.42	0.14
Stearyl Alcohol	0.03	—	0.18	0.18	0.06
PEG-150 Pentaerythrityl Tetrastearate	0.1	0.15	—	0.08	0.20
Polyquaternium 10 (JR30M) (2)	0.3	—	0.3	—	0.2
Polyquaternium 10 (JR400) (2)	—	—	—	0.4	—
Guar Hydroxypropyltrimonium Chloride (Jaguar C-17) (3)	—	0.3	—	—	—
Dimethicone	0.25	—	—	—	—
DMDM Hydantoin	0.2	0.2	0.2	0.2	0.2
Water	qs 100	qs 100	qs 100	qs 100	qs 100

(1) Available from BASF (Ludwigshafen, Germany)
(2) Available from Amerchol Corp. (Edison, NJ, USA)
(3) Available from Rhone-Poulenc (Cranbury, NJ, USA)
(4) Available from Goldschmidt (Hopewell, Virginia, USA)

Claims

1. A styling shampoo composition comprising:

(a) from 5% to 50% by weight of a surfactant component selected from the group consisting of a combination of an anionic surfactant and an amphoteric surfactant, and a combination of an anionic surfactant and a zwitterionic surfactant;
(b) from 0.025% to 3% by weight of a cationic deposition polymer having a cationic charge density of from 0.2 meq/gram to 2 meq/gram and which is selected from the group consisting of cationic cellulose polymers, cationic guar gum derivatives, and mixtures thereof;

invention, as many variations is envisaged which do not depart from the spirit and scope of the invention. The embodiments described hereinabove are further intended to explain best modes known of practicing it and to enable others skilled in the art to utilize the invention in such, or other, embodiments and with various modifications required by the particular application or uses thereof. It is intended that the claims be construed to include alternative embodiments to the extent permitted by the prior art.

[0096] The drying shampoo compositions illustrated in Example I-V are prepared by conventional formulation and mixing techniques. An example of which is set forth below. All amounts are listed as weight percents and exclude minor materials such as diluents, filler, and so forth, unless otherwise specified.

Preparation

[0097] The drying shampoo compositions of the present invention may be prepared using conventional formulation and mixing techniques. The solid components are dispersed directly into a portion of the surfactants system or into all surfactants which has been heated to melt the solid components, e.g. about 72°C. This mixture is then mixed (mixer = IKA-Werke mill) and cooled, and then the remaining components, including the cationic polymer, conditioning agent, perfume, and preservative, are mixed in. The composition should have a final viscosity of from about 2,000 to about 15,000 cps, preferably from about 4,000 to about 10,000 cps. The viscosity of the composition can be adjusted using sodium chloride or ammonium xylenesulfonate, as needed.

Component	Weight %				
	I	II	III	IV	V
Ammonium Laureth Sulfate	9.5	8.0	8.3	9.3	8.5
Ammonium Lauryl Sulfate	1.0	3.0	—	—	1.0
Lauroamphoacetate	7.5	6.0	—	—	7.5
Cocamidopropyl Betaine FF (4)	—	—	4.7	4.7	—
Polyquaternium-10 (Amerpol PX 370) (1)	2.0	3.0	3.0	2.0	3.0
Monoacetin Propylene	0.1	0.1	0.1	0.1	0.1
Dicetyl Thiodipropionate	0.2	0.2	0.2	0.2	0.2
Glycol Distearate	2.0	2.0	2.0	2.0	2.0
Cocamidomonoethanol amide	0.8	0.5	0.8	0.8	0.8
Fragrance	1.0	1.0	1.0	1.0	1.0
Cetyl Alcohol	0.07	—	0.42	0.42	0.14
Stearyl Alcohol	0.03	—	0.18	0.18	0.06
PEG-150 Pentaerythrityl Tetrastearate	0.1	0.15	—	0.09	0.20
Polyquaternium-10 (JR30M) (2)	0.3	—	0.3	—	0.2
Polyquaternium-10 (Ucare) (3)	—	—	—	0.4	—
Guar Hydroxypropyltrimonium Chloride (Jaguar C-17) (3)	—	0.3	—	—	—
Dimethicone	0.25	—	—	—	—
UMDM Hydantoin	0.2	0.2	0.2	0.2	0.2
Water	qs 100	qs 100	qs 100	qs 100	qs 100

(1) Available from BASF (Ludwigshafen, Germany)
(2) Available from Amerchol Corp (Edison, NJ, USA)
(3) Available from Rhone-Poulenc (Cranbury, NJ, USA)
(4) Available from Goldschmidt (Hopewell, Virginia, USA)

Claims

1. A drying shampoo composition comprising:

(a) from 5% to 50% by weight of a surfactant component selected from the group consisting of a combination of an anionic surfactant and an amphoteric surfactant, and a combination of an anionic surfactant and a nonionic surfactant;

(b) from 0.05% to 5% by weight of a cationic deposition polymer having a cationic charge density of from 0.2 meq/gm to 4 meq/gm and a molecular weight of from 10,000 to 1 million daltons;

(c) from 2% to 10% by weight of an organic cationic hair styling polymer having a cationic charge density of greater than 2 meq/gram to less than 4.75 meq/gram; and
(d) from 27% to 94.5% by weight water.

2. The composition of Claim 1 wherein the anionic surfactant is selected from the group consisting of ammonium lauryl sulfate, ammonium laureth sulfate, alkyl glyceryl ether sulfonate, and mixtures thereof; the amphoteric surfactant is selected from the group consisting of lauroamphoacetate, lauroamphodiacetate, cocoamphoacetate, cocoamphodiacetate, and mixtures thereof; and the zwitterionic surfactant is a betaine surfactant.

3. The composition of Claim 1 or 2 wherein the betaine surfactant is cocoamidopropyl betaine.

4. A styling shampoo composition according to claim 1, comprising:

(a) from 5% to 50% by weight of a surfactant combination of ammonium laureth sulfate and cocoamidopropyl betaine having a weight ratio of ammonium laureth sulfate to cocoamidopropyl betaine of from 1.5:1 to 10:1;
(b) from 0.025% to 3% by weight of a cationic deposition polymer having a cationic charge density of from 0.2 meq/gram to 2 meq/gram and which is selected from the group consisting of cationic cellulose polymers, cationic guar gum derivatives, and mixtures thereof;
(c) from 2% to 10% by weight of Polyquaternium-16 as an organic cationic hair styling polymer having a charge density of greater than 2 meq/gram to less than 4.75 meq/gram; and
(d) from 27% to 94.5% by weight of water.

5. The composition of any one of the preceding claims wherein the organic cationic hair styling polymer is a copolymer of 30% vinylimidazole and 70% vinyl pyrrolidone.

6. The composition of any one of the preceding claims wherein the cationic cellulose polymer is Polyquaternium-10, and the guar gum derivative is guar hydroxypropyltrimonium chloride.

7. The composition of any one of the preceding claims wherein the composition further comprises a non-volatile hair conditioning agent selected from the group consisting of polyarylsiloxanes, polyalkylsiloxanes, polyalkylarylsiloxanes, derivatives thereof, and mixtures thereof.

8. The composition of Claim 7 wherein the composition comprises from 0.15% to 3% by weight of a non-volatile polydimethylsiloxane as the hair conditioning agent.

9. A method for cleansing and styling the hair, which method comprises the steps of:

(a) wetting the hair with water,
(b) applying from 1 gram to 50 grams of the composition of any of the preceding claims to the hair,
(c) shampooing the hair with the composition, and
(d) rinsing the composition from the hair using water.

Patentansprüche

1. Stylingshampoozusammensetzung, umfassend:

(a) von 5 Gew.-% bis 50 Gew.-% einen Tensidbestandteil, ausgewählt aus der Gruppe, bestehend aus einer Kombination eines anionischen Tensids und eines amphoteren Tensids und einer Kombination eines anionischen Tensids und eines zwitterionischen Tensids;
(b) von 0,025 Gew.-% bis 3 Gew.-% ein kationisches Abscheidepolymer mit einer kationischen Ladungsdichte von 0,2 meq/g bis 2 meq/g und ausgewählt aus der Gruppe, bestehend aus kationischen Cellulosepolymeren, kationischen Guargummiderivaten und Mischungen davon;
(c) von 2 Gew.-% bis 10 Gew.-% ein organisches kationisches Haarstylingpolymer mit einer kationischen Ladungsdichte von mehr als 2 meq/g bis weniger als 4,75 meq/g; und
(d) von 27 Gew.-% bis 94,5 Gew.-% Wasser.

2. Zusammensetzung nach Anspruch 1, worin das anionische Tensid ausgewählt ist aus der Gruppe, bestehend aus

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(a) from 2% to 10% by weight of an organic cationic film-forming polymer having a cationic charge density of greater than 2 meq/gm to less than 4.75 meq/gm; and

(d) from 2% to 34.5% by weight water.

2. The composition of Claim 1 wherein the cationic surfactant is selected from the group consisting of ammonium lauryl sulfate, ammonium laureth sulfate, diethyl ethanolamine lauryl sulfate, and mixtures thereof; the anionic surfactant is selected from the group consisting of isethionates, alkyl sulfosuccinates, alkyl sarcosinates, alkyl glycinates, alkyl taurates, and mixtures thereof; the amphoteric surfactant is selected from the group consisting of betaines, alkyl glycinates, alkyl carboxyglycinates, alkyl amphopropionates, alkyl amphoglycinates, alkyl amidopropyl hydroxysultaines, acyl taurates, and acyl isethionates, and mixtures thereof; and the nonionic surfactant is selected from the group consisting of sucrose esters, fatty alcohol ethoxylates, alkyl ethoxylates, alkyl phenol ethoxylates, alkyl glucose esters, alkyl polyglucosides, and mixtures thereof.

3. The composition of Claim 1 or 2 wherein the foaming surfactant is cocoamidopropyl betaine.

4. A styling shampoo composition according to claim 1, comprising:

(a) from 6% to 30% by weight of a surfactant combination of ammonium lauryl sulfate and cocoamidopropyl betaine having a weight ratio of ammonium lauryl sulfate to cocoamidopropyl betaine of from 1.5:1 to 10:1;

(b) from 0.05% to 3% by weight of a cationic deposition polymer having a cationic charge density of from 0.2 meq/gm to 2 meq/gm and which is selected from the group consisting of cationic cellulose polymers, cationic guar gum derivatives, and mixtures thereof;

(c) from 2% to 10% by weight of polydiallyldimethylammonium chloride;

(d) from 27% to 84% by weight of water.

5. The composition of any one of the preceding claims wherein the organic cationic hair styling polymer is a copolymer of 20% vinylpyrrolidone and 70% vinylimidazole.

6. The composition of any one of the preceding claims wherein the cationic cellulose polymer is Polyquaternium-10, and the guar gum derivative is guar hydroxypropyltrimonium chloride.

7. The composition of any one of the preceding claims wherein the composition further comprises a non-volatile hair conditioning agent selected from the group consisting of polyalkylene glycols, polyalkylene oxides, polyalkylene terephthalates, derivatives thereof, and mixtures thereof.

8. The composition of Claim 7 wherein the composition comprises from 0.125% to 3% by weight of a non-volatile polyoxyethyleneglycerin as the hair conditioning agent.

9. A method for cleaning and styling the hair, which method comprises the steps of

(a) wetting the hair with water;

(b) applying from 1 gram to 50 grams of the composition of any of the preceding claims to the hair;

(c) shampooing the hair with the composition; and

(d) rinsing the composition from the hair using water.

Patentansprüche

1. Stylingshampoozusammensetzung umfassend:

(a) von 6 Gew.-% bis 30 Gew.-% einer Tensidmischung, ausgewählt aus der Gruppe bestehend aus einer Kombination eines ammoniumhaltigen Tensids und eines amphoteren Tensids und einer Kombination eines ammoniumhaltigen Tensids und eines nichtionischen Tensids;

(b) von 0,05 Gew.-% bis 3 Gew.-% eines kationischen Ablagerungspolymers mit einer kationischen Ladungsdichte von 0,2 meq/g bis 2 meq/g und ausgewählt aus der Gruppe bestehend aus kationischen Cellulosepolymeren, kationischen Guarumderivaten und Mischungen davon;

(c) von 2 Gew.-% bis 10 Gew.-% an organischen kationischen filmbildenden Polymer mit einer kationischen Ladungsdichte von mehr als 2 meq/g bis weniger als 4,75 meq/g und

(d) von 27 Gew.-% bis 84 Gew.-% Wasser.

2. Zusammensetzung nach Anspruch 1, worin das ammoniumhaltige Tensid ausgewählt ist aus der Gruppe bestehend aus

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(54) Microemulsion.

(57) A conditioning composition for hair and/or skin comprises a stable microemulsion of a conditioning oil, e.g a silicone, with a particle size of ≤0.15 microns, in combination with a deposition polymer.

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This invention relates to cosmetic compositions, particularly but not exclusively hair treatment compositions. More specifically, the invention relates to cosmetic compositions which include emulsified particles of conditioning oil, which compositions are mechanically stable, preferably optically clear and impart good conditioning benefits to hair and/or skin.

The use of conditioning agents such as silicones in cosmetic formulations, for example hair treatment compositions, is well known and widely documented in the patent literature. Generally, dispersed droplets of the silicone oil are suspended in the composition, which is then applied to the hair to deposit the silicone material on the hair shaft.

Hitherto, steps have had to be taken to prevent the emulsified droplets of silicone oil from agglomerating and the composition creaming during storage. Such steps have for example included the addition of polymers such as Carbopol or certain gums, and/or crystalline materials, e.g. ethylene glycol distearate, to act as suspending agents, but the use of such materials renders the resulting compositions cloudy or opaque. Visually and aesthetically such products are inferior.

The presence of such suspending agents in hair treatment compositions, however, is also disadvantageous because they lead to dulling of the hair, as well as lowering of other conditioning attributes, as a result of the suspending agent being deposited on the hair in addition to the intended silicone conditioning oil.

It is known in the art that oily cosmetic agents such as silicones can be incorporated into cosmetic compositions by means of microemulsification, whereby the silicone is present as stably emulsified droplets of a particle size of the order of 0.15 microns or less.

For example, US 4733677 discloses leave-on hair fixatives containing cationic organic polymer and polydiorganosiloxane microemulsion. EP-A-268982 describes dimethylpolysiloxane microemulsions for various cosmetic uses, the microemulsified dimethylpolysiloxane being formed by emulsion polymerization and with a particle size of 0.15 microns or less.

However, by the very nature of the form in which microemulsified particles of a conditioning oil are incorporated into cosmetic compositions, the conditioning benefits attainable are frequently limited, owing to a poor level of deposition on the intended site, ie. the hair or the skin.

It has now been found that cosmetic compositions which have good mechanical stability, high optical transparency or translucency, and excellent conditioning ability can be obtained by utilising a microemulsified conditioning oil in combination with a deposition aid.

Accordingly, in one aspect the present invention provides a cosmetic composition comprising:

(a) at least one surfactant,

(b) microemulsified particles of a conditioning oil having a particle size of ≦ 0.15 microns; and

(c) a deposition polymer.

The invention will now be described in detail.

As used herein, the term "conditioning oil" includes any material which is used to give a particular conditioning benefit to hair and/or skin. For example, in cosmetic compositions for use on the skin, conditioning agents such as moisturizers, essential oils, sun-protective or after-sun treatment materials, occlusive oils and the like may be used. In hair treatment compositions, suitable conditioning agents are those which deliver one or more benefits relating to shine, softness, combability, anti-static properties, wet-handling, damage, stylability and manageability, body and greasiness.

Preferred hair conditioning agents for use in the present invention include volatile and non-volatile silicones, siloxane gums and resins, aminofunctional silicones, quaternary silicones, other oily materials known for use in conditioning hair, and mixtures thereof. Examples of suitable silicone polymers for use in the present invention include those disclosed in EP-A-228575.

Various methods of making microemulsions of particles of conditioning oils for use in the invention are available and are well known and documented in the art.

One particularly preferred technique for making conditioning oil, particularly silicone, microemulsions is that described in EP-A-228575 referred to above, the disclosure of which is incorporated herein by reference. This document described a method of making a stable microemulsion of high molecular weight silicone polymer and water by sequentially adding at an effective rate a standard emulsion comprising polydiorganosiloxane precursor, surfactant and water to a polymerization catalyst medium while mixing to form a clear, stable aqueous microemulsion of polydiorganosiloxane. This emulsion polymerization technique can be used to prepare microemulsions of conditioning agents other than polydiorganosiloxanes for incorporation into compositions of the invention.

Another method of making suitable microemulsions for use in the invention are described in EP-A-0 138 192, the disclosure of which is also incorporated herein by reference.

The conditioning oil may for example be a liquid at ambient temperatures, so as to be of a suitable viscosity to enable the material itself to be readily emulsified with the required particle size of 0.15 microns or less. How-

The invention relates to cosmetic compositions, particularly but not exclusively hair treatment compositions. More specifically, the invention relates to cosmetic compositions which include emulsified particles of conditioning oil, which compositions are mechanically stable, pleasantly odourless and have good conditioning properties in hair and skin.

The use of conditioning agents such as silicones in cosmetic formulations, for example hair treatment compositions, is well known and widely documented in the patent literature. Generally, dispersed droplets of the silicone oil are suspended in the composition, which is then applied to the hair to deposit the silicone material on the hair shaft.

Hitherto, steps have had to be taken to prevent the emulsified droplets of silicone oil from coalescing and the silicone oil from separating during storage. Such steps have for example included the addition of polymeric auxiliaries such as carbopol or carbon gums, and/or crystalline materials, e.g. ethylene glycol distearate, to act as suspending agents. But the use of such materials reduces the resulting composition's clarity or opacity. Viscosity and/or odour problems are also known.

The presence of such auxiliary agents in hair treatment compositions, however, is also disadvantageous because they lead to coating of the hair, as well as lowering of other conditioning attributes, as a result of the auxiliary agent being deposited on the hair in addition to the intended silicone conditioning agent.

It is known in the art that oily cosmetic agents such as silicones can be incorporated into emulsified compositions by means of microemulsification, whereby the silicone is present as finely emulsified droplets of a particle size of the order of 0.15 microns or less.

For example, US 4 620 972 discloses aerosol hair fixative containing cationic organic polymer and polydimethylsiloxane microemulsion. EP-A-256 982 discloses dandruff-removing microemulsions for various cosmetic uses, the microemulsified dimethylpolysiloxane being formed by emulsion polymerisation and with a particle size of 0.15 microns or less.

However, by the very nature of the form in which microemulsified particles of a conditioning oil are introduced into cosmetic compositions, the conditioning benefits attainable are frequently limited, owing to a poor level of deposition on the intended site, ie the hair or the skin.

It has now been found that cosmetic compositions with certain novel mechanical stability, high particle opacity or translucency, and excellent conditioning ability can be obtained by utilising a microemulsified conditioning oil in combination with a deposition aid.

Accordingly, in one aspect the present invention provides a cosmetic composition comprising:

(a) at least one surfactant;

(b) microemulsified particles of a conditioning oil having a particle size of ≤ 0.15 microns, and

(c) a deposition polymer.

The invention will now be described in detail.

As used herein, the term "conditioning oil" includes any material which is used to give a user-perceptible lubricating benefit to hair and/or skin. For example, a common consideration for use on the skin, particularly in the case of sun-products, cosmetic oils, sun-protective or after-sun treatment preparations, moisturising preparations and the like is that they are non-greasy, suitable conditioning agents for these purposes are known as "dry" oils, or more generally, emollients, which provide a soothing, cooling, non-sticky, non-greasy, lubricating effect on the skin, and/or soften it by softening and/or plasticising the stratum corneum, e.g. by retarding evaporation of water from the skin. Such agents are also known for use in hair conditioning, and may be referred to as hair conditioning agents, hair softening agents, combing aids, lubricants, or hair smoothing agents. Many such agents have also been known for use as hair fixatives, or hair-setting agents, as well as having conditioning effects on hair, skin and/or cuticle. Conditioning agents for hair and skin should preferably be substantially non-irritating, non-toxic, and safe for use in contact with skin.

Preferred hair conditioning agents for use in the present invention include volatile and non-volatile silicone oils, such as pure and mixed dimethylsiloxanes of suitable molecular weight, cyclomethicones, phenyl substituted silicones, and the like. Also preferred for use herein are conditioning oils, such as fatty esters, fatty alcohols, and mixtures thereof, such as mixtures of fatty esters and fatty alcohols, for example those disclosed in EP-A-256 756.

Various methods of making microemulsions of particles of conditioning oils for use in the invention are available and are well known and documented in the art.

One particularly preferred method for making conditioning oil microemulsions is that described in EP-A-256 756 referred to above. This discloses a method of making microemulsions of polydimethylsiloxane and other conditioning oils by mechanical agitation of the oil, water and surfactant components.

The oil is first dispersed in water containing surfactant to form a crude emulsion having particles of the oil in the size range of 1 to 100 microns. This crude emulsion is then converted to a microemulsion having particles of the oil in the size range of 0.15 microns or less by passing the crude emulsion through a mechanical homogeniser apparatus, for example a high pressure homogeniser, operating at pressures of 5 to 35 MPa (50 to 350 bar), preferably 10 to 25 MPa (100 to 250 bar).

Alternative methods of making microemulsions for use in the invention are described in EP-A-0 138 752, the disclosure of which is also incorporated herein by reference.

The conditioning oil may be employed at ambient temperature, or as to be of a suitably viscosity to enable the oil to be readily emulsified with the required particle size of 0.15 microns or less. More

ever, high viscosity or even solid materials may be appropriate for use in the invention, and indeed may be preferred where in situ polymerisation is used to prepare the microemulsified particles, as mentioned above. Alternatively, such high viscosity or solid materials may be suitable for use directly if dissolved in a water-immiscible solvent. For example, in the case of a conditioning agent which is a highly viscous silicone resin or siloxane gum, a suitable solvent is a volatile silicone or a volatile hydrocarbon. Examples of all these materials are well documented in the patent literature.

The amount of conditioning oil incorporated into the compositions of the invention may depend on the type of composition and the material used as the conditioning agent. A preferred amount of conditioning oil is from about 0.01 to about 50% by weight of the total composition, more preferably from about 0.01 to about 20% by weight, even more preferably from about 0.01 to about 10% by weight.

The microemulsion of the conditioning agent is stabilised by a suitable amount of one or more emulsifiers, preferably chosen from anionic, cationic, nonionic, amphoteric and zwitterionic surfactants, and mixtures thereof.

Suitable anionic surfactants are the alkyl sulphates, alkyl ether sulphates, alkaryl sulphonates, alkyl succinates, alkyl sulphosuccinates, acyl taurates, acyl glutamates, N-alkoyl sarcosinates, alkyl phosphates, alkyl ether phosphates, alkyl ether carboxylates, and alpha-olefin sulphonates, especially their sodium, magnesium, ammonium and mono-, di- and triethanolamine salts. The alkyl and acyl groups generally contain from 8 to 18 carbon atoms and may be unsaturated. The alkyl ether sulphates, alkyl ether phosphates and alkyl ether carboxylates may contain from one to 10 ethylene oxide or propylene oxide units per molecule, and preferably contain 2 to 3 ethylene oxide units per molecule.

Examples of suitable anionic surfactants include sodium oleyl succinate, ammonium lauryl sulphosuccinate, ammonium lauryl sulphate, sodium dodecylbenzene sulphonate, triethanolamine and sodium salts of dodecylbenzene sulphonate and sodium N-lauryl sarcosinate. The most preferred anionic surfactants are sodium lauryl ether sulphate 1EO, 2EO, and 3EO, ammonium lauryl sulphate, ammonium lauryl ether sulphate 1EO, 2EO and 3EO, and triethanolamine and sodium salts of dodecylbenzene sulphonate.

Suitable cationic surfactants may include quaternary ammonium hydroxides, e.g. tetramethylammonium hydroxide, octyltrimethylammonium hydroxide, dodecyltrimethylammonium hydroxide, hexadecyltrimethylammonium hydroxide, octyldimethylbenzylammonium hydroxide, decyldimethylbenzylammonium hydroxide, didodecyldimethylammonium hydroxide, dioctadecyldimethylammonium hydroxide, tallow trimethylammonium hydroxide, cocotrimethylammonium hydroxide, and the corresponding salts thereof.

Suitable nonionic surfactants may include condensation products of aliphatic (C_8-C_{18}) primary or secondary linear or branched chain alcohols or phenols with alkylene oxides, usually ethylene oxide and generally having from 6 to 30 ethylene oxide groups.

Other suitable nonionics include alkylpolyglycosides and mono- or di-alkyl alkanolamides. Examples of the latter nonionics include coco mono- or diethanolamide and coco mono-isopropanolamide.

Suitable amphoteric and zwitterionic surfactants may include alkyl amine oxides, alkyl betaines, alkyl amidopropyl betaines, alkyl sulphobetaines (sultaines), alkyl glycinates, alkyl carboxyglycinates, alkyl amphopropionates, alkylamphoglycinates, alkyl amidopropyl and hydroxysultaines, wherein the alkyl and acyl groups have 8 to 19 carbon atoms. Examples include lauryl amine oxide, cocodimethyl sulphopropyl betaine and preferably lauryl betaine, cocamidopropyl betaine and sodium cocamphopropionate.

A particularly preferred cosmetic composition in accordance with the invention is a shampoo composition which, in addition to the microemulsified conditioning oil itself, comprises in total from about 0.1 to about 50% by weight of the total composition, preferably from about 1 to about 40% by weight, more preferably from about 2 to about 35% by weight, of at least one surfactant selected from anionic, cationic, nonionic, and amphoteric and zwitterionic surfactants, and mixtures thereof, examples of which are given above.

In accordance with the invention, the cosmetic composition contains one or more deposition polymers. Suitable deposition polymers are any which enhance deposition of the conditioning oil on the intended site, i.e. the hair or the skin. A preferred deposition polymer is a cationic deposition polymer, especially a cationic derivative of guar gum or a cationic cellulose ether derivative.

Suitable cationic guar gum derivatives are those given the CTFA designation guar hydroxypropyl trimonium chloride, available commercially for example as JAGUAR C13S, which has a low degree of substitution of the cationic groups and high viscosity. Other suitable materials include that known as JAGUAR C15, having a moderate degree of substitution and a low viscosity, JAGUAR C17 (high degree of substitution, high viscosity) ann JAGUAR C16 which is a hydroxypropylated cationic guar derivative containing a low level of substituent groups as well as cationic quaternary ammonium groups. Also suitable is JAGUAR 162 which is a high transparency, medium viscosity guar having a low degree of substitution.

Suitable cationic cellulose ether derivatives are quaternary ammonium derivatives of cellulose ethers, for example the Polymer JR series of materials available from Union Carbide.

ever, high viscosity or even solid materials may be appropriate for use in the invention, and indeed may be preferred where a solid polymer electrolyte is used to prepare the mechanically laminated particles, as mentioned above. Also relatively high viscosity or solid materials may be suitable for use directly if dissolved in a water-miscible solvent. For example, in the case of a condensation system it is highly viscous silicone resin or silicone gum, a solution solvent in a volatile silicone or a volatile hydrocarbon, examples of all of these materials are mentioned in the patent literature.

The amount of such leaving groups incorporated into the formulations of the invention may depend on the type of moiety selected and the material used as the conditioning agent. A preferred amount of conditioning agent is from about 0.01 to about 20% by weight of the total composition, more preferably from about 0.01 to about 10% by weight, even more preferably from about 0.01 to about 1% by weight.

The incorporation of the conditioning agent is assisted by a suitable amount of one or more emulsifiers, preferably non-ionic emulsifiers, cationic emulsifiers or both emulsifiers as mixtures, and preferably the emulsifier is:

Suitable anionic surfactants are the alkyl sulphates, alkyl ether sulphates, alkaryl sulphonates, alkyl succinates, alkyl sulphosuccinates, isethionates, and taurates, N-alkoyl sarcosinates, alkyl phosphates, alkyl ether phosphates, alkyl ether carboxylates, and alpha-olefin sulphonates, especially their sodium, magnesium, ammonium and mono-, di- and tri-ethanolamine salts. The alkyl and acyl groups generally contain from 8 to 18 carbon atoms and may be unsaturated. The alkyl ether sulphates, alkyl ether phosphates and alkyl ether carboxylates may contain from one to 10 ethylene oxide or propylene oxide units per molecule, and preferably contain 2 to 3 ethylene oxide units per molecule.

Examples of suitable anionic surfactants include sodium oleyl succinate, ammonium lauryl sulphosuccinate, ammonium lauryl sulphate, sodium dodecylbenzene sulphonate, triethanolamine dodecylbenzene sulphonate, sodium cocoyl isethionate, sodium lauryl ether carboxylate and sodium N-lauroyl sarcosinate. The most preferred anionic surfactants are sodium lauryl ether sulphate (1EO, 2EO, and 3EO, ammonium lauryl sulphate, ammonium lauryl ether sulphate 1EO, 2EO and 3EO, and triethanolamine and sodium salts of dodecylbenzene sulphonate.

Suitable cationic surfactants may include quaternary ammonium materials, e.g. tetraalkyl ammonium, cetyl trimethylammonium hydroxide, dodecyltrimethylammonium hydroxide, hexadecyltrimethylammonium hydroxide, octyldimethylbenzylammonium hydroxide, decyldimethylbenzylammonium hydroxide, didodecyldimethylammonium hydroxide, tallow benzylmethylammonium hydroxide, cocoalkyldimethylbenzylammonium hydroxide, and the corresponding salts thereof.

Suitable nonionic surfactants may include condensation products of alkanols (C_8-C_{24}) primary or secondary linear or branched chain, alkenols or phenols with alkylene oxide, usually ethylene oxide and generally having from 6 to 30 ethylene oxide groups.

Other nonionics include alkyl polyglycosides and mono- or di-alkyl alkanolamides. Examples of the latter materials include coco mono- or diethanolamide and coco mono-isopropanolamide.

Suitable amphoteric and zwitterionic surfactants may include alkyl amine oxides, alkyl betaines, alkyl amidopropyl betaines, alkyl sulphobetaines (sultaines), alkyl glycinates, alkyl carboxyglycinates, alkyl amphopropionates, alkylamphoglycinates, alkyl amidopropyl and hydroxysultaines, wherein the alkyl and acyl groups have 8 to 18 carbon atoms. Examples include lauryl amine oxide, cocodimethyl carboxyglycinate, cocoamidopropyl betaine and cocoamidopropyl hydroxy sultaine.

A particularly preferred cosmetic composition in accordance with the invention is a shampoo composition which, in addition to the mechanically conditioning oil seed, comprises in total from about 0.1 to about 50% by weight of the total composition, preferably from about 1 to about 25% by weight, more preferably from about 2 to about 20% by weight, of at least one surfactant selected from anionic, cationic, nonionic, and amphoteric and zwitterionic surfactants, and mixtures thereof, examples of which are given above.

In accordance with the invention, the cosmetic composition contains one or more deposition polymers. Suitable deposition polymers are any which enhance deposition on the hair of the conditioning agent. Preferably, the deposition polymer is a cationic deposition polymer, especially a cationic polysaccharide polymer or a synthetic cationic polymer.

Suitable cationic polysaccharides are those given in the CTFA dictionary which are cationic derivatives of cellulose, starch, guar gum, for example as JAGUAR C162, which has a degree of substitution of three cationic groups and high viscosity. Other suitable materials include JAGUAR C13, having a moderate degree of substitution and a low viscosity, JAGUAR C17 (high degree of substitution, high viscosity), JAGUAR C16 which is a hydroxypropylated cationic derivative of guar gum, a low level of substituent groups as well as cationic groups, JAGUAR 162 which is high viscosity, JAGUAR 13 which is medium viscosity and JAGUAR 14 which is low viscosity, all ex Rhodia.

Suitable cationic derivatives are quaternary ammonium derivatives of cellulose ethers, for example the Polymer JR series of materials available from Union Carbide.

The deposition polymer may be present in an amount of from about 0.01 to about 10% by weight of the total composition, preferably from about 0.01 to about 1% by weight, even more preferably from about 0.04 to about 0.6% by weight.

The cosmetic compositions of the invention are preferably aqueous based, water forming the basis of the continuous phase of the microemulsion. The compositions preferably comprise water in an amount of from about 20 to about 99% by weight of the total composition.

The compositions of the invention are preferably rinse-off compositions, i.e. suitable for applying to the hair and/or skin, left thereon for an appropriate period of time and then rinsed off with water. Thus, shampoos are a particularly preferred product form for compositions of the invention.

Preferred compositions in accordance with the present invention are optically clear or translucent. However, within the scope of the invention are those compositions as defined which are not themselves transparent or translucent, or which further comprise one or more pearlising and/or opacifying agents.

Depending upon the type of composition and/or conditioning oil employed, one or more additional ingredients conventionally incorporated into cosmetic formulations may be included in the compositions of the invention. Such additional ingredients include suspending agents, opacifiers such as polyethylene glycol distearate, ethylene glycol distearate, polymer latices, antibacterial agents, antidandruff agents, foam boosters, perfumes, colouring agents, preservatives, viscosity modifiers, proteins, polymers, buffering or pH adjusting agents, moisturising agents, herb or other plant extracts and other natural ingredients.

The invention is further illustrated by way of the following non-limitative examples.

Examples

Example 1

A hair shampoo composition (A) in accordance with the present invention, comprising microemulsified particles of silicone and a deposition polymer, was prepared as described herein. A similar hair shampoo composition (B) but in accordance with the prior art was also prepared, this composition comprising emulsified silicone of larger particle size and also a suspension system (ethylene glycol distearate). The two compositions had the following formulations:

	(%wt)	
Ingredient	A	B
SLES 2EO	16	16
Cocoamidopropyl betaine	2	2
Silicone (1) (particle size 0.036 microns)	1.0	-
Silicone (2) (particle size 0.38 microns)	-	1.0
Ethylene glycol distearate	-	1.5
Jaguar C13S	0.1	0.1
Salt	1.0	1.0
Formalin	0.1	0.1
Water	to 100	to 100

(1) 15,000 cS dimethiconol, added as microemulsion ex Dow Corning.

(2) 60,000 cS dimethicone, added as emulsion BY22-026 ex Toray Silicone.

Both compositions A and B had a viscosity of approximately 2500 cps. Composition A was transparent, while composition B had a white pearly appearance.

Both compositions were used to treat identical hair switches, which were then subjected to a paired com-

Ingredient	A	B
	(%wt)	
Glass 2SO	15	15
Cocoamidopropyl betaine	2	2
Silicone (1) (particle size 0.035 microns)	1.0	-
Silicone (2) (particle size 0.39 microns)	-	1.0
Ethylene glycol distearate	-	1.5
Jaguar C13S	0.1	0.1
Salt	1.0	1.0
Perfume	0.1	0.1
Water	to 100	to 100

(1) 15,000 cs dimethicone, added as microemulsion ex Dow Corning.

(2) 60,000 cs dimethicone, added as emulsion BY22-026 ex Toray Silicone.

Both compositions A and B had a viscosity of approximately 2500 cps. Composition A was transparent, while composition B had a milky pearly appearance.

Both compositions were used to treat identical hair swatches, which were then subjected to a panel com-

parison test by trained panellists for various conditioning attributes. The results were as follows:

	Voting split (maximum 72)	
	A	B
Shine	51	21
Ease of dry combing	67	5
Softness	68	4
Non-flyaway	56	16

All of these results are statistically significant in favour of composition A of the invention, with a confidence level of ≧99.9%.

Example 2

To test the stability of compositions in accordance with the invention, a sample of composition A from Example 1 was compared with a composition corresponding to B in Example 1 but with the ethylene glycol distearate suspending agent omitted.

The latter sample separated, i.e. clear liquid became visible at the bottom of the sample, within 24 hours at 25°C. In contrast, the sample of composition A was stable without visible change for several months both at 25°C and at 45°C.

Example 3

A series of compositions were prepared to test the level of deposition on hair of microemulsified silicone with and without a deposition polymer, i.e. to compare the level of deposition of compositions in accordance with the invention with similar compositions in accordance with the prior art represented by EP-A-268982. In the following compositions Jaguar C13S and Polymer JR400 are deposition polymers as used in preferred compositions of the invention, whereas Merquat 550 (ex Merck) is a cationic copolymer of dimethyldiaryl-ammonium halide with acrylamide, as disclosed in EP-A-268982 in combination with silicone microemulsion, which latter polymer is understood not to act as a deposition polymer with cosmetic agents.

...dimension was measured by means of a micrometer. The results were as follows:

	Young's modulus (maximum value)	
	A	B
Shrinkage	6%	2%
Ease of dry cleaning	8%	5%
Softness	6%	4
Non-slippery	6%	1%

As can be seen, these results are substantially significantly lower in the case of composition A of the invention, with a confidence level of ...95%.

Example 2

To test the stability of compositions in accordance with the invention, a sample of composition A from Example 1 was compared with a composition corresponding to B in Example 1 but with the ethylene glycol dibenzoate ester omitted.

The latter sample separated, i.e. clear liquid became visible at the bottom of the sample, within 24 hours at 35°C. In contrast, the sample of composition A was stable without visible change for several months both at 25°C and at 45°C.

Example 3

A series of compositions were prepared to test the level of deposition on hair of microemulsified silicone with and without a deposition polymer, i.e. to compare the level of deposition of composition A in accordance with the invention with similar compositions in accordance with the prior art (represented by EP-A-268982). In the following compositions, Jaguar C-13S and Polymer JR400 are deposition polymers as used in preferred compositions of the invention, whereas Viscasil 60C (ex Wacker) is a silicone oil of similar viscosity and nonionic linear ethoxylate, as disclosed in EP-A-268982 in combination with silicone microemulsion, which latter polymer is understood not to act as a deposition polymer with cosmetic efficacy.

Composition (%wt)									
Ingredient	1	2	3	4	5	6	7	8	9
Sodium lauryl sulphate	10	10	10	-	-	-	-	-	-
SLES 2EO	-	-	-	16	-	12	12	16	-
SLES 3EO	-	-	-	-	8	-	-	-	8
Cocodiethanolamide	5	5	5	-	-	-	-	-	-
Cocoamidopropyl betaine	-	-	-	2	4	2	2	2	4
Merquat 550(4)	1	6.3	-	1.3	3.8	-	1.3	-	-
Jaguar C13S(5)	-	-	0.5	-	-	0.1	-	0.1	-
Polymer JR400(6)	-	-	-	-	-	-	-	-	0.3
Silicone(3) (particle size 0.038 microns)	1	1	1	1	2	1	1	1	2
Water	to 100	to 100	to 100	to 100	to 100	to 100	to 100	to 100	to 100

(3) microemulsion as in Example 1
(4) contains 8% active
(5) contains 100% active
(6) contains 100% active

Each of the above Compositions 1 to 9 was subjected to a standard deposition test on identical hair switches and the level of silicone deposited in each case was measured using the technique of X-ray fluorescence (XRF), the principles and protocols of which are well described in the scientific literature.

It was observed that with the compositions containing Jaguar C13S and/or Polymer JR400, the level of deposition of silicone was significantly better than the level obtained with the compositions containing Merquat 550.

Claims

1. A cosmetic composition comprising:
   (a) at least one surfactant;
   (b) microemulsified particles of a conditioning oil having a particle size of ≤0.15 microns, and

Composition (%wt)	1	2	3	4	5	6	7	8	9
Ingredient									
Sodium lauryl sulphate	10	10	10	-	-	-	-	-	-
SLES 2EO	-	-	-	16	-	12	12	16	-
SLES 3EO	-	-	-	-	8	-	-	-	8
Cocodiethanolamide	5	5	5	-	-	-	-	-	-
Cocoamidopropyl betaine	-	-	-	2	4	2	2	3	4
Merquat 550(4)	1	6.3	-	1.3	3.8	-	1.3	-	-
Jaguar C135(5)	-	-	0.6	-	-	0.1	-	0.1	-
Polymer JR400(6)	-	-	-	-	-	-	-	-	0.3
Silicone(3) (particle size 0.038 microns)	1	1	1	1	2	1	1	1	2
Water	to 100	to 100	to 100	to 100	to 100	to 100	to 100	to 100	to 100

(3) microemulsion as in Example 1
(4) contains 8% active
(5) contains 100% active
(6) contains 100% active

Each of the above Compositions 1 to 9 was subjected to a standard deposition test on identical hair switches and the level of silicone deposited in each case was measured using the technique of X-ray fluorescence (XRF), the principles and protocols of which are well described in the scientific literature.

It was observed that with the compositions containing Jaguar C135 and/or Polymer JR400, the level of deposition of silicone was significantly better than the level obtained with the compositions containing Merquat 550.

Claims

1. A cosmetic composition comprising:

(a) at least one surfactant;

(b) microemulsified particles of a conditioning oil having a particle size of <0.15 microns; and

(c) a deposition polymer.

2. A composition according to claim 1, wherein the conditioning oil is selected from volatile and nonvolatile silicones, siloxane gums and resins, aminofunctional silicones, quaternary silicones, and mixtures thereof.

3. A composition according to claim 1 or claim 2, wherein the particles of conditioning oil have a particle size of ≤0.1 microns.

4. A composition according to any one of claims 1 to 3, wherein the microemulsified conditioning oil is present in the composition in an amount of from 0.01 to 50% by weight.

5. A composition according to claim 4, wherein the microemulsified conditioning oil is present in an amount of from 0.01 to 20% by weight of the composition.

6. A composition according to any preceding claim, wherein the deposition polymer is a cationic deposition polymer.

7. A composition according to claim 6, wherein the cationic deposition polymer is a cationic derivative of guar gum or a cationic cellulose ether derivative.

8. A composition according to any preceding claim which is a shampoo, wherein the at least one surfactant is present in a total amount of from 0.1 to 50% by weight of the composition.

9. A composition according to any preceding claim, wherein the at least one surfactant is selected from anionic, cationic, non-ionic, amphoteric and zwitterionic surfactants, and mixtures thereof.

10. A composition according to any one of claims 1 to 9 which is for treating hair.

11. A composition according to any one of claims 1 to 9 which is for treating skin.

12. A method of conditioning hair or skin comprising applying thereto a composition which comprises:
(a) at least one surfactant;
(b) microemulsified particles of a conditioning oil having a particle size of ≤0.15 micron s; and
(c) a deposition polymer.

13. Use as a hair and/or skin conditioning composition of a microemulsion of a conditioning oil having a particle size of ≤0.15 microns in combination with a deposition polymer.

a deposition polymer.

2. A composition according to claim 1, wherein the conditioning oil is selected from volatile and non-volatile silicones, mineral oils and vegetable oils, esters, amides and ethers.

3. A composition according to claim 1 or claim 2, wherein the particles of conditioning oil have a particle size of 0.1 microns.

4. A composition according to any one of claims 1 to 3, wherein the micronised conditioning oil is present in the composition in an amount of from 0.01 to 50% by weight.

5. A composition according to claim 4, wherein the micronised conditioning oil is present in an amount of from 0.01 to 20% by weight of the composition.

6. A composition according to any preceding claim, wherein the deposition polymer is a cationic deposition polymer.

7. A composition according to claim 6, wherein the cationic deposition polymer is a cationic derivative of guar gum or a cellulose ether derivative.

8. A composition according to any preceding claim which is a shampoo, wherein the at least one surfactant is present in a total amount of from 0.1 to 50% by weight of the composition.

9. A composition according to any preceding claim, wherein the at least one surfactant is selected from anionic, nonionic, amphoteric and zwitterionic surfactants, and mixtures thereof.

10. A composition according to any one of claims 1 to 9 which is for treating hair.

11. A composition according to any one of claims 1 to 9 which is for treating skin.

12. A method of conditioning hair or skin comprising applying thereto a composition which comprises:
(a) at least one surfactant;
(b) micronised particles of a conditioning oil having a particle size of ≤0.15 microns; and
(c) a deposition polymer.

13. Use in a hair and/or skin conditioning composition of a micronisation of a conditioning oil having a particle size of ≤0.15 microns in combination with a deposition polymer.

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SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIRECCIÓN DE NUEVAS CREACIONES

2020
Bogotá, D.C.,

Abogado
ALICIA LLOREDA RICAURTE

ASUNTO	Radicación	05044573
	Trámite	002
	Evento	001
	Actuación	430
	Oficio	
	Folios	127 167

Patente de Invención [X] Patente de Modelo de Utilidad [ ]

Vía Nacional [ ]

Vía PCT (fase nacional) [X] Cap. I [ ] Cap. II [X]

No. Sol. Internacional PCT/EP2003/012066
Fecha de Presentación Internal. 30/10/03

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

Documentos estudiados

Descripción:	Folios: 43 a 67	(como se radicó inicialmente)
Reivindicaciones:	Folios: 68 a 70	(como se radicó inicialmente)
Prioridad:	Folio 1	(12/11/02, GB 0226380.4).
		(06/10/03, GB 0323276.6).
Respuesta del solicitante	Folios: 93 a 96	

Objeto de la invención

Título de la solicitud: Composiciones para lavar y acondicionar el cabello.

El objeto de la presente solicitud de patente de invención consiste en:

Composiciones para el lavado del cabello que proporcionan limpieza con acondicionamiento y fricción reducida y facilidad de peinar para cabellos húmedo y seco.

Reivindicaciones 1- 13: Una composición para el lavado del cabello que comprende: (Ver folio 68) .

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIRECCION DE NUEVAS CREACIONES

Ref.: P.C.T.

Auxiliar:

ALEJANDRA LUQUEDA RICAURTE

ASUNTO

Radicación 65044573
Tramite 002
Evento 001
Actuacion 456
Oficio
Folios 1 0 1 6

Patente de Invención ☒ Patente de Modelo de Utilidad ☐

Vía Nacional ☐

Vía PCT (fase nacional) ☒ Cap I ☐ Cap II ☒

No. Sol. Internacional PCT/EP2003/012053
Fecha de Presentación Internal. 30/10/03

Como resultado del examen de fondo, realizado con fundamento en el artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le comunica:

Documentos solicitados

Especificación Folios 43 a 67 (como se radicó inicialmente)

Reivindicaciones Folios 68 a 76 (como se radicó inicialmente)

Fundamento Folio 1 (13/11/02, GB 0229380.4)
(06/10/03, GB 0323276.8)

Resumen Folios 93 a 96

Objeto de la invención

Título de la solicitud: Composiciones para lavar y acondicionar el cabello.

El objeto de la presente solicitud de patente de invención consiste en:

Composiciones para el lavado del cabello que proporcionan limpieza, acondicionamiento y fijación reducida y facilidad de peinar para cabello mojado y seco.

Reivindicaciones 1- 13: Una composición para el lavado del cabello que comprende:
(Ver folio 76)

Expediente PCT (Fase Nacional) - Segunda Art 45

Reivindicación 14 : Un método de lavar y acondicionar el cabello.

El problema planteado en esta solicitud es la necesidad de composiciones para el cabello con baja fricción y a la facilidad para peinar el cabello después del secado, con una reducción en la sensación de cabello pesado y grasoso que se experimenta cuando son combinados en los champús polimeros catiónicos con alta densidad de carga y de agentes acondicionadores aceitosos.

Para solucionar este problema técnico la solicitud en estudio proporciona composiciones para el lavado del cabello con una combinación específica de 2 polimeros catiónicos con las mismas unidades monoméricas y sustituyentes catiónicos.

El objeto de la invención definido anteriormente se clasificó de acuerdo con la Clasificación Internacional de Patentes (IPC) : A61K7/06.

De la solicitud de Patente

Reivindicaciones *(artículo 30 D 486)*

Para la reivindicación 1 se encuentra :

- En el numeral e) cuando se dice "..... en agua con un diámetro medio ($D_{3,2}$) de ---? Micrómetros o menos. No se establece los micrómetros del aceite. Según la publicación internacional corresponde a 4 .

Determinación del Estado de la Técnica

Considerando que la fecha de presentación de la primera solicitud de patente de la cual se reivindica prioridad es 12-11- 2002, se consultaron las bases de datos y los archivos con que cuenta la entidad con fecha de publicación anterior y se encontraron los siguientes documentos que anticipan el objeto de esta solicitud :

N°	Documento	Título	Fecha de Publicación
D1	EP0529883	Microemulsion.	03-03-1993.
D3	EP0975311	Styling Shampoo compositions containing cationic styling polymers.	02-02-2000

Análisis de patentabilidad (artículo 14 D486)

Nivel inventivo *(artículo18 D486)*

La reivindicación 1 dice : Una composición para el lavado del cabello que comprende:

a) de 1 a 50% por peso de un surfactante limpiador.
b) De 0.01 a 0.5% por peso de un primer polímero catiónico teniendo una densidad de carga media a pH 7 de 0.2 a 1.0 meq por gramo.
c) De 0.01 a 0.4% por peso de un segundo polímero catiónico teniendo una densidad de carga media a pH de 1.3 a 3.0 meq por gramo
d) Más de 40% por peso de agua.

Reivindicación 14.- Un método de lavado y acondicionamiento del cabello.

El problema planteado en esta solicitud es la necesidad de composiciones para el cuidado del cabello que brinden fricción y a la facilidad para peinar el cabello después del secado, con una reducción en la aparición de cabello pesado y grasoso que se evita mediante cuando son combinados en los champús poliméricos catiónicos con alta densidad de carga y de agentes acondicionadores adicionales.

Para solucionar este problema técnico la solicitud en estudio propone una composición para el lavado del cabello con una combinación específica de 2 polímeros catiónicos con las mismas unidades monoméricas y sustituyentes cationicos.

El objeto de la invención definido anteriormente se clasifica de acuerdo con la Clasificación Internacional de Patentes (IPC): A61K/08.

De la solicitud de Patente

Reivindicaciones (artículo 30 D 486)

Para la reivindicación 1 se encuentra

- En el numeral a) cuando se dice "... en agua con un diámetro medio ($D_{3,2}$) de ~ micrometros o menos. No se establece los micrometros del aceite. Según la publicación internacional corresponde a 4

Determinación del estado de la Técnica

Considerando que la fecha de presentación de la primera solicitud de patente de la cual se reivindica prioridad es 12-11-2002 se consultaron las bases de datos y los alcances con que cuenta la emitida con fecha de publicación anterior y se encontraron los siguientes documentos que anticipan el objeto de esta solicitud:

N°	Documento	Título	Fecha de Publicación
D1	EP0529843	Microemulsion	03-03-1993
D3	EP0275311	Styling Shampoo composition containing cationic styling polymers.	02-02-2000

Ausencia de patentabilidad (artículo 14 D486)

Para reivindicación 1 dice : Una composición para el lavado del cabello que comprende

a) de 1 a 50% por peso de un surfactante limpiador
b) De 0.01 a 0.5% por peso de un primer polímero catiónico teniendo una densidad de carga media a pH 7 de 0.2 a 1.0 meq por gramo.
c) De 0.01 a 0.4% por peso de un segundo polímero catiónico teniendo una densidad de carga media a un de 1.3 a 3.0 meq por gramo
d) Más de 40% por peso de agua

e) De 0.1 a 10% por peso de gotas moderadas , dispersas de un aceite acondicionador insoluble en agua con un diámetro medio de 4 micrómetros o menos.

Caracterizado en que ambos : el primer polímero catiónico y el segundo polímero catiónico consisten esencialmente de las mismas unidades monoméricas y sustituyentes catiónicos.

D3 (folios 104 a 117) divulga una composición para el cabello la cual posee buenas propiedades de acondicionamiento sin dejar una sensación grasosa en el cabello, que comprende:

a) de 5 a 50% por peso de un surfactante limpiador.
b) De 0.025 a 3 % , más preferiblemente de 0.05 % a 2% y más preferiblemente de 0.1 a 1% de un polímero de deposición catiónico que tiene una densidad de carga de 0.2 meq/gramo hasta 2meq/gramo, el cual es seleccionado de de un grupo consistente de polímeros de celulosa catiónicos, derivados de goma guar catiónicos y mezcla de los mismos (jaguar C-17)
c) De 2% al 10% por peso de un polímero catiónico orgánico que tiene una densidad de carga de 2 meq/gramo hasta 4.75 meq/gramo, más preferiblemente menor de 3 meq/gramo.(Poliquaternium-16).
d) Del 27 al 94.5% de agua , más preferiblemente de 35 al 85% y más preferiblemente de 60 al 75%
e) De 0.01 a 10%, 0.1% a 5% , y más preferiblemente de 0.15 a 3% por peso de gotas moderadas , dispersas de un aceite acondicionador insoluble en agua .

La solicitud se diferencia de D3 en que la composición, no contiene simultáneamente dos polímeros catiónicos con las mismas unidades monoméricas, en la proporción del segundo polímero y en que no se especifica el diámetro medio del aceite acondicionador insoluble en agua.

El Efecto Técnico que logra la diferencia es proporcionar una composición para lavar y acondicionar el cabello con baja fricción y reducción en la sensación de cabello pesado y grasoso.

El Problema Técnico Objetivo de esta solicitud es como obtener una composición proporcionar una composición para lavar y acondicionar el cabello con baja fricción y reducción en la sensación de cabello pesado y grasoso alternativa.

D1 (folios118 a 124) divulga composiciones que presentan una excelente capacidad de acondicionamiento para el cabello mediante la utilización de un aceite acondicionador microemulsionado junto con un adyuvante de deposición , en donde se sugiere que la composición de champú contiene uno o más polímeros de deposición dentro de los cuales se encuentran derivados de goma guar catiónicos como Jaguar C13S y Jaguar C-17(Ver folio 120, líneas 50 a 56 y Folio 121 líneas 1-3) , los cuales se encuentran en una proporción de 0.01 a 10% en peso, más preferiblemente de 0.01 a 1% en peso y más preferiblemente de 0.04 a 0.5 % en peso y el diámetro del aceite acondicionador insoluble en agua es ≤ 0.15 micrómetros (ver Folio 119, líneas 57-58 y folio 120, líneas 7-10) .

El Experto en la Materia, enfrentado al Problema Técnico Objetivo y conociendo el Estado de la Técnica (D3 y D1) hubiera sugerido sin mucho esfuerzo utilizar simultáneamente los polímeros catiónicos con las mismas unidades monoméricas (Jaguar C17 y Jaguar C13S) y sus proporciones (0.04% a 5%) junto con el diámetro del aceite acondicionador insoluble en agua (≤ 0.15), según lo divulgado en D1

dentro de la composición divulgada en D3 y así obtener la composición para lavar y acondicionar el cabello reclamada.

De manera que la solución propuesta al problema técnico planteado en esta solicitud en la reivindicación 1 y sus dependientes 2-13, es obvia y no tiene Nivel Inventivo.

Respuesta a los argumentos del solicitante:

3. EVALUACION DEL NIVEL INVENTIVO

- *"El señor Examinador afirma en su concepto técnico que el capítulo reivindicatorio de la presente solicitud carece de nivel inventivo frente a las enseñanza de los siguientes documentos"*

D1 EP0529883
D2 WO0066081

En este sentido el señor Examinador argumenta básicamente que la única diferencia con D1 es que en la solicitud de patente en cuestión se mencionan polímeros catiónicos dentro de la formulación ....., a continuación me permito realizar un análisis comparativo detallado entre la materia técnica revelada en la presente solicitud y las enseñanzas de cada una de las anterioridades señaladas por el señor Examinador en su concepto técnico. (Ver folios 93 y 93A).

3.1 Consideraciones con respecto al documento EP0529883.(D1).

En términos generales el documento D1 enseña composiciones cosméticas conformadas por.: (Ver folio 93 A).

Así mismo de la lectura del documento D1 es claro que el objetivo técnico de dicha anterioridad es obtener un champú con altos niveles de transparencia óptica y estabilidad mecánica (página 2, líneas 28 a 30 de D1), así como mejorar el beneficio acondicionador de éste hecho que se asocia con la capacidad de deposición del aceite acondicionador sobre el cabello. (página 2, líneas 25 a 27).

Ahora de manera completamente contraria a lo anterior, en la presente solicitud se revelan composiciones para el lavado del cabello que comprenden: (Ver folios 93 Ay 94).

De lo anterior es indiscutible que el documento D1 no proporciona a la persona medianamente versada en la materia ninguna enseñanza en términos cualitativos o cuantitativos ....., así como tampoco encuentra alguna indicación que le sugiera que dichas composiciones permiten disminuir la fricción y facilitar el peinado sin aumentar la sensación de cabello pesado y grasoso (Ver folios 94 y 94 A.)

Se le aclara al señor solicitante que el documento D1 a pesar de que en sus ejemplos no enseña la combinación de dos polímeros catiónicos, en su descripción (Ver folio 120, página 3,líneas 46 a 56) si sugiere que dentro de la composición allí divulgada puede contener uno o más polímeros de deposición de tipo catiónico como derivados de la goma guar, dentro de los cuales se nombran de manera específica los derivados de JAGUAR C13S y JAGUAR C17 en una proporción preferida de 0.04 a 0.5 % en peso (Ver folio 121, página 4, líneas 1-3) , los cuales son utilizados como ejemplo en la presente solicitud de invención. Por lo tanto D1 si da enseñanza en

...de la composición dividiendo en [illegible] y así obtener la composición para llevar y ...cionar el cabello recientemente.

De manera que la solución propuesta al problema técnico planteado en esta solicitud ...ación 1 y sus dependientes 2-13, es obvia y no tiene Nivel Inventivo.

Se pasa a los argumentos del solicitante:

3. EVALUACION DEL NIVEL INVENTIVO

- El señor Examinador afirma en su concepto técnico que el capítulo reivindicatorio de la presente solicitud carece de nivel inventivo frente a las enseñanza de los siguientes documentos:

D1: EP0529583
D2: WO0066021

En este sentido el señor Examinador argumenta básicamente que la única diferencia con D1 es que en la solicitud de patente en cuestión se mencionan polímeros catiónicos dentro de la formulación ....., a continuación me permito realizar un análisis comparativo delineando entre la mejora técnica revelada en la presente solicitud y las enseñanzas de cada una de las anteriormente señaladas por el señor Examinador en su concepto técnico. (Ver folios 93 y 93A).

3.1 Consideraciones con respecto al documento EP0529583 (D1).

En términos generales el documento D1 enseña composiciones cosméticas conformadas por.. (Ver folio 83 A)

Así mismo de la lectura del documento D1 es claro que el objetivo técnico de dicha anterioridad es obtener un champú con altos niveles de transparencia óptica y estabilidad mecánica (página 2, líneas 28 a 30 de D1), así como mejorar el depósito acondicionador de este hecho que se asocia con la capacidad de deposición del aceite acondicionador sobre el cabello. (página 2, líneas 25 a 27).

Ahora de manera completamente contraria a lo anterior, en la presente solicitud se revelan composiciones para el lavado del cabello que comprenden (Ver folios 89 Av 94)

De lo anterior es indiscutible que el documento D1 no proporciona a la persona medianamente versada en la materia ninguna enseñanza en términos sustitutivos o cuantitativos ....., así como tampoco sugiere alguna indicación que la anteriores composiciones permiten eliminar la irritación y resultar el cabello sin aumentar la sensación de cabello pesado y grasoso (Ver folios 94 y 95 A)

Se le aclara al señor solicitante que el documento D1 a pesar de que en sus ejemplos no enseña la combinación de dos polímeros catiónicos, en su descripción (Ver folio 120, página 3 líneas 46 a 56) si sugiere que dentro de la composición allí divulgada puede contener uno o más polímeros de deposición de tipo catiónico como derivados de la goma guar, dentro de los cuales se nombran de manera específica los derivados de JAGUAR C135 y JAGUAR C17 en una proporción preferida de 0.04 a 0.3% en peso (Ver folio 121, página 4, líneas 1-3), los cuales son utilizados como ejemplo en la presente solicitud de invención. Por lo tanto D1 si da enseñanza en

términos cualitativos y cuantitativos de la posible mezcla de polímeros catiónicos objeto de la invención y también que esta composición posee buenas propiedades de acondicionamiento sin dejar una sensación grasosa en el cabello (Ver folio 119, página 2, líneas 3-4 y Folio 122, página 5, en el ejemplo donde se observa que el cabello, presenta buen brillo, facilidad de peinado, suavidad y cuerpo), el cual es el objeto de la presente solicitud.

Adicionalmente teniendo en cuenta los datos reportados en el cuadro 2, folio 65 de la descripción encontramos que si comparamos el ejemplo B donde solo se utiliza JAGUAR C17 versus las composiciones de los ejemplos 1-4 no se observa un efecto técnico inesperado ya que como se puede ver el ejemplo B presenta una mayor deposición de la silicona y una menor fricción con respecto a los ejemplos 1-4 que corresponden a las modalidades preferidas de la invención .

En cuanto a la comparación del ejemplo B con el ejemplo 3, en donde se concluye que el ejemplo 3 fue preferido sobre la B con referencia a la sensación de cabellera grasosa, no se considera para el experto en la materia sorprendente ya que esta sensación grasa de la composición B se debe principalmente al tener una mayor deposición de la silicona sobre el cabello.

Ahora teniendo en cuenta que el nuevo documento D3 (EP0975311) corresponde al estado de la técnica más cercano el cual revela la combinación de dos polímeros catiónicos (JAGUAR C17 y POLIQUATERNIUM 16), aunque no con las mismas unidades monoméricas y el segundo polímero catiónico se encuentra en una proporción más alta dentro de la composición con respecto a la reclamada en la actual solicitud, el experto en la materia esperaría con gran expectativa de éxito cambiar el segundo polímero divulgado en D3, por un polímero como el divulgado en D1 (entre ellos el JAGUAR C13S) en las proporciones allí establecidas (de 0.04 a 0.5 % en peso), con el fin de obtener una composición para lavar y acondicionar el cabello sin que deje sensación grasosa.

Por lo tanto el objeto de la presente solicitud de invención no cumple los requisitos de patentabilidad en cuanto a su nivel inventivo.

3.2 Consideraciones con respecto al documento WO0066081(D2)

"Por su parte el documento D2 enseña básicamente una composición anticaspa acondicionadora del cabello que contiene (Ver folio 94 A).
Con respecto al polímero catiónico, el documento D2 enseña composiciones que comprenden un solo polímero , tal como goma guar con densidad de carga...y que adicionalmente lo conduzca a predecir que dichas novedosas formulaciones permiten disminuir la fricción del cabello, facilitar su peinado y evitar la sensación de cabello pesado y grasoso (Ver folios 94A-95).

Se le aclara al solicitante que el documento D2, ya no es tenido en cuenta del presente análisis de patentabilidad.

Finalmente , con base en lo planteado hasta el momento me permito manifestar que la materia técnica revelada en la solicitud de patente en cuestión presentan un inequívoco carácter inventivo con respecto a las enseñanzas de D1 y D2 cumpliendo por lo tanto a cabalidad con las disposiciones de patentabilidad establecidas en el artículo 18 de la Decisión 486 de 2000.

Se le aclara al solicitante que de acuerdo al nuevo análisis de patentabilidad los documentos D1 y D3 combinados permiten llegar al objeto de la presente solicitud .

4 REPORTE DE EXAMEN PRELIMINAR INTERNACIONAL (Ver folio95)
5. CONCESIÓN DE PATENTE EUROPEA (Ver folio 95 A).

En cuanto a estos dos puntos, se le recuerda al solicitante que el análisis de patentabilidad de una invención se debe realizar para cada caso en concreto, en consideración a sus antecedentes y a la legislación vigente en el momento y lugar en el que se efectúe, por lo que a pesar de que este sirva como una guía , no determina que se deba asumir como propio en otros países , más aún atendiendo al principio de territorialidad mediante el cual los derechos de propiedad industrial se circunscriben al país en el que se evalúa , siendo autónomo cada país a efectos del examen de patentabilidad de una invención que se someta a su jurisdicción.

6. CONCLUSION.

"Teniendo en cuenta los argumentos técnicos presentados en el presente escrito..... se han superado satisfactoriamente todas las objeciones expuestas por el señor Examinador frente a la solicitud de patente de invención.

Se le aclara al solicitante que con base a los argumentos expuestos no se puede reconocer el nivel inventivo de la solicitud frente a D1 y D3, ya que la persona medianamente versada en la materia estaría motivada a lograr las composiciones de la actual solicitud por la obvia combinación de estos dos documentos.

Conclusión:

Los requisitos de patentabilidad de la presente solicitud se encuentran afectados así:

N°	Documento N°	Reivindicaciones afectadas	Requisito que afecta
D1	EP0529883	1-13	Nivel inventivo
D3	EP0975311	1-13	Nivel inventivo

En cumplimiento del artículo 45 de la Decisión 486 de la Comisión de la Comunidad Andina, se le indica que debe dar respuesta dentro del término de sesenta días contados a partir de la fecha de notificación de la presente comunicación. En caso de no dar respuesta al presente requerimiento, o si a pesar de la respuesta subsistieran los impedimentos para la concesión, se denegará la patente.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única N° 10 de 2001.

ALIX CARMENZA CÉSPEDES DE VERGEL
Directora de Nuevas Creaciones (C).

El anterior requerimiento fue notificado por fijación en lista, de fecha 10 SET. 2010

CONCEPTO TÉCNICO No. 2723	EXAMINADOR TÉCNICO Código No. 202075