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Liquid detergent compositions containing organo-functional polysiloxanes.

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EP 0 150 872 B1

Description

This invention relates to liquid detergent compositions containing low levels of selected organo-functional polydi-alkylsiloxanes. In more detail, the compositions herein comprise conventional ingredients inclusive of surface-active agents, liquid carrier and optional ingredients such as detergent builders, enzymes and side regulants and low levels of organo-functional polydi-short alkylsiloxanes. The latter ingredient unexpectedly provides desirable through-the-wash textile benefits inclusive of softness. The preferred siloxanes embrace amino derivatives. The essential siloxanes are further characterized by a degree of substitution in the range from 0.01—0.7.

The through-the-wash benefits conferred by the inventive compositions, in addition to softening, are frequently perceived in terms of anti-static, ease-of-ironing and anti-wrinkling benefits. On a conservative basis, it was established that, at least, and contrary to standing prejudice, the essential siloxane components do not, adversely affect the general textile cleaning suitability of the compositions herein.

The liquid compositions herein can be divided arbitrarily in (mostly P—)-built compositions and in substantially unbuilt compositions. Both kinds of compositions will procure textile handling benefits. Selective preference can originate from the combined use of anionic surface-active agents in combination with the subject siloxanes.

The prior art relative to the textile-treatment utilization broadly of silicones/polydialkylsiloxanes is crowded and diverse. The like siloxanes have, for example, found widespread commercial application in a detergent suds regulant functionality. Silicone polymers have also found widespread application in the textile industry to provide fiber properties inclusive of softness, water proofing and easy ironing. To that effect the silicone polymers are applied (in the textile industry) to the fabrics during manufacture or during make-up of clothing, in the form of relatively concentrated dispersions or solutions either by padding or spray-on. Often, especially for long lasting softness, water proofing treatment or other benefits, mixtures or organofunctional polydialkylsiloxanes are used. The fabrics are subsequently treated with catalysts or heated to cause crosslinking of setting of the silicone polymers.

German Patent 27 54 704 discloses a treating agent consisting of a polydimethylsiloxane containing diaminoalkyl groups for providing softness to natural and synthetic fabrics.

Japanese Patent 79,131,096 pertains to a treating agent consisting of a mixture of polydimethylsiloxane with NHR-groups and a polydimethylsiloxane with hydroxy groups, for providing softness to acrylics. The fabrics are spray coated and then heated for curing.

German Patent 20 16 095 uses polydimethylsiloxane containing pendant epoxy groups for providing softness and smoothness to synthetic organic fabrics.

US Patent 4,247,592 discloses a treating agent consisting of a polydimethylsiloxane containing diaminoalkyl groups in providing softness to fire retardant synthetic textile. The treating agent is applied by brushing, rinsing, padding, dipping and spraying, and is then durably affixed to the textile by heating.

European Patent 058 493 relates to a treating agent mixture of an organo polysiloxane containing diaminoalkyl and polyoxyalkylene groups, with an organopolysiloxane containing carboxylic acid ester groups or with an organopolysiloxane containing epoxy and polyalkylene groups. The mixture is added by spray-on and treated for curing. It is said to provide softness, anti-wrinkling and long lasting electrostatic prevention benefits.

German Patent application DOS. 26.31.419 relates to fabric rinse softening compositions containing a fabric-substantive cationic component and a polydimethylsiloxane possibly amino substituted. The mixture is applied as an aqueous dispersion.

The suds regulant utilization of polydimethylsiloxanes in liquid detergent is known from European Patent application 0.028.865. U.S. Patent 4.075.118 discloses the utilization of emulsified polydimethylsilicones for suds regulant purposes.

The feasibility for using polydimethylsilicones in granular detergents for foam control is known from DOS 23.38.468.

It is also known that the detergent incorporation of polydimethylsiloxane suds regulants can adversely affect textile cleaning benefits.

It has now been found that specific organo-functional polydialkylsiloxanes, preferably aminosubstituted species, can advantageously be incorporated in liquid detergents generally to provide remarkable benefits inclusive of through-the-wash softening and further textile handling improvements. The essential means needed to achieve these unexpected properties are explained in more detail hereafter.

SUMMARY OF THE INVENTION

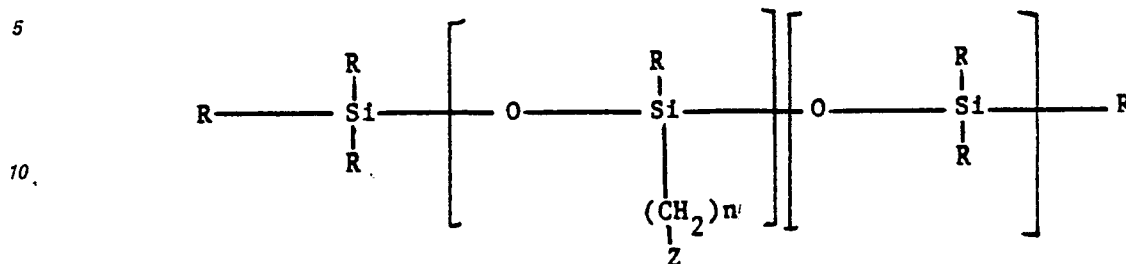
This invention is based on the discovery that liquid detergent compositions capable of simultaneously providing fibre-cleaning and textile handling benefits, inclusive of softness, can now be formulated containing a binary component systems and an organo-functional siloxane.

In particular, the compositions herein comprise:

- (a) from 5% to 70% by weight of a surface-active agent selected from the group of anionic, nonionic, ampholytic and zwitterionic surface-active agents and mixtures thereof;
- (b) a liquid carrier; and
- (c) if desired, conventional detergent additives inclusive of detergent builders, enzymes and suds

regulants, characterized in, that it contains:

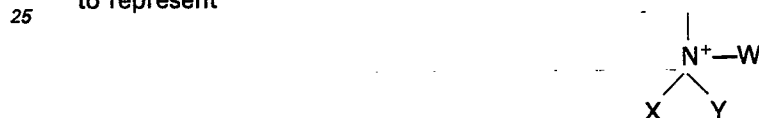
(d) from 0.05% to 5% by weight of an organo-functional poly-di-C₁₋₄-alkyl siloxane textile treatment agent having the general formula:



15 wherein R = C₁₋₄-alkyl; n is an integer from 1 to 6; Z is



20 whereby X and Y are selected independently, —H; —C₁₋₃₀-alkyl; —C₆-aryl; —C₅₋₆-cycloalkyl; —C₁₋₆-alkylene —NH; —CO—R; or Z is such that the siloxane textile treatment agent is a (4-carboxy-5-(N-tallowamide)pentyl-1) polydimethylsiloxane with the proviso that the nitrogen can be quaternized such as to represent



30 whereby W can be selected from X or Y or Z is



35 whereby P and M are —COOH; —CO—NR₂; or —CO—OR' and wherein R' is hydrogen or C₁₋₂-alkyl with the further proviso that the degree of substitution, i.e., the molar proportion of silicones carrying a substituent other than a C₁₋₁₄ alkyl group to total silicones is in the range from 0.01 to 0.7, said siloxanes having a viscosity (25°C) of from 250—100,000 mm²/s. Especially preferred are aminosubstituted siloxanes having a degree of substitution in the range of from 0.05 to 0.5.

40 In one preferred execution herein the substituted siloxanes are incorporated in liquid detergent compositions containing inorganic builder salts such as (poly)-phosphates.

In another preferred composition aspect of the invention, the siloxanes are incorporated in concentrated liquid compositions which are substantially free of builders.

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DETAILED DESCRIPTION OF THE INVENTION

The invention herein broadly relates to liquid detergent compositions comprising a surface-active agent, a liquid carrier, an organo-functional polydi-alkylsiloxane textile treatment agent, and, if desirable, conventional detergent additives. These variables and other aspects of the invention are explained in more detail hereinafter.

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Unless indicated to the contrary, the "percent" indications stand for "percent by weight".

THE SURFACE-ACTIVE AGENT

55 A first essential component for use in the compositions of this invention is represented by a surface-active agent selected from the group of anionic, nonionic, amphoteric (ampholytic) and zwitterionic surface-active agents and mixtures thereof. In the context of this invention, the term nonionic surface-active agent is meant to include semi-polar nonionic surfactants.

Examples of suitable non-ionic surfactants are disclosed in E.P.A. 0.028.865 page 4, line 23 to page 5, line 10 and page 8 line 14 to page 9, line 4.

60 A disclosure of zwitterionic and ampholytic surfactants for use herein can also be found in E.P.A. 0.028.865 page 7, line 21 to page 8, line 13.

The anionic surfactants for use herein can be represented by known synthetic and natural anionic surface-active agent which are known to be suitable for use in detergents and frequently have found commercial application. Suitable synthetic anionic surfactants are described in E.P.A. 0.028.865 page 5, line 12 to line 31. Examples of natural anionic surface-active agents for use in this invention can be represented

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by saturated and unsaturated fatty acids having from 10 to 20 carbon atoms in the alkyl chain or the alkali-metal, earth-alkali-metal and amine or alkanolamine soaps thereof. Preferred fatty acids/soaps have from 12 to 18 carbon atoms in the alkyl chain. Well-known examples of fatty acids/soaps suitable for use herein are natural coconut fatty acid containing a majority of C₁₂ and C₁₄ acids and tallow fatty acids containing a mixture of saturated and unsaturated C₁₆ and C₁₈-fatty acids/soaps.

The surface-active agent is used generally at levels from 5% to 70%. While the surface-active agent may be varied over the broad range depending upon the intended utility of the composition and the quantitative and qualitative definition of the additional ingredients and possibly optional components, two preferred executions can be formulated depending upon the presence of (poly)-phosphate builders.

In a first preferred execution of the invention liquid compositions are envisaged which are substantially unbuild. In this embodiment, the surface active agents are frequently used in an amount from 25% to 55% and are represented by a mixture of anionic and nonionic surface-active agents, more preferably in a weight ratio of anionic to nonionic in the range from 4:1 to 1:4.

In a second preferred embodiment, liquid built detergent compositions are contemplated containing from 5% to 25%, preferably from 5% to 15% surface-active agent. The latter ingredient can preferably be represented by a mixture of anionic and nonionic surface-active agents whereby the anionic species represents at least 20% of the sum of anionic and nonionic surface-active agents, an at least 3%, calculated on the detergent composition.

The like detergent compositions frequently comprise from 5% to 30%, preferably from 12% to 25% of a detergent builder which can be represented by conventional detergent builders many of which have already found commercial application. Well-known examples of suitable builders include the alkali, often sodium, metal salts of (poly)phosphates, e.g. tripolyphosphoric acid, nitrilotriacetic acid (NTA), citric acid and crystalline, completely hydrated, synthetically prepared zeolite builders having a particle diameter in the range from 0.1 to 10, preferably from 0.1 to 4 micrometers. Suitable zeolite builders are ZEOLITE A, X and P (registered trade marks). Mixtures of detergent builders can also be used.

The compositions herein can additionally contain, as an optional ingredient, a cationic surfactant. Suitable cationic surfactant species for use herein are described in European Patent application 0.028.865, page 5, line 32 to page 7 line 21, this passage being incorporated herein by reference. The cationic surfactants can provide and/or enhance a broad range of textile treatment benefits inclusive of cleaning, feel, and bactericidal advantages. These optional cationic surface-active agents are used in additive levels, such as in levels not exceeding 10% of the cumulative amount of anionic and nonionic surfactants defined hereinbefore, and more preferred in a range from 1% to 5% of the detergent composition.

THE LIQUID CARRIER

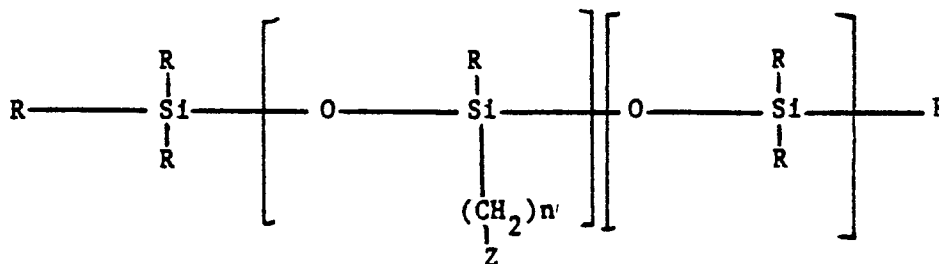
The compositions herein contain as a further essential component a liquid carrier, possibly a mixture of liquid carriers. The liquid carrier component can be represented by water and conventional liquid organic carriers. Non-limiting examples of the like organic carriers include lower aliphatic alcohol having from 2 to about 6 carbon atoms and 1 to 3 hydroxyl groups; ethers of diethylene glycol and lower aliphatic mono-alcohols having from 1 to 4 carbon atoms and mixtures thereof.

Specific examples of liquid carriers are: ethanol; n-propanol; isopropanol; butanol; 1,2-propanediol; 1,3-propanediol; n-hexanol; monomethyl-, -ethyl-, -propyl, and mono-butyl ethers and di-ethylene glycol. Other organic solvents having a relatively high boiling point and low vapor pressure can also be used, provided they do not react with any of the other ingredients present. The relative quantities of liquid carriers needed to insure the liquid state of the composition can vary depending upon the qualitative and quantitative ingredient parameters in a given composition. However, the adequate choice of the carrier is based on routine determinations well-known in the art.

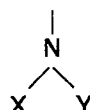
THE ORGANO-FUNCTIONAL SILOXANE

The essential organo-functional siloxane for use herein can be present in levels from 0.05% to 5%, preferably from 0.1%—3%, and most preferably from 0.15%—1%. Using levels below 0.05% will not anymore produce, to any noticeable extent, the claimed benefits whereas the incorporation of levels exceeding 5% will not produce additional benefits commensurate with (proportional to) the level increase.

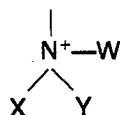
The organo-functional-polydi-C₁₋₄-alkyl siloxane component can stoichiometrically be defined with the aid of the following formula:



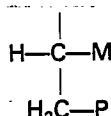
wherein R = C₁₋₄-alkyl; n is an integer from 1 to 6; Z is



whereby X and Y are selected independently, —H; —C₁₋₃-alkyl; —C₆-aryl; —C₅₋₆-cycloalkyl; —C₁₋₆-alkylene —NH₂; —CO—R; or Z is such that the siloxane textile treatment agent is a (4-carboxy-5-(N-tallowamide)pentyl-1) polydimethylsiloxane with the proviso that the nitrogen can be quaternized such as to represent



whereby W can be selected from X or Y or Z is



whereby P and M are —COOH; —CO—NR'₂; or —CO—OR' and wherein R' is hydrogen or C₁₋₂-alkyl; with the proviso that the degree of substitution, i.e., the molar proportion of silicones carrying a substituent other than a C₁₋₄alkyl group to total silicones is in the range from 0.01 to 0.7, preferably from 0.02—0.3.

The siloxane component is preferably represented by amino-functional polydialkylsiloxanes which are frequently used in levels from 0.1% to 3%, more preferably from 0.15—1.0%.

The degree of substitution of preferred siloxanes, such as the aminosiloxanes, can be expressed as the molar (moiety) proportion of non-terminal silicones carrying a substituent other than a C₁₋₄ alkyl group to total non-terminal silicones. The numerical value or the degree of substitution of preferred siloxanes lies in the range from 0.01 to 0.7; preferably from 0.02 to 0.3. While non-terminal substitution is preferred for enhanced through-the-wash fiber substantivity, it is understood that siloxanes with substituted terminal silicone atoms can also be used.

In the preferred siloxane component herein, n is 3 or 4, X and Y are, selected independently, hydrogen, —C₁₋₄-alkyl; —C₅₋₆-cycloalkyl and —C₂₋₄—NH₂.

Preferred organofunctional polydimethyl siloxanes include aminofunctional siloxanes such as:

(N-cyclohexylamino-4-amino-butyl)polydimethylsiloxane	Abbreviated Sil—I
[N-(2-amino-ethylene)-4-amino-butyl-1]polydimethylsiloxane	Sil—II
(N-dodecyl-4-amino-butyl-1)polydimethylsiloxane	Sil—III
(4-(N,N-dimethyl ammonium)-butyl-1)polydimethylsiloxane	Sil—IV
(5(tallow amide)-4-carboxy-pentyl-1)polydimethylsiloxane	Sil—V

The organofunctional siloxanes have a viscosity in the range from 250 mm²/s to 100.000 mm²/s, preferably from 250 mm²/s to 2000 mm²/s. The viscosity of the siloxane is measured on the pure raw material at 25°C with the aid of a BROOKFIELD® viscometer (LV Digital).

The organofunctional polydimethyl siloxanes, in addition to the essential substituents defined hereinbefore, can contain polyalkylene oxide chains attached to unsubstituted silicone atoms (in the meaning of this invention). The polyalkylene, such as propylene or ethylene, oxide chains are attached to the silicone atoms instead of a C₁₋₄ alkyl group. The alkoxylation enhances the hydrophilic and antistatic (charge-reducing) properties of the component in relation to the textiles.

OPTIONAL INGREDIENTS

In addition to the essential components, the compositions herein can contain a series of optional detergent ingredients with a view to improve the composition taking into consideration the specific utilization. These optional components can be presented by virtually all substances, which are known to suitable for use in the like composition, for their known functionality in the art established levels.

The non-built or built compositions of the invention can contain, in addition to the detergent builder, other types of sequestrants, having precipitation inhibitor or anti-incrustation properties, in varying levels e.g. in an amount from 0.2% to 5%. Such further sequestrants can be water-soluble copolymeric

EP 0 150 872 B1

ingredients e.g.: polyacrylates, polymaleates and copolymeric carboxylates including those obtained from the copolymerization of unsaturated polyacids such as maleic or citraconic acid with suitable polymerizable reaction partners such as methacrylic acid, acrylic acid, mesaconic acid and methyl-vinyl-ether. Mixture of the like watersoluble detergent sequestrant can also be used.

Examples of other optional components are detergent enzymes such as proteases, amylases, lipases and mixtures thereof, and stabilizing agents for the like enzymes, soil suspending agents such as sodium carboxymethylcellulose and polyvinylpyrrolidone, suds regulants, such as C_{16-22} fatty acids and methylated polysiloxanes, especially dimethylpolysiloxane, said silicone being used preferably at levels from 0.01% to 0.4%. Hydrotropes can also be used and are frequently desirable in built compositions. Examples of suitable hydrotropes include the water-soluble alkylaryl sulfonates having up to 3 carbon atoms in an alkyl group such as sodium, potassium, ammonium, and ethanol amine salts of xylene-, toluene-, ethylbenzene- and isopropyl benzene sulfonic acids. The subject compositions further can comprise brighteners, perfumes, dyes, bactericidal agents, antioxidants, opacifiers, photoactivators, fillers and the like.

Examples

The following examples illustrate preferred executions of this invention, and facilitate its understanding. The abbreviations for the individual ingredients of the examples have the following meaning:

LAS	:	Sodium salt of linear dodecyl benzene sulfonate.
HLAS	:	Linear dodecylbenzene sulfonic acid.
TEACnAS	:	Triethanolamine coconut (C_{12-14}) alcohol sulfate.
$C_{x-y}EO_n$	:	C_{x-y} alcohol ethoxylated with n moles of ethylene oxide.
DTPA	:	Sodium salt of diethylene triamine penta acetic acid.
DETPMP	:	Diethylene triamine pentamethyl phosphonic acid.
C_{12} TMAC	:	Dodecyl trimethyl ammonium chloride.
$C_{x-y}(EO)_nS$	:	Sodium salt of C_{x-y} alcohol ethoxylated with n moles of ethylene oxide and sulfated.
DTAC	:	Ditallow dimethyl ammonium chloride.
TEPA—EO	:	Tetraethylene pentamine ethoxylated with about 100 moles of ethylene oxide.
KTS	:	Potassium salt of toluene sulfonate.
STPP	:	Sodium tripolyphosphate.
NTA	:	Sodium salt of nitrilo-triacetic acid.
CdDEA	:	Coconut diethanol amide.

The following liquid detergent compositions were prepared by mixing, in a conventional manner, the following ingredients in the stated proportions; the aminofunctional polysiloxane was admixed directly in liquid composition under agitation.

EP 0 150 872 B1

COMPOSITIONS (% BY WEIGHT)

		<u>Comp. A</u>	<u>Ex I</u>	<u>Comp. B</u>	<u>Ex II</u>
5	LAS	11.3	11.3	6.3	6.3
	TEACnAS	4.0	4.0	-	-
10	C ₁₃₋₁₅ E07	12.0	12.0	3.7	3.7
	C ₁₂₋₁₄ Fatty Acid	10.0	10.0	-	-
	Oleic Acid	5.0	5.0	-	-
15	C ₁₆₋₂₀ Fatty Acid	-	-	1.1	1.1
	STPP	-	-	23.0	23.0
	DETPMP	0.6	0.6	-	-
20	Ethanol	8.6	8.6	-	-
	Propanediol	3.0	3.0	-	-
	Glycerol	-	-	4.8	4.8
25	Sodium borate	-	-	2	2
	Sil-I (1)	-	2.0	-	2.0
	Sodium hydroxyde to adjust				
30	pH (2) to	7.7	7.7	7.3	7.3
	Miscellaneous (brighteners, dyes, enzymes, perfumes, water)... ----- balance to 100 -----				
35	(1) Degree of substitution of 0.15; viscosity 300 mm ² /s.				
	(2) pH in composition.				

40 The compositions of examples I and II were compared for through-the-wash softness versus identical compositions A and B which did not contain the aminofunctional polydimethylsiloxane.

The testing conditions were as follows:

- automatic drum washing machine MIELE 423.
- one wash cycle, heating up to 60°C, mainwash only.
- 45 • 3 kg clean cotton load + test terry swatches.
- 1% product concentration in wash liquor.
- 0.308 g/l water hardness (CaCO₃ basis).

50 The washed and line dried terry swatches were compared by a panel of two expert judges, working independently, by a paired comparison technique using a 9-point Scheffe scale. Differences were recorded in panel score units (psu), positive being performancewise better and the least significant difference (LSD) at 95% confidence was also calculated.

The testing results were as follows:

			<u>SOFTNESS</u> (psu)
55	Example I	versus	Comp. A
	+0.3		LSD
			-0.3
			0.5
60	Example II	versus	Comp. B
	+0.5		LSD
			-0.5
			0.5

65 These results show the significant softness through-the-wash benefits derivable from inventive compositions of examples I and II versus identical compositions of examples I and II versus identical

EP 0 150 872 B1

compositions A and B which did not contain the aminofunctional polydimethylsiloxane.

Comparable textile benefits can be secured from liquid detergent compositions I and II hereinabove wherein the (N-cyclohexyl-4-amino-butyl-1) polydimethylsiloxane (Sil—I) is replaced by the listed organo-functional siloxanes in the stated proportions.

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	SILOXANE	DEGREE OF SUBSTITUTION	EXAMPLE	
			I	II
10	Sil-II	0.18	1.0	-
	Sil-II	0.45	-	0.7
15	Sil-III	0.08	0.3	1.3
	Sil-III	0.20	-	0.5
20	Sil-IV	0.25	0.6	1.4
	Sil-IV	0.60	0.9	0.2
25	Sil-V	0.05	0.4	-
	Sil-V	0.30	0.2	1.2
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Further examples of substantially unbuild compositions in accordance with the invention are as follows:

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EP 0 150 872 B1

		EXAMPLES (% BY WEIGHT)							
INGREDIENT		III	IV	V	VI	VII	VIII	IX	
5	HLAS	10	7	7	-	-	-	-	
	C ₁₄₋₁₅ .EO ₂ .S	-	12	12	11.5	-	-	-	
	C ₁₂₋₁₄ .EO.S	-	-	-	-	-	9.4	-	
10	C ₁₂₋₁₃ .EO _{6.5}	-	-	-	-	-	21.5	-	
	C ₁₄₋₁₅ .EO ₇	-	-	-	-	-	-	18	
	Coconut alkyl dimethylamine								
15	oxide	-	-	-	-	-	-	1	
	TEA.CnAS	4	-	-	-	-	-	-	
	C ₁₃₋₁₅ .EO ₇	12	7	7	22	23	-	-	
20	C ₁₂ .TMAC	-	1.1	-	-	-	-	-	
	DTMAC	-	-	-	-	5	-	3	
	C ₁₂₋₁₄ .Fatty Acid	10	13	15	-	-	-	-	
25	Oleic Acid	5	2	-	-	-	-	-	
	Sodium Citrate	2.5	5	5	0.1	-	-	-	
	DETPMP	0.6	-	-	-	-	-	-	
30	DTPA	-	0.3	0.6	-	-	0.2	-	
	Proteolytic enzyme	0.7	0.7	0.7	0.7	-	0.6	0.6	
	Amylase	0.1	0.2	0.2	-	-	0.2	0.2	
35	Ethanol	5	8	7	10	15	5.7	7.5	
	Propanediol,1-2	4	7	4	-	-	-	-	
	TEPA.EO	1.5	1.5	1.0	-	-	-	1.5	
40	Sil-I - DS ^(*) : 0.15	0.8	-	0.4	-	0.5	-	0.6	
	Sil-II - DS : 0.33	-	0.3	-	0.7	-	0.7	-	
	Miscellaneous incl. of								
45	water, brightener,								
	neutralizing agents,								
	aesthetics								
		----- balance to 100 -----							
50	(*) DS = degree of substitution.								

Examples of built compositions in accordance with this invention are as follows:

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		EXAMPLES (% BY WEIGHT)					
INGREDIENT		X	IX	XII	XIII	XIV	XV
5	LAS	4	6	5	12	-	6
	TEA.CnAS	-	-	-	-	4	2
	C ₁₄₋₁₅ .EO7	2	2	3	5	8	3
10	Cn-DEA	2	2	-	3	-	-
	STPP	18	16	22	-	-	10
	NTA	2	-	-		18	8
15	Sodium Citrate	-	-	-	15	-	-
	Zeolite A ⁽¹⁾	-	8	-	-	-	-
	Sodium borate	2	-	2	-	-	1
20	KTS	1	2	1	9	9	4
	Fatty acid C ₁₆ -C ₂₂	-	-	1.5	-	-	-
	Ethanol	-	-	-	-	-	-
25	Glycerol	3	4	5	-	-	3
	Polydimethylsiloxane ⁽²⁾	0.2	-	-	-	-	-
	Protease	0.85	0.5	0.6	-	-	0.4
30	DTPA	0.2	0.2	0.2	0.2	0.4	-
	Polyacrylate M = 100.000	2	-	1	-	-	1
35	DETPMP	-	-	0.6	-	-	0.3
	Sil-I : DS 0.40	0.8	-	1.0	-	-	0.6
	Sil-IV : DS 0.15	-	0.6	-	-	0.7	-
40	Sil-V : DS 0.55	-	-	-	0.4	-	-
	Miscellaneous incl. of water, aesthetics, brightener, neutralizers, etc.	-----balance to 100 -----					

(1) Particle diameter 0.8 - 2.0 micrometer.

(2) Suds regulant.

Claims

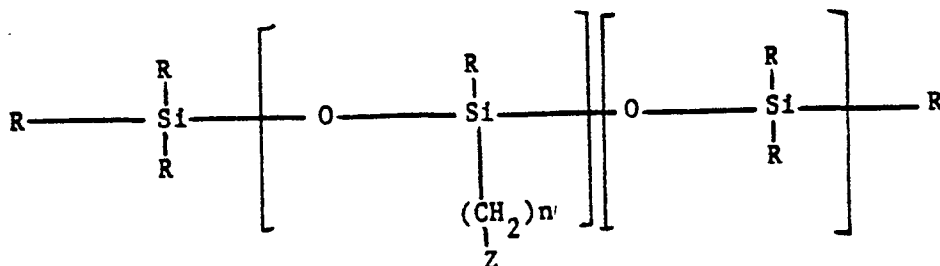
1. A liquid detergent composition capable of providing desirable textile benefits inclusive of softness, containing:

(a) from 5% to 70% by weight of a surface-active agent selected from the group of anionic, nonionic, amphoteric and zwitterionic surface-active agents and mixtures thereof;

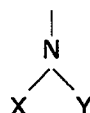
(b) a liquid carrier; and

(c) if desired, conventional detergent additives inclusive of detergent builders, enzymes and suds regulants, characterized in, that it contains:

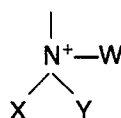
(d) from 0.05% to 5% by weight of an organo-functional poly-di-C₁₋₄-alkyl siloxane textile treatment agent having the general formula:



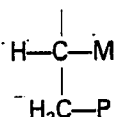
wherein R = C₁₋₄-alkyl; n is an integer from 1 to 6; Z is



whereby X and Y are selected independently, —H; —C₁₋₃₀-alkyl; —C₆-aryl; —C₅₋₆-cycloalkyl; —C₁₋₆-alkylene —NH₂; —CO—R; or Z is such that the siloxane textile treatment agent is a (4-carboxy-5-(N-tallowamide)pentyl-1) polydimethylsiloxane with the proviso that the nitrogen can be quaternized such as to represent



whereby W can be selected from X or Y; or Z is



whereby P and M are —COOH; —CO—NR₂; or —CO—OR' and wherein R' is hydrogen or C₁₋₂-alkyl; with the further proviso that the degree of substitution, i.e., the molar proportion of silicones carrying a substituent other than a C₁₋₄-alkyl group to total silicones is in the range from 0.01 to 0.7, said siloxanes having a viscosity (25°C) of from 250—1000,000 mm²/s.

2. The composition in accordance with Claim 1 wherein the siloxane is amino-substituted.

3. The composition in accordance with Claim 1 wherein the siloxane has a degree of substitution in the range from 0.02 to 0.3.

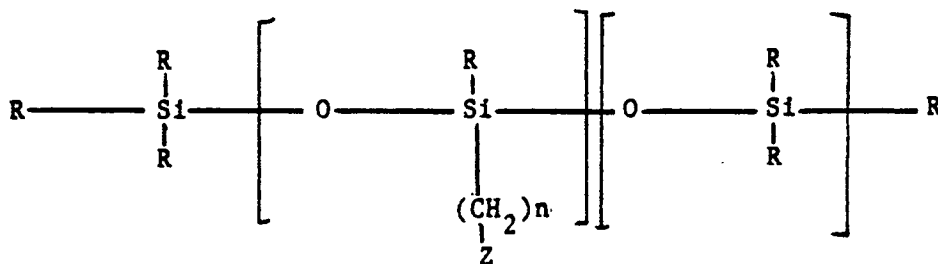
4. A unbuilt liquid detergent composition capable of providing desirable textile benefits inclusive of softness containing:

(a) from 25% to 55% by weight of a surface-active agent selected from the group of anionic, nonionic, amphoteric and zwitterionic surface-active agents and mixtures thereof;

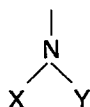
(b) a liquid carrier;

(c) if desired, conventional detergent additives inclusive of enzymes and suds regulants, characterized in, that it contains:

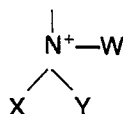
(d) from 0.05% to 5% by weight of an organo-functional poly-di-C₁₋₄-alkyl siloxane textile treatment agent having the general formula:



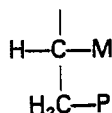
wherein R = C₁₋₄-alkyl; n is an integer from 1 to 6; Z is



whereby X and Y are, selected independently, —H; —C₁₋₃₀-alkyl; —C₆-aryl; —C₅₋₆-cycloalkyl; —C₁₋₆-alkylene —NH₂; —CO—R; or Z is such that the siloxane textile treatment agent is a (4-carboxy-5-(N-tallowamide)pentyl-1) polydimethylsiloxane with the proviso that the nitrogen can be quaternized such as to represent



whereby W can be selected from X or Y; or Z is



whereby P and M are —COOH; —CO—NR₂; or —CO—OR' and wherein R' is hydrogen or C₁₋₂-alkyl; with the further proviso that the degree of substitution, i.e., the molar proportion of silicones carrying a substituent other than a C₁₋₄-alkyl group to total silicones is in the range from 0.01 to 0.7, said siloxanes having a viscosity (25°C) of from 250—100,000 mm²/s.

5. The composition in accordance with Claim 4 wherein the surface active agent is represented by a mixture of anionic and nonionic surface-active agents in a weight ratio of anionic to nonionic in the range from 4:1 to 1:4.

6. The composition in accordance with Claim 4 wherein the siloxane is amino-substituted.

7. The composition in accordance with Claim 4 wherein the siloxane has a degree of substitution in the range from 0.02 to 0.3.

8. The composition in accordance with Claim 4 wherein the siloxane is characterized as follows: n is 3 or 4, and X and Y are selected independently from: hydrogen; —C₁₋₄-alkyl; —C₅₋₆-cycloalkyl; and —C₂₋₄-NH₂.

9. The composition in accordance with Claim 4 and 5 wherein the siloxane component is selected from: (N-cyclohexylamino-4-amino-butyl-1) polydimethylsiloxane; [N-(2-amino-ethylene)-4-amino-butyl-1]-polydimethylsiloxane; (N-dodecyl-4-amino-butyl-1) polydimethylsiloxane; (4-(N,N-dimethyl ammonium)-butyl-1) polydimethylsiloxane; (5-(tallow amide)-4-carboxy-pentyl-1) polydimethylsiloxane.

10. A liquid built detergent composition capable of providing desirable textile benefits inclusive of softness containing:

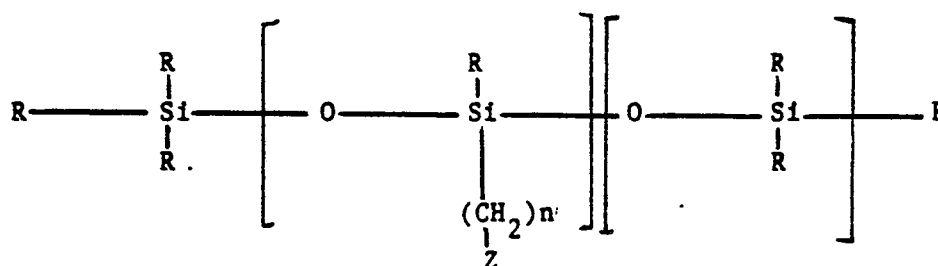
(a) from 5% to 25% by weight of a surface-active agent selected from the group of anionic, nonionic, amphoteric and zwitterionic surface-active agents and mixtures thereof;

(b) a liquid carrier;

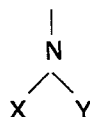
(c) from 5% to 30% by weight of a detergent builder;

(d) if desired, conventional detergent additives inclusive of enzymes and suds regulants, characterized in, that it contains:

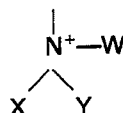
(e) from 0.05% to 5% by weight of an organo-functional poly-di-C₁₋₄-alkyl siloxane textile treatment agent having the general formula:



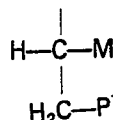
wherein R = C₁₋₄; n is an integer from 1 to 6; Z is



whereby X and Y are selected independently, —H; —C₁₋₃₀-alkyl; —C₆-aryl; —C₅₋₆-cycloalkyl; —C₁₋₆-alkylene —NH₂; —CO—R; or Z is such that the siloxane textile treatment agent is a (4-carboxy-5-(N-tallowamide)pentyl-1) polydimethylsiloxane with the proviso that the nitrogen can be quaternized such as to represent



whereby W can be selected from X or Y; or
Z is



whereby P and M are $-\text{COOH}$; $-\text{CO}-\text{NR}'_2$; or $-\text{CO}-\text{OR}'$ and wherein R' is hydrogen or C_{1-2} -alkyl; with the further proviso that the degree of substitution, i.e., the molar proportion of silicones carrying a substituent other than a C_{1-4} -alkyl group to total silicones is in the range from 0.01 to 0.7, said siloxanes having a viscosity (25°C) of from 250—100,000 mm²/s.

11. The composition in accordance with Claim 10 wherein the surface-active agent, which represents from 5% to 15% by weight, is represented by a mixture of anionic and nonionic surface-active agents, whereby the anionic species represents at least 20% (by weight) of the sum of anionic and nonionic surface-active agents.

12. The composition in accordance with Claim 10 wherein the siloxane is amino-substituted.

13. The composition in accordance with Claim 10 wherein the detergent builder represents from 12% to 25% by weight and is selected from the alkali-metal salts of polyphosphoric, citric and nitrilotriacetic acids and from ZEOLITE A, X and P having a particle diameter in the range from 0.1 to 4 micrometers.

14. The composition in accordance with Claim 10 wherein the siloxane is characterized as follows: n is 3 or 4, and X and Y are selected independently from: hydrogen; $-\text{C}_{1-4}$ -alkyl; $-\text{C}_{5-6}$ -cycloalkyl; and $-\text{C}_{2-4}-\text{NH}_2$.

15. The composition in accordance with Claim 13 wherein the siloxane is selected from:

(N-cyclohexylamino-4-amino-butyl-1) polydimethylsiloxane;
[N-(2-amino-ethylene)-4-amino-butyl-1]-polydimethylsiloxane;
(N-dodecyl-4-amino-butyl-1) polydimethylsiloxane;
(4-(N,N-dimethyl ammonium)-butyl-1) polydimethylsiloxane;
(5-(tallow amide)-4-carboxy-pentyl-1) polydimethylsiloxane.

Patentansprüche

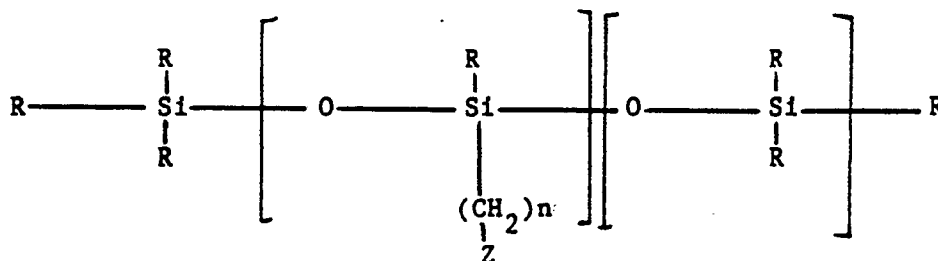
1. Flüssige Detergenezusammensetzung, fähig zum Schaffen wünschenswerter Gewebvorteile einschließlich der Weichheit, enthaltend:

(a) von 5 Gew.-% bis 70 Gew.-% eines grenzflächenaktiven Mittels, ausgewählt aus der Gruppe von anionischen, nichtionischen, amphoteren und zwitterionischen grenzflächenaktiven Mitteln und Gemischen hiervon;

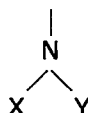
(b) einen flüssigen Träger; und

(c) gewünschtenfalls herkömmliche Detergenezusätze einschließlich Detergensgerüststoffen, Enzymen und Schaumregulatoren, dadurch gekennzeichnet, daß sie:

(d) von 0,05 Gew.-% bis 5 Gew.-% eines organo-funktionellen Poly-di- C_{1-4} -akylsiloxan-Gewebebehandlungsmittels der allgemeinen Formel:



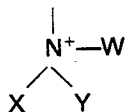
enthält, worin R für C_{1-4} -Alkyl steht; n eine ganze Zahl von 1 bis 6 ist; Z für



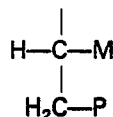
steht, worin X und Y voneinander unabhängig unter $-\text{H}$; $-\text{C}_{1-30}$ -Alkyl; $-\text{C}_6$ -Aryl; $-\text{C}_{5-6}$ -Cycloalkyl;

EP 0 150 872 B1

—C₁₋₆-Alkylen-NH₂; —CO—R ausgewählt sind, oder Z so ist, daß das Siloxangewebebehandlungsmittel ein (4-Carboxy-5-(N-talgamid)pentyl-1)-polydimethylsiloxan ist; mit der Maßgabe, daß der Stickstoff quaternisiert sein kann, um



zu entsprechen; worin W unter X oder Y ausgewählt sein kann; oder Z für



steht, worin P und M —COOH; —CO—NR'₂; oder —CO—R' sind, worin R' für Wasserstoff oder C₁₋₂ Alkyl steht; mit der weiteren Maßgabe, daß der Substitutionsgrad, d.h. das molare Verhältnis der Siliciumatome, welche einen anderen Substituenten als eine C₁₋₄-Alkylgruppe tragen, zur Gesamtzahl an Siliciumatomen im Bereich von 0,01 bis 0,7 liegt, welche Siloxane eine Viskosität (25°C) von 250—100.000 mm²/s besitzen.

2. Zusammensetzung nach Anspruch 1, worin das Siloxan Amino-substituiert ist.

3. Zusammensetzung nach Anspruch 1, worin das Siloxan einen Substitutionsgrad im Bereich von 0,02 bis 0,3 besitzt.

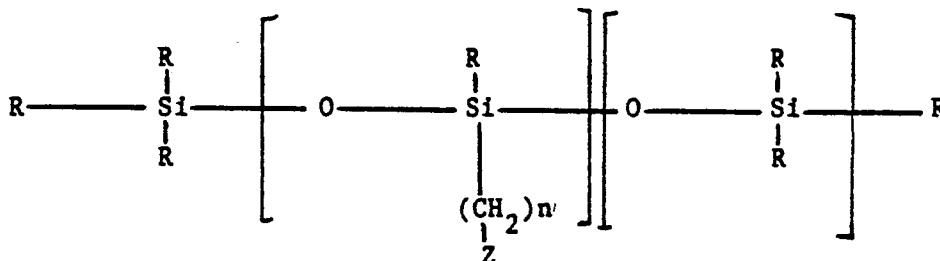
4. Gerüststofffreie, flüssige Detergenezusammensetzung, fähig zum Schaffen wünschenswerter Gewebevorteile einschließlich der Weichheit, enthaltend:

(a) von 25 Gew.-% bis 55 Gew.-% eines grenzflächenaktiven Mittels, ausgewählt aus der Gruppe von anionischen, nichtionischen, amphoteren und zwitterionischen grenzflächenaktiven Mitteln und Gemischen hievon;

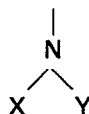
(b) einen flüssigen Träger;

(c) gewünschtenfalls herkömmliche Detergenezusätze einschließlich Enzymen und Schaumregulatoren; dadurch gekennzeichnet, daß sie:

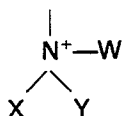
(d) von 0,05 Gew.-% bis 5 Gew.-% eines organo-funktionellen Poly-di-C₁₋₄-akylsiloxan-Gewebebehandlungsmittels der allgemeinen Formel:



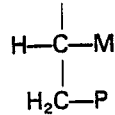
enthalt, worin R für C₁₋₄-Alkyl steht; n eine ganze Zahl von 1 bis 6 ist; Z für



steht, worin X und Y voneinander unabhängig unter —H; —C₁₋₃₀-Alkyl; —C₆-Aryl; —C₅₋₆-Cycloalkyl; —C₁₋₆-Alkylen-NH₂; —CO—R ausgewählt sind, oder Z so ist, daß das Siloxangewebebehandlungsmittel ein (4-Carboxy-5-(N-talgamid)pentyl-1)-polydimethylsiloxan ist; mit der Maßgabe, daß der Stickstoff quaternisiert sein kann, um



zu entsprechen, worin W unter X oder Y ausgewählt sein kann; oder Z für



steht, worin P und M $-\text{COOH}$; $-\text{CO}-\text{NR}'_2$; oder $-\text{CO}-\text{R}'$ sind, worin R' für Wasserstoff oder C_{1-2} Alkyl steht; mit der weiteren Maßgabe, daß der Substitutionsgrad, d.h. das molare Verhältnis der Siliciumatome, welche einen anderen Substituenten als eine C_{1-4} -Alkylgruppe tragen, zur Gesamtzahl an Siliciumatomen im Bereich von 0,01 bis 0,7 liegt, welche Siloxane eine Viskosität (25°C) von 250—100.000 mm²/s besitzen.

5. Zusammensetzung nach Anspruch 4, worin das grenzflächenaktive Mittel durch ein Gemisch aus anionisch und nichtionischen grenzflächenaktiven Mitteln in einem Gewichtverhältnis von anionischem zu nichtionischem grenzflächenaktivem Mittel im Bereich von 4:1 bis 1:4 gebildet wird.

6. Zusammensetzung nach Anspruch 4, worin das Siloxan Amino-substituiert ist.

7. Zusammensetzung nach Anspruch 4, worin das Siloxan einen Substitutionsgrad im Bereich von 0,02 bis 0,3 besitzt.

8. Zusammensetzung nach Anspruch 4, worin das Siloxan wie folgt gekennzeichnet ist; n ist 3 oder 4 und X und Y sind unabhängig voneinander unter: Wasserstoff; $-\text{C}_{1-4}$ -Alkyl; $-\text{C}_{5-6}$ -Cycloalkyl; und $-\text{C}_2\text{H}_4-\text{NH}_2$ ausgewählt.

9. Zusammensetzung nach Anspruch 4 und 5, worin die Siloxankomponente unter:

(N-Cyclohexylamino-4-butyl-1)-polydimethylsiloxan;
[N-(2-Amino-ethylen)-4-amino-butyl-1]-polydimethylsiloxan;
(N-Dodecyl-4-amino-butyl-1)-polydimethylsiloxan;
(4-(N,N-Dimethylammonium)-butyl-1)-polydimethylsiloxan;
(5-(Talgamid)-4-carboxy-pentyl-1)-polydimethylsiloxan
ausgewählt ist.

10. Gerüststoff enthaltende, flüssige Detergenezusammensetzung, fähig zum Schaffen wünschenswerter Gewebevorteile einschließlich der Weichheit, enthaltend:

(a) von 5 Gew.-% bis 25 Gew.-% eines grenzflächenaktiven Mittels, ausgewählt aus der Gruppe von anionischen, nichtionischen, amphoteren und zwitterionischen grenzflächenaktiven Mitteln und Gemischen hievon;

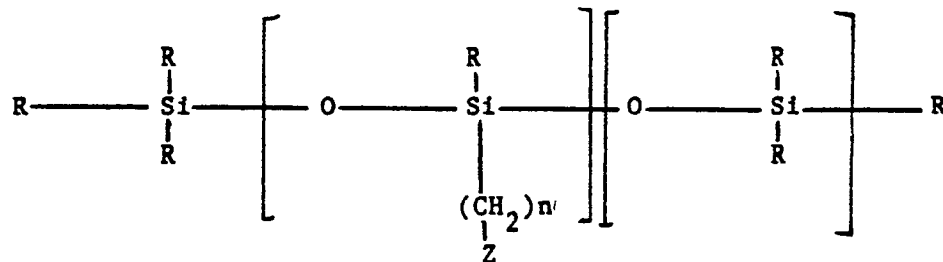
(b) einen flüssigen Träger;

(c) von 5 Gew.-% bis 30 Gew.-% eines Detergensgerüststoffes;

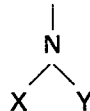
(d) gewünschtenfalls herkömmliche Detergenezusätze einschließlich Enzymen und Schaumregulatoren,

dadurch gekennzeichnet, daß sie:

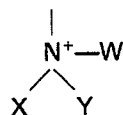
(e) von 0,05 Gew.-% bis 5 Gew.-% eines organo-funktionellen Poly-di- C_{1-4} -alkylsiloxane-Gewebebehandlungsmittels der allgemeinen Formel:



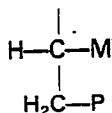
enthält, worin R für C_{1-4} -Alkyl steht; n eine ganze Zahl von 1 bis 6; Z für



steht, worin X und Y voneinander unabhängig unter $-\text{H}$; $-\text{C}_{1-30}$ -Alkyl; $-\text{C}_6$ -Aryl; $-\text{C}_{5-6}$ -Cycloalkyl; $-\text{C}_{1-6}$ -Alkyl-NH₂; $-\text{CO}-\text{R}$ ausgewählt sind, oder Z so ist, daß das Siloxangewebebehandlungsmittel ein (4-Carboxy-5-(N-talgamid)pentyl-1)-polydimethylsiloxan ist; mit der Maßgabe, daß der Stickstoff quaternisiert sein kann, um



zu entsprechen, worin W unter X oder Y ausgewählt sein kann; oder Z für



steht, worin P und M —COOH; —CO—NR'₂; oder —CO—R' sind, worin R' für Wasserstoff oder C₁₋₂ Alkyl steht; mit der weiteren Maßgabe, daß der Substitutionsgrad, d.h. das molare Verhältnis der Siliciumatome, welche einen anderen Substituenten als eine C₁₋₄-Alkylgruppe tragen, zur Gesamtzahl an Siliciumatomen im Bereich von 0,01 bis 0,7 liegt, welche Siloxane eine Viskosität (25°C) von 250—100.000 mm²/s besitzen.

11. Zusammensetzung nach Anspruch 10, worin das grenzflächenaktive Mittel, welches 5 Gew.-% bis 15 Gew.-% darstellt, durch ein Gemisch aus anionischen und nichtionischen grenzflächenaktiven Mitteln gebildet wird, wodurch die anionische Spezies mindestens 20% (Gewichtsprozent) der Summe aus anionischen und nichtionischen grenzflächenaktiven Mitteln bildet.

12. Zusammensetzung nach Anspruch 10, worin das Siloxan Amino-substituiert ist.

13. Zusammensetzung nach Anspruch 10, worin der Detergensgerüststoff von 12 Gew.-% bis 25 Gew.-% darstellt und unter den Alkalimetallsalzen von Polyphosphorsäure, Citronensäure und Nitrilotriessigsäure und ZEOLITH A, X und P mit einem Teilchendurchmesser im Bereich von 0,1 bis 4 µm ausgewählt ist.

14. Zusammensetzung nach Anspruch 10, worin das Siloxan wie folgt gekennzeichnet ist: n ist 3 oder 4 und X und Y sind unabhängig voneinander unter: Wasserstoff; —C₁₋₄-Alkyl; —C₅₋₆-Cycloalkyl; und —C₂H₄—NH₂ ausgewählt.

15. Zusammensetzung nach Anspruch 13, worin das Siloxan unter:

(N-Cyclohexylamino-4-amino-butyl-1)-polydimethylsiloxan;
[N-(2-Amino-ethylen)-4-amino-butyl-1]-polydimethylsiloxan;
(N-Dodecyl-4-amino-butyl-1)-polydimethylsiloxan;
(4-(N,N-Dimethylammonium)-butyl-1)-polydimethylsiloxan;
(5-(Talgamid)-4-carboxy-pentyl-1)-polydimethylsiloxan
ausgewählt ist.

Revendications

1. Composition détergente liquide capable d'apporter des avantages souhaitables y compris de douceur aux textiles, contenant

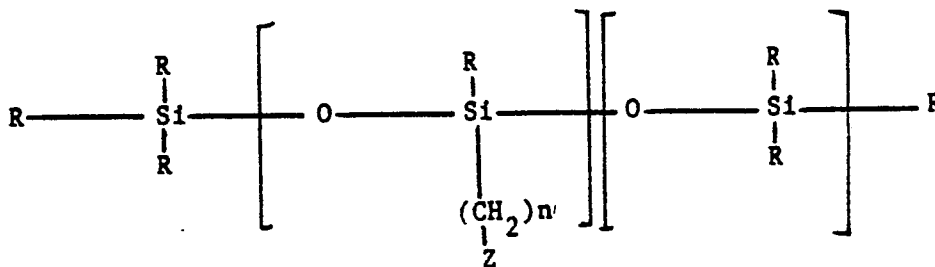
(a) de 5% à 70% en poids d'un agent tensioactif choisi dans le groupe des agents tensioactifs anioniques, non ioniques, amphotères et zwitterioniques et leurs mélanges;

(b) un véhicule liquide; et

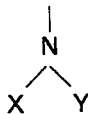
(c) éventuellement, des additifs de détergence classiques, y compris des adjuvants de détergence, des enzymes et des régulateurs de mousse,

caractérisée en ce qu'elle contient:

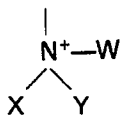
(d) de 0,05% à 5% en poids d'un agent de traitement des textiles de type poly-dialkyl(en C₁—C₄)siloxane organofonctionnel de formule générale:



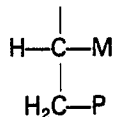
dans laquelle R = alkyle en C₁₋₄; n est un entier de 1 à 6; Z est



ou X et Y sont, choisis indépendamment, —H, alkyle en C₁—C₃₀, aryle en C₆, cycloalkyle en C₅—C₆, alkylène—NH₂ en C₁—C₆, —CO—R; ou Z est tel que l'agent de traitement des textiles de type siloxane soit un (4-carboxy-5-(N-amide de suif)pentyl-1)polydiméthylsiloxane; à condition que l'azote puisse être quaternisé de manière à représenter



W pouvant être choisi parmi X et Y; ou bien Z est



P et M étant $-\text{COOH}$, $-\text{CO}-\text{NR}'_2$ ou $-\text{CO}-\text{OR}'$, où R' est un hydrogène ou un groupe alkyle en C_{1-2} , à condition, en outre, que le degré de substitution, c'est-à-dire la proportion molaire de silicones portant un substituant autre qu'un groupe alkyle en C_1-C_4 par rapport aux silicones totales, soit dans l'intervalle de 0,01 à 0,7, lesdits siloxanes ayant une viscosité (25°C) de 250—100 000 mm²/s.

2. Composition selon la revendication 1, dans laquelle le siloxane est amino-substitué.

3. Composition selon la revendication 1, dans laquelle le siloxane a un degré de substitution dans l'intervalle de 0,02 à 0,3.

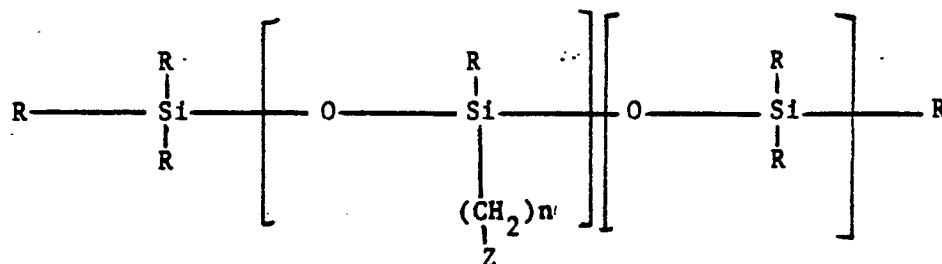
4. Composition détergente liquide sans adjuvant capable d'apporter des avantages souhaitables aux textiles, y compris de douceur, contenant:

(a) de 25% à 55% en poids d'un agent tensioactif choisi dans le groupe des agents tensioactifs anioniques, non ioniques, amphotères et zwitterioniques et leurs mélanges;

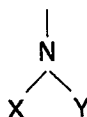
(b) un véhicule liquide; et

(c) éventuellement, des additifs de détergence classiques, y compris des enzymes et des régulateurs de mousse, caractérisée en ce qu'elle contient;

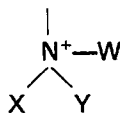
(d) de 0,05% à 5% en poids d'un agent de traitement des textiles de type poly-dialkyl(en C_{1-4})siloxane organofonctionnel de formule générale:



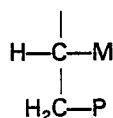
dans laquelle R = alkyle en C_{1-4} ; n est un entier de 1 à 6; Z est



où X et Y sont, choisis indépendamment, $-\text{H}$, alkyle en C_1-C_{30} , aryle en C_6 , cycloalkyle en C_5-C_6 , alkylène- NH_2 en C_1-C_6 , $-\text{CO}-\text{R}$; ou Z est tel que l'agent de traitement des textiles de type siloxane soit un (4-carboxy-5-(N-amide de sulf)pentyl-1)polydiméthylsiloxane; à condition que l'azote puisse être quaternisé de manière à représenter



W pouvant être choisi parmi X et Y; ou bien Z est



P et M étant $-\text{COOH}$, $-\text{CO}-\text{NR}'_2$ ou $-\text{CO}-\text{OR}'$, où R' est un hydrogène ou un groupe alkyle en C_{1-2} , à condition, en outre, que le degré de substitution, c'est-à-dire la proportion molaire de silicones portant un substituant autre qu'un groupe alkyle en C_1-C_4 par rapport aux silicones totales, soit dans l'intervalle de

EP 0 150 872 B1

0,01 à 0,7, lesdits siloxanes ayant une viscosité (25°C) de 250—100 000 mm²/s.

5. Composition selon la revendication 4, dans laquelle l'agent tensioactif est représenté par un mélange d'agents tensioactifs anioniques et non ioniques, dans un rapport pondéral des anioniques aux non ioniques dans l'intervalle de 4:1 à 1:4.

6. Composition selon la revendication 4, dans laquelle le siloxane amino-substitué.

7. Composition selon la revendication 4, dans laquelle le siloxane a un degré de substitution dans l'intervalle de 0,02 à 0,3.

8. Composition selon la revendication 4, dans laquelle le siloxane est caractérisé comme suit: n est égal à 3 ou 4, et X et Y sont choisis indépendamment parmi un hydrogène, un groupe alkyle en C₁—C₄, cycloalkyle en C₁—C₆ et —C₂H₄—NH₂.

9. Composition selon la revendication 4 ou 5, dans laquelle le constituant siloxane est choisi parmi:

le (N-cyclohexylamino-4-aminobutyl-1)-polydiméthylsiloxane;

le [N-(2-aminoéthylène)-4-aminobutyl-1]-polydiméthylsiloxane;

le (N-dodécyl-4-aminobutyl-1)-polydiméthylsiloxane;

le (4-(N,N-diméthylammonium)butyl-1)-polydiméthylsiloxane;

le (5-(amide de suif)-4-carboxypentyl-1)polydiméthylsiloxane.

10. Composition détergente liquide avec adjuvant capable d'apporter des avantages souhaitables aux textiles, y comprise de douceur, contenant:

(a) de 5% à 25% en poids d'un agent tensioactif choisi dans le groupe des agents tensioactifs anioniques, non ioniques, amphotères et zwitterioniques et leurs mélanges;

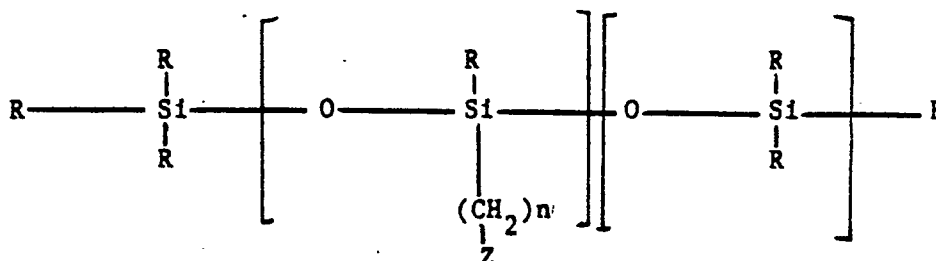
(b) un véhicule liquide;

(c) de 5% à 30% en poids d'un adjuvant de détergence;

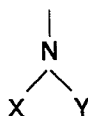
(d) éventuellement, des additifs de détergence classiques, y compris des enzymes et des régulateurs de mousse,

caractérisée en ce qu'elle contient:

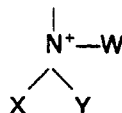
(e) de 0,05% à 5% en poids d'un agent de traitement des textiles de type poly-dialkyl(en C₁₋₄)siloxane organofonctionnel de formule générale:



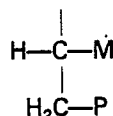
dans laquelle R = alkyle en C₁—C₄; n est un entier de 1 à 6; Z est



où X et Y sont, choisis indépendamment, —H, alkyle en C₁—C₃₀, aryle en C₆, cycloalkyle en C₅—C₆, alkylène—NH₂ en C₁—C₆—CO—R, ou Z est tel que l'agent de traitement des textiles de type siloxane soit le (4-carboxy-5-(N-amide de suif)pentyl)polydiméthylsiloxane; à condition que l'azote puisse être quaternisé de manière à représenter



W pouvant être choisi parmi X et Y; ou bien Z est



P et M étant —COOH, —CO—NR'₂ ou —CO—OR', où R' est un hydrogène ou un groupe alkyle en C₁—C₂, à condition, en outre, que le degré de substitution, c'est-à-dire la proportion molaire de silicones portant un substituant autre qu'un groupe alkyle en C₁—C₄ par rapport aux silicones totales, soit dans l'intervalle de 0,01 à 0,7, lesdits siloxanes ayant une viscosité (25°C) de 250—100 000 mm²/s.

EP 0 150 872 B1

11. Composition selon la revendication 10, dans laquelle l'agent tensioactif, qui représente de 5% à 15% en poids, est représenté par un mélange d'agents tensioactifs anioniques et non ioniques, l'espèce anionique représentant au moins 20% (en poids) de la somme des agents tensioactifs anioniques et non ioniques.

5 12. Composition selon la revendication 10, dans laquelle le siloxane est amino-substitué.

13. Composition selon la revendication 10, dans laquelle l'adjuvant de détergence représente de 12% à 25% en poids et est choisi parmi les sels de métaux alcalins des acides polyphosphorique, citrique et nitrilotriacétique, et les Zéolithes A, X et P d'une granulométrie dans l'intervalle de 0,1 à 4 μm .

10 14. Composition selon la revendication 10, dans laquelle le siloxane est caractérisé de la manière suivante: n est égal à 3 ou 4, et X et Y sont choisis indépendamment parmi un hydrogène, un groupe alkyle en $\text{C}_1\text{—C}_4$, cycloalkyle en $\text{C}_5\text{—C}_6$ et $\text{—C}_2\text{H}_4\text{—NH}_2$.

15 15. Composition selon la revendication 13, dans laquelle le siloxane est choisi parmi:

le (N-cyclohexylamino-4-aminobutyl-1)-polydiméthylsiloxane;

le [N-(2-aminoéthylène)-4-aminobutyl-1]-polydiméthylsiloxane;

le (N-dodécyl-4-aminobutyl-1)-polydiméthylsiloxane;

le (4-(N,N-diméthylammonium)butyl-1)-polydiméthylsiloxane;

le (5-(amide de suif)-4-carboxypentyl-1)-polydiméthylsiloxane.

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