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(54) **CARE POLYMERS**

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(57) **ABSTRACT**

The present application relates to care agents, for example care polymers, and compositions such as consumer products comprising such care agents, as well as processes for making and using such care agents and such compositions. The performance of the care polymers that Applicants teach, can be further increased by following the emulsification teaching of the present specification and/or combining such care polymers with silicone materials.

CARE POLYMERS

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application claims priority under 35 U.S.C. §119(e) to U.S. Provisional Application Ser. No. 61/320,133 filed Apr. 1, 2010; U.S. Provisional Application Ser. No. 61/320,141 filed Apr. 1, 2010; U.S. Provisional Application Ser. No. 61/366,270 filed Jul. 21, 2010; U.S. Provisional Application Ser. No. 61/383,770 filed Sep. 17, 2010; and U.S. Provisional Application Ser. No. 61/413,062 filed Nov. 12, 2010.

FIELD OF INVENTION

[0002] The present application relates to care agents, for example care polymers, and compositions such as consumer products comprising such care agents, as well as processes for making and using such care agents and such compositions.

BACKGROUND OF THE INVENTION

[0003] Care polymers, including silicones, are used in premium consumer products to provide benefits such as softness, hand, anti-wrinkle, hair conditioning/frizz control, color protection, etc. Unfortunately, such care polymers are incompatible with a variety of other consumer product ingredients, for example, anionic surfactants, and/or are expensive due to the cost of silicone raw materials and the silicone emulsification step that is required to make such silicones useful in products. Thus, what is needed is an economical, stable care polymer technology with reduced incompatibility issues.

[0004] Fortunately, Applicants recognized that the source of the incompatibility and stability issues was the charge of current care polymers and such polymers' stiffness as due to such polymers' high glass transition temperature. Thus, Applicants discovered that by judiciously selecting or synthesizing care polymers that have the correct charge and glass transition temperature, the incompatibility and stability issues could be resolved and yet the required performance can be economically obtained. The performance of the care polymers that Applicants teach, can be further increased by following the emulsification teachings of the present specification and/or by combining such care polymers with silicone materials.

SUMMARY OF THE INVENTION

[0005] The present application relates to care agents, for example, care polymers and compositions such as consumer products comprising such care agents, as well as processes for making and using such care agents and such compositions.

DETAILED DESCRIPTION OF THE INVENTION

Definitions

[0006] As used herein "consumer product" means baby care, personal care, fabric & home care, family care, feminine care, health care, products or devices generally intended to be used or consumed in the form in which it is sold. Such products include but are not limited to diapers, bibs, wipes; products for and/or methods relating to treating hair (human, dog, and/or cat), including, bleaching, coloring, dyeing, conditioning, shampooing, styling; deodorants and antiperspirants; personal cleansing; cosmetics; skin care including application of creams, lotions, and other topically applied products for consumer use including fine fragrances; and shaving products, products for and/or methods relating to treating fabrics, hard surfaces and any other surfaces in the area of fabric and home care, including: air care including air fresheners and scent delivery systems, car care, dishwashing, fabric conditioning (including softening and/or freshening), laundry detergency, laundry and rinse additive and/or care, hard surface cleaning and/or treatment including floor and toilet bowl cleaners, and other cleaning for consumer or institutional use; products and/or methods relating to bath tissue, facial tissue, paper handkerchiefs, and/or paper towels; tampons, feminine napkins; products and/or methods relating to oral care including toothpastes, tooth gels, tooth rinses, denture adhesives, and tooth whitening.

[0007] As used herein, the term "cleaning and/or treatment composition" is a subset of consumer products that includes, unless otherwise indicated, beauty care, fabric & home care products. Such products include, but are not limited to, products for treating hair (human, dog, and/or cat), including, bleaching, coloring, dyeing, conditioning, shampooing, styling; deodorants and antiperspirants; personal cleansing; cosmetics; skin care including application of creams, lotions, and other topically applied products for consumer use including fine fragrances; and shaving products, products for treating fabrics, hard surfaces and any other surfaces in the area of fabric and home care, including: air care including air fresheners and scent delivery systems, car care, dishwashing, fabric conditioning (including softening and/or freshening), laundry detergency, laundry and rinse additive and/or care, hard surface cleaning and/or treatment including floor and toilet bowl cleaners, granular or powder-form all-purpose or "heavy-duty" washing agents, especially cleaning detergents; liquid, gel or paste-form all-purpose washing agents, especially the so-called heavy-duty liquid types; liquid fine-fabric detergents; hand dishwashing agents or light duty dishwashing agents, especially those of the high-foaming type; machine dishwashing agents, including the various tablet, granular, liquid and rinse-aid types for household and institutional use; liquid cleaning and disinfecting agents, including antibacterial hand-wash types, cleaning bars, mouthwashes, denture cleaners, dentifrice, car or carpet shampoos, bathroom cleaners including toilet bowl cleaners; hair shampoos and hair-rinses; shower gels, fine fragrances and foam baths and metal cleaners; as well as cleaning auxiliaries such as bleach additives and "stain-stick" or pre-treat types, substrate-laden products such as dryer added sheets, dry and wetted wipes and pads, nonwoven substrates, and sponges; as well as sprays and mists all for consumer or/and institutional use; and/or methods relating to oral care including toothpastes, tooth gels, tooth rinses, denture adhesives, tooth whitening.

[0008] As used herein, the term "fabric and/or hard surface cleaning and/or treatment composition" is a subset of cleaning and treatment compositions that includes, unless otherwise indicated, granular or powder-form all-purpose or "heavy-duty" washing agents, especially cleaning detergents; liquid, gel or paste-form all-purpose washing agents, especially the so-called heavy-duty liquid types; liquid fine-fabric detergents; hand dishwashing agents or light duty dishwashing agents, especially those of the high-foaming type; machine dishwashing agents, including the various tablet, granular, liquid and rinse-aid types for household and insti-

tutional use; liquid cleaning and disinfecting agents, including antibacterial hand-wash types, cleaning bars, car or carpet shampoos, bathroom cleaners including toilet bowl cleaners; and metal cleaners, fabric conditioning products including softening and/or freshening that may be in liquid, solid and/or dryer sheet form; as well as cleaning auxiliaries such as bleach additives and "stain-stick" or pre-treat types, substrate-laden products such as dryer added sheets, dry and wetted wipes and pads, nonwoven substrates, and sponges; as well as sprays and mists. All of such products which were applicable may be in standard, concentrated or even highly concentrated form even to the extent that such products may in certain aspect be non-aqueous.

[0009] As used herein, articles such as "a" and "an" when used in a claim, are understood to mean one or more of what is claimed or described.

[0010] As used herein, the terms "include", "includes" and "including" are meant to be non-limiting.

[0011] As used herein, the term "solid" includes granular, powder, bar and tablet product forms.

[0012] As used herein, the term "fluid" includes liquid, gel, paste and gas product forms.

[0013] As used herein, the term "situs" includes paper products, fabrics, garments, hard surfaces, hair and skin.

[0014] Unless specified otherwise, all molecular weights are given in Daltons.

[0015] As used herein, the term "hydrocarbon polymer radical" means a polymeric radical comprising only carbon and hydrogen.

[0016] As used herein the term "siloxyl residue" means a polydimethylsiloxane moiety.

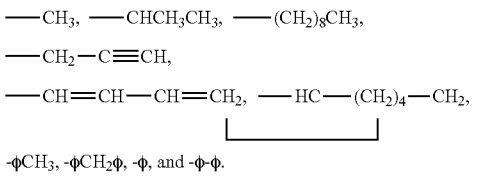
[0017] As used herein, "substituted" means that the organic composition or radical to which the term is applied is:

[0018] (a) made unsaturated by the elimination of elements or radical; or

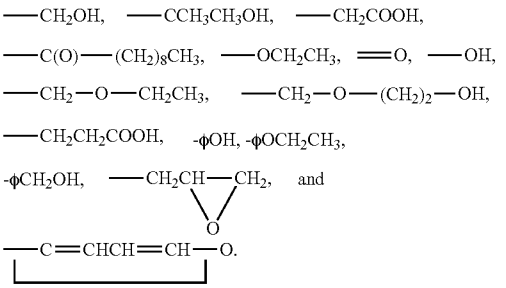
[0019] (b) at least one hydrogen in the compound or radical is replaced with a moiety containing one or more (i) carbon, (ii) oxygen, (iii) sulfur, (iv) nitrogen or (v) halogen atoms; or

[0020] (c) both (a) and (b).

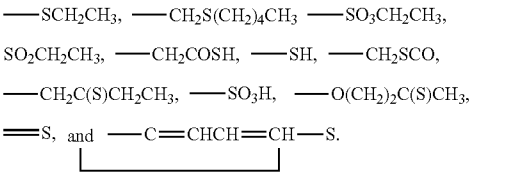
[0021] Moieties that may replace hydrogen as described in (b) immediately above, which contain only carbon and hydrogen atoms are all hydrocarbon moieties including, but not limited to, alkyl, alkenyl, alkynyl, alkyldienyl, cycloalkyl, phenyl, alkyl phenyl, naphthyl, anthryl, phenanthryl, fluoryl, steroid groups, and combinations of these groups with each other and with polyvalent hydrocarbon groups such as alkylene, alkylidene and alkylidyne groups. Specific non-limiting examples of such groups are:



[0022] Moieties containing oxygen atoms that may replace hydrogen as described in (b) immediately above include hydroxy, acyl or keto, ether, epoxy, carboxy, and ester containing groups. Specific non-limiting examples of such oxygen containing groups are:



[0023] Moieties containing sulfur atoms that may replace hydrogen as described in (b) immediately above include the sulfur-containing acids and acid ester groups, thioether groups, mercapto groups and thioketo groups. Specific non-limiting examples of such sulfur containing groups are:



[0024] Moieties containing nitrogen atoms that may replace hydrogen as described in (b) immediately above include amino groups, the nitro group, azo groups, ammonium groups, amide groups, azido groups, isocyanate groups, cyano groups and nitrile groups. Specific non-limiting examples of such nitrogen containing groups are: —$NHCH_3$, —NH_2, —NH_3^+, —CH_2CONH_2, —CH_2CON_3, —$CH_2CH_2CH{=}NOH$, —CN, —$CH(CH_3)CH_2NCO$, —CH_2NCO, —Nφ, -φN=NφOH, and =N.

[0025] Moieties containing halogen atoms that may replace hydrogen as described in (b) immediately above include chloro, bromo, fluoro, iodo groups and any of the moieties previously described where a hydrogen or a pendant alkyl group is substituted by a halo group to form a stable substituted moiety. Specific non-limiting examples of such halogen containing groups are: —$(CH_2)_3COCl$, -φF_5, -φCl, —CF_3, and —CH_2φBr.

[0026] It is understood that any of the above moieties that may replace hydrogen as described in (b) can be substituted into each other in either a monovalent substitution or by loss of hydrogen in a polyvalent substitution to form another monovalent moiety that can replace hydrogen in the organic compound or radical.

[0027] As used herein "φ" represents a phenyl ring.

[0028] As used herein non-ionic care polymer means a polymer with a cationic or anionic charge density of between 0 to about 0.5 milliequivalents/g of net cationic or anionic charge.

[0029] Unless specified otherwise, all molecular weights are weight average molecular weights as determined by size exclusion chromatography with a MALS detector.

[0030] As used herein, the nomenclature $SiO_{n^{*}/2}$ represents the ratio of oxygen and silicon atoms. For example, $SiO_{1/2}$ means that one atom oxygen is shared between two Si atoms. Likewise $SiO_{2/2}$ means that two oxygen atoms are shared between two Si atoms and $SiO_{3/2}$ means that three oxygen atoms are shared are shared between two Si atoms.

[0031] As used herein "random" means that the $[(R_4Si(X—Z)O_{2/2}]$, $[R_4R_4SiO_{2/2}]$ and $[R_4SiO_{3/2}]$ units are randomly distributed throughout the polymer chain.

[0032] As used herein "blocky" means that multiple units of $[(R_4Si(X—Z)O_{2/2}]$, $[R_4R_4SiO_{2/2}]$ and $[R_4SiO_{3/2}]$ units are placed end to end throughout the polymer chain.

[0033] Unless otherwise noted, all component or composition levels are in reference to the active portion of that component or composition, and are exclusive of impurities, for example, residual solvents or by-products, which may be present in commercially available sources of such components or compositions.

[0034] All percentages and ratios are calculated by weight unless otherwise indicated. All percentages and ratios are calculated based on the total composition unless otherwise indicated.

[0035] It should be understood that every maximum numerical limitation given throughout this specification includes every lower numerical limitation, as if such lower numerical limitations were expressly written herein. Every minimum numerical limitation given throughout this specification will include every higher numerical limitation, as if such higher numerical limitations were expressly written herein. Every numerical range given throughout this specification will include every narrower numerical range that falls within such broader numerical range, as if such narrower numerical ranges were all expressly written herein.

Compositions, Molecules and Processes

[0036] In a first aspect, composition comprising, based on total composition weight:

[0037] a) from about 0.1% to about 50%, from about 0.5% to about 30% or even from about 1% to about 20% of a surfactant selected from the group consisting of anionic, cationic, zwitterionic, amphoteric, nonionic surfactants, and combinations thereof; and

[0038] b) from about 0.01% to about 20%, from about 0.1% to about 10% or even from about 0.5% to about 5% of a paraffin wax having a melting point from about 30° C. to about 80° C., from about 45° C. to about 75° C. or even from about 50° C. to about 70° C.;

Fabric and/or Hard Surface Cleaning and/or Treatment Compositions

[0039] Aspects of the invention include the use of the a care agent, in one aspect a nonionic care agent, disclosed herein in laundry detergent compositions (e.g., TIDE™), hard surface cleaners (e.g., MR CLEAN™), automatic dishwashing liquids (e.g., CASCADE™), dishwashing liquids (e.g., DAWN™), and floor cleaners (e.g., SWIFFER™). Non-limiting examples of cleaning compositions may include those described in U.S. Pat. Nos. 4,515,705; 4,537,706; 4,537,707; 4,550,862; 4,561,998; 4,597,898; 4,968,451; 5,565,145; 5,929,022; 6,294,514; and 6,376,445. The cleaning compositions disclosed herein are typically formulated such that, during use in aqueous cleaning operations, the wash water will have a pH of between about 6.5 and about 12, or between about 7.5 and 10.5. Liquid dishwashing product formulations typically have a pH between about 6.8 and about 9.0. Cleaning products are typically formulated to have a pH of from about 7 to about 12. Techniques for controlling pH at recommended usage levels include the use of buffers, alkalis, acids, etc., and are well known to those skilled in the art.

[0040] Fabric treatment compositions disclosed herein typically comprise a fabric softening active ("FSA") and a nonionic care agent disclosed herein. Suitable fabric softening actives, include, but are not limited to, materials selected from the group consisting of quats, amines, fatty esters, sucrose esters, silicones, dispersible polyolefins, clays, polysaccharides, fatty oils, polymer latexes and mixtures thereof.

Paraffin Wax

[0041] Paraffin wax refers to a mixture of alkanes that falls within the $20 \leqq n \leqq 40$ range; they are found in the solid state at room temperature and begin to enter the liquid phase past approximately 37° C. The simplest paraffin molecule is that of methane, CH_4, a gas at room temperature. Heavier members of the series, such as octane, C_8H_{18}, and mineral oil appear as liquids at room temperature. The solid forms of paraffin, called paraffin wax, are from the heaviest molecules from $C_{20}H_{42}$ to $C_{40}H_{82}$.

Adjunct Materials

[0042] The disclosed compositions may include additional adjunct ingredients. Each adjunct ingredient is not essential to Applicants' compositions. Thus, certain embodiments of Applicants' compositions do not contain one or more of the following adjuncts materials: bleach activators, surfactants, builders, chelating agents, dye transfer inhibiting agents, dispersants, enzymes, and enzyme stabilizers, catalytic metal complexes, polymeric dispersing agents, clay and soil removal/anti-redeposition agents, brighteners, suds suppressors, dyes, additional perfumes and perfume delivery systems, structure elasticizing agents, fabric softeners, carriers, hydrotropes, processing aids and/or pigments. However, when one or more adjuncts are present, such one or more adjuncts may be present as detailed below. The following is a non-limiting list of suitable additional adjuncts.

[0043] Deposition Aid—In one aspect, the fabric treatment composition may comprise from about 0.01% to about 10%, from about 0.05 to about 5%, or from about 0.15 to about 3% of a deposition aid. Suitable deposition aids are disclosed in, for example, U.S. patent application Ser. No. 12/080,358.

[0044] In one aspect, the deposition aid may be a cationic or amphoteric polymer. In another aspect, the deposition aid may be a cationic polymer. Cationic polymers in general and their method of manufacture are known in the literature. In one aspect, the cationic polymer may have a cationic charge density of from about 0.005 to about 23 meq/g, from about 0.01 to about 12 meq/g, or from about 0.1 to about 7 meq/g, at the pH of the composition. For amine-containing polymers, wherein the charge density depends on the pH of the composition, charge density is measured at the intended use pH of the product. Such pH will generally range from about 2 to about 11, more generally from about 2.5 to about 9.5. Charge density is calculated by dividing the number of net charges

per repeating unit by the molecular weight of the repeating unit. The positive charges may be located on the backbone of the polymers and/or the side chains of polymers.

[0045] Non-limiting examples of deposition enhancing agents are cationic or amphoteric, polysaccharides, proteins and synthetic polymers. Cationic polysaccharides include cationic cellulose derivatives, cationic guar gum derivatives, chitosan and derivatives and cationic starches. Cationic polysaccharides have a molecular weight from about 50,000 to about 2 million, or even from about 100,000 to about 3,500,000. Suitable cationic polysaccharides include cationic cellulose ethers, particularly cationic hydroxyethylcellulose and cationic hydroxypropylcellulose. Examples of cationic hydroxyalkyl cellulose include those with the INCI name Polyquaternium10 such as those sold under the trade names Ucare™ Polymer JR 30M, JR 400, JR 125, LR 400 and LK 400 polymers; Polyquaternium 67 such as those sold under the trade name Softcat SK™, all of which are marketed by Amerchol Corporation, Edgewater N.J.; and Polyquaternium 4 such as those sold under the trade name Celquat™ H200 and Celquat™ L-200 available from National Starch and Chemical Company, Bridgewater, N.J. Other suitable polysaccharides include Hydroxyethyl cellulose or hydroxypropylcellulose quaternized with glycidyl C_{12}-C_{22} alkyl dimethyl ammonium chloride. Examples of such polysaccharides include the polymers with the INCI names Polyquaternium 24 such as those sold under the trade name Quaternium LM 200 by Amerchol Corporation, Edgewater N.J. Cationic starches described by D. B. Solarek in Modified Starches, Properties and Uses published by CRC Press (1986) and in U.S. Pat. No. 7,135,451, col. 2, line 33-col. 4, line 67. Cationic galactomannans include cationic guar gums or cationic locust bean gum. An example of a cationic guar gum is a quaternary ammonium derivative of Hydroxypropyl Guar such as those sold under the trade name Jaguar®C13 and Jaguar®Excel available from Rhodia, Inc of Cranbury N.J. and N-Hance® by Aqualon, Wilmington, Del.

[0046] Another group of suitable cationic polymers includes those produced by polymerization of ethylenically unsaturated monomers using a suitable initiator or catalyst, such as those disclosed in U.S. Pat. No. 6,642,200.

[0047] Suitable polymers may be selected from the group consisting of cationic or amphoteric polysaccharide, polyethylene imine and its derivatives, and a synthetic polymer made by polymerizing one or more cationic monomers selected from the group consisting of N,N-dialkylaminoalkyl acrylate, N,N-dialkylaminoalkyl methacrylate, N,N-dialkylaminoalkyl acrylamide, N,N-dialkylaminoalkylmethacrylamide, quaternized N,N dialkylaminoalkyl acrylate quaternized N,N-dialkylaminoalkyl methacrylate, quaternized N,N-dialkylaminoalkyl acrylamide, quaternized N,N-dialkylaminoalkylmethacrylamide, Methacryloamidopropyl-pentamethyl-1,3-propylene-2-ol-ammonium dichloride, N,N,N,N',N',N",N"-heptamethyl-N"-3-(1-oxo-2-methyl-2-propenyl) aminopropyl-9-oxo-8-azo-decane-1,4,10-triammonium trichloride, vinylamine and its derivatives, allylamine and its derivatives, vinyl imidazole, quaternized vinyl imidazole and diallyl dialkyl ammonium chloride and combinations thereof, and optionally a second monomer selected from the group consisting of acrylamide, N,N-dialkyl acrylamide, methacrylamide, N,N-dialkylmethacrylamide, C1-C12 alkyl acrylate, C1-C12 hydroxyalkyl acrylate, polyalkylene glyol acrylate, C1-C12 alkyl methacrylate, C1-C12 hydroxyalkyl methacrylate, polyalkylene glycol methacrylate, vinyl acetate, vinyl alcohol, vinyl formamide, vinyl acetamide, vinyl alkyl ether, vinyl pyridine, vinyl pyrrolidone, vinyl imidazole, vinyl caprolactam, and derivatives, acrylic acid, methacrylic acid, maleic acid, vinyl sulfonic acid, styrene sulfonic acid, acrylamidopropylmethane sulfonic acid (AMPS) and their salts. The polymer may optionally be branched or cross-linked by using branching and crosslinking monomers. Branching and cros slinking monomers include ethylene glycoldiacrylate divinylbenzene, and butadiene. In another aspect, the treatment composition may comprise an amphoteric deposition aid polymer so long as the polymer possesses a net positive charge. Said polymer may have a cationic charge density of about 0.05 to about 18 milliequivalents/g.

[0048] In another aspect, the deposition aid may be selected from the group consisting of cationic polysaccharide, polyethylene imine and its derivatives, poly(acrylamide-co-diallyldimethylammonium chloride), poly(acrylamide-methacrylamidopropyltrimethyl ammonium chloride), poly (acrylamide-co-N,N-dimethylaminoethyl acrylate) and its quaternized derivatives, poly(acrylamide-co-N,N-dimethylaminoethyl methacrylate) and its quaternized derivative, poly(hydroxyethylacrylate-co-dimethylaminoethyl methacrylate), poly(hydroxpropylacrylate-co-dimethylaminoethyl methacrylate), poly(hydroxpropylacrylate-co-methacrylamidopropyltrimethylammonium chloride), poly (acrylamide-co-diallyldimethylammonium chloride-co-acrylic acid), poly(acrylamide-methacrylamidopropyltrimethyl ammonium chloride-co-acrylic acid), poly(diallyldimethyl ammonium chloride), poly(vinylpyrrolidone-co-dimethylaminoethyl methacrylate), poly(ethyl methacrylate-co-quaternized dimethylaminoethyl methacrylate), poly(ethyl methacrylate-co-oleyl methacrylate-co-diethylaminoethyl methacrylate), poly(diallyldimethylammonium chloride-co-acrylic acid), poly(vinyl pyrrolidone-co-quaternized vinyl imidazole) and poly (acrylamide-co-Methacryloamidopropyl-pentamethyl-1,3-propylene-2-ol-ammonium dichloride), Suitable deposition aids include Polyquaternium-1, Polyquaternium-5, Polyquaternium-6, Polyquaternium-7, Polyquaternium-8, Polyquaternium-11, Polyquaternium-14, Polyquaternium-22, Polyquaternium-28, Polyquaternium-30, Polyquaternium-32 and Polyquaternium-33, as named under the International Nomenclature for Cosmetic Ingredients. In one aspect, the deposition aid may comprise polyethyleneimine or a polyethyleneimine derivative. A suitable polyethyleneinine useful herein is that sold under the trade name Lupasol® by BASF, AG, and Ludwigshafen, Germany

[0049] In another aspect, the deposition aid may comprise a cationic acrylic based polymer. In a further aspect, the deposition aid may comprise a cationic polyacrylamide. In another aspect, the deposition aid may comprise a polymer comprising polyacrylamide and polymethacrylamidopropyl trimethylammonium cation. In another aspect, the deposition aid may comprise poly(acrylamide-N-dimethylaminoethyl acrylate) and its quaternized derivatives. In this aspect, the deposition aid may be that sold under the trade name Sedipur®, available from BTC Specialty Chemicals, a BASF Group, Florham Park, N.J. In a yet further aspect, the deposition aid may comprise poly(acrylamide-co-methacrylamidopropyltrimethyl ammonium chloride). In another aspect, the deposition aid may comprise a non-acrylamide based polymer, such as that sold under the trade name Rheovis® CDE, available from Ciba Specialty Chemicals, a BASF group, Florham Park, N.J., or as disclosed in USPA 2006/0252668.

[0050] In another aspect, the deposition aid may be selected from the group consisting of cationic or amphoteric polysaccharides. In one aspect, the deposition aid may be selected from the group consisting of cationic and amphoteric cellulose ethers, cationic or amphoteric galactomannan, cationic guar gum, cationic or amphoteric starch, and combinations thereof.

[0051] Another group of suitable cationic polymers may include alkylamine-epichlorohydrin polymers which are reaction products of amines and oligoamines with epichlorohydrin, for example, those polymers listed in, for example, U.S. Pat. Nos. 6,642,200 and 6,551,986. Examples include dimethylamine-epichlorohydrin-ethylenediamine, available under the trade name Cartafix® CB and Cartafix® TSF from Clariant, Basle, Switzerland.

[0052] Another group of suitable synthetic cationic polymers may include polyamidoamine-epichlorohydrin (PAE) resins of polyalkylenepolyamine with polycarboxylic acid. The most common PAE resins are the condensation products of diethylenetriamine with adipic acid followed by a subsequent reaction with epichlorohydrin. They are available from Hercules Inc. of Wilmington Del. under the trade name Kymene™ or from BASF AG (Ludwigshafen, Germany) under the trade name Luresin™. The cationic polymers may contain charge neutralizing anions such that the overall polymer is neutral under ambient conditions. Non-limiting examples of suitable counter ions (in addition to anionic species generated during use) include chloride, bromide, sulfate, methylsulfate, sulfonate, methylsulfonate, carbonate, bicarbonate, formate, acetate, citrate, nitrate, and mixtures thereof.

[0053] The weight-average molecular weight of the polymer may be from about 500 Daltons to about 5,000,000 Daltons, or from about 1,000 Daltons to about 2,000,000 Daltons, or from about 2,500 Daltons to about 1,500,000 Daltons, as determined by size exclusion chromatography relative to polyethylene oxide standards with RI detection. In one aspect, the MW of the cationic polymer may be from about 500 Daltons to about 37,500 Daltons.

[0054] Surfactants: The products of the present invention may comprise from about 0.11% to 80% by weight of a surfactant. In one aspect, such compositions may comprise from about 5% to 50% by weight of surfactant. Surfactants utilized can be of the anionic, nonionic, zwitterionic, ampholytic or cationic type or can comprise compatible mixtures of these types. Detergent surfactants useful herein are described in U.S. Pat. Nos. 3,664,961, 3,919,678, 4,222,905, 4,239,659, 6,136,769, 6,020,303, and 6,060,443.

[0055] Anionic and nonionic surfactants are typically employed if the fabric care product is a laundry detergent. On the other hand, cationic surfactants are typically employed if the fabric care product is a fabric softener.

[0056] Useful anionic surfactants can themselves be of several different types. For example, water-soluble salts of the higher fatty acids, i.e., "soaps", are useful anionic surfactants in the compositions herein. This includes alkali metal soaps such as the sodium, potassium, ammonium, and alkylolammonium salts of higher fatty acids containing from about 8 to about 24 carbon atoms, or even from about 12 to about 18 carbon atoms. Soaps can be made by direct saponification of fats and oils or by the neutralization of free fatty acids. Particularly useful are the sodium and potassium salts of the mixtures of fatty acids derived from coconut oil and tallow, i.e., sodium or potassium tallow and coconut soap.

[0057] Useful anionic surfactants include the water-soluble salts, particularly the alkali metal, ammonium and alkylolammonium (e.g., monoethanolammonium or triethanolammonium) salts, of organic sulfuric reaction products having in their molecular structure an alkyl group containing from about 10 to about 20 carbon atoms and a sulfonic acid or sulfuric acid ester group. (Included in the term "alkyl" is the alkyl portion of aryl groups.) Examples of this group of synthetic surfactants are the alkyl sulfates and alkyl alkoxy sulfates, especially those obtained by sulfating the higher alcohols (C_8-C_{18} carbon atoms).

[0058] Other useful anionic surfactants herein include the water-soluble salts of esters of α-sulfonated fatty acids containing from about 6 to 20 carbon atoms in the fatty acid group and from about 1 to 10 carbon atoms in the ester group; water-soluble salts of 2-acyloxy-alkane-1-sulfonic acids containing from about 2 to 9 carbon atoms in the acyl group and from about 9 to about 23 carbon atoms in the alkane moiety; water-soluble salts of olefin sulfonates containing from about 12 to 24 carbon atoms; and β-alkyloxy alkane sulfonates containing from about 1 to 3 carbon atoms in the alkyl group and from about 8 to 20 carbon atoms in the alkane moiety.

[0059] In another embodiment, the anionic surfactant may comprise a C_{11}-C_{18} alkyl benzene sulfonate surfactant; a C_{10}-C_{20} alkyl sulfate surfactant; a C_{10}-C_{18} alkyl alkoxy sulfate surfactant, having an average degree of alkoxylation of from 1 to 30, wherein the alkoxy comprises a C_1-C_4 chain and mixtures thereof; a mid-chain branched alkyl sulfate surfactant; a mid-chain branched alkyl alkoxy sulfate surfactant having an average degree of alkoxylation of from 1 to 30, wherein the alkoxy comprises a C_1-C_4 chain and mixtures thereof; a C_{10}-C_{18} alkyl alkoxy carboxylates comprising an average degree of alkoxylation of from 1 to 5; a C_{12}-C_{20} methyl ester sulfonate surfactant, a C_{10}-C_{18} alpha-olefin sulfonate surfactant, a C_6-C_{20} sulfosuccinate surfactant, and a mixture thereof.

[0060] In addition to the anionic surfactant, the fabric care compositions of the present invention may further contain a nonionic surfactant. The compositions of the present invention can contain up to about 30%, alternatively from about 0.01% to about 20%, more alternatively from about 0.1% to about 10%, by weight of the composition, of a nonionic surfactant. In one embodiment, the nonionic surfactant may comprise an ethoxylated nonionic surfactant. Examples of suitable non-ionic surfactants are provided in U.S. Pat. Nos. 4,285,841, 6,150,322, and 6,153,577.

[0061] Suitable for use herein are the ethoxylated alcohols and ethoxylated alkyl phenols of the formula $R(OC_2H_4)nOH$, wherein R is selected from the group consisting of aliphatic hydrocarbon radicals containing from about 8 to about 20 carbon atoms and alkyl phenyl radicals in which the alkyl groups contain from about 8 to about 12 carbon atoms, and the average value of n is from about 5 to about 15.

[0062] Suitable nonionic surfactants are those of the formula $R1(OC_2H_4)nOH$, wherein R1 is a C_{10}-C_{16} alkyl group or a C_8-C_{12} alkyl phenyl group, and n is from 3 to about 80. In one aspect, particularly useful materials are condensation products of C_9-C_{15} alcohols with from about 5 to about 20 moles of ethylene oxide per mole of alcohol.

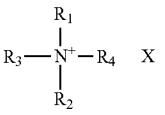
[0063] Additional suitable nonionic surfactants include polyhydroxy fatty acid amides such as N-methyl N-1-deoxyglucityl cocoamide and N-methyl N-1-deoxyglucityl oleam-

ide and alkyl polysaccharides such as the ones described in U.S. Pat. No. 5,332,528. Alkylpolysaccharides are disclosed in U.S. Pat. No. 4,565,647.

[0064] The fabric care compositions of the present invention may contain up to about 30%, alternatively from about 0.01% to about 20%, more alternatively from about 0.1% to about 20%, by weight of the composition, of a cationic surfactant. For the purposes of the present invention, cationic surfactants include those which can deliver fabric care benefits. Non-limiting examples of useful cationic surfactants include: fatty amines; quaternary ammonium surfactants; and imidazoline quat materials.

[0065] In some embodiments, useful cationic surfactants, include those disclosed in U.S. Patent Application number 2005/0164905 A1 and having the general Formula (I):

Formula (I)



wherein:

(a) R_1 and R_2 each are individually selected from the groups of: C_1-C_4 alkyl; C_1-C_4 hydroxy alkyl; benzyl; —$(CnH_{2n}O)_xH$, wherein:

[0066] i. x has a value from about 2 to about 5;

[0067] ii. n has a value of about 1-4;

(b) R_3 and R_4 are each:

[0068] i. a C_8-C_{22} alkyl; or

[0069] ii. R_3 is a C_8-C_{22} alkyl and R_4 is selected from the group of: C_1-C_{10} alkyl; C_1-C_{10} hydroxy alkyl; benzyl; —$(CnH_{2n}O)_xH$, wherein:

[0070] 1. x has a value from 2 to 5; and

[0071] 2. n has a value of 1-4; and

(c) X is an anion.

[0072] Fabric Softening Active Compounds—The fabric softening active may comprise, as the principal active, compounds of the following Formula (II)

$$\{R_{4-m}—N^+—[X—Y—R_1]_m\}X^- \quad \text{Formula (II)}$$

wherein each R may comprise either hydrogen, a short chain C_1-C_6, in one aspect a C_1-C_3 alkyl or hydroxyalkyl group, for example methyl, ethyl, propyl, hydroxyethyl, and the like, poly(C_{2-3} alkoxy), polyethoxy, benzyl, or mixtures thereof; each X may independently be $(CH_2)_n$, CH_2—$CH(CH_3)$— or CH—(CH_3)—CH_2—; each Y may comprise —O—(O)C—, —C(O)—O—, —NR—C(O)—, or —C(O)—NR—; each m may be 2 or 3; each n may be from 1 to about 4, in one aspect 2; the sum of carbons in each R^1, plus one when Y is —O—(O)C— or —NR—C(O)—, may be C_{12}-C_{22}, or C_{14}-C_{20}, with each R^1 being a hydrocarbyl, or substituted hydrocarbyl group; and X^- may comprise any softener-compatible anion. In one aspect, the softener-compatible anion may comprise chloride, bromide, methylsulfate, ethylsulfate, sulfate, and nitrate. In another aspect, the softener-compatible anion may comprise chloride or methyl sulfate.

[0073] In another aspect, the fabric softening active may comprise the general Formula (III):

$$[R_3N^+CH_2CH(YR^1)(CH_2YR^1)]X^- \quad \text{Formula (III)}$$

wherein each Y, R, R^1, and X^- have the same meanings as before. Such compounds include those having the Formula (IV):

$$[CH_3]_3N^{(+)}[CH_2CH(CH_2O(O)CR^1)O(O)CR^1]C1^{(-)} \quad \text{Formula (IV)}$$

wherein each R may comprise a methyl or ethyl group. In one aspect, each R^1 may comprise a C_{15} to C_{19} group. As used herein, when the diester is specified, it can include the monoester that is present.

[0074] These types of agents and general methods of making them are disclosed in U.S. Pat. No. 4,137,180. An example of a suitable DEQA (2) is the "propyl" ester quaternary ammonium fabric softener active comprising the formula 1,2-di(acyloxy)-3-trimethylammoniopropane chloride.

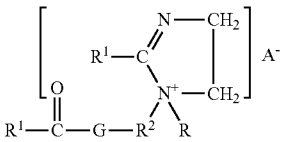
[0075] In one aspect, the fabric softening active may comprise the Formula (V):

$$[R_{4-m}—N^+—R^1{}_m]X^- \quad \text{Formula (V)}$$

wherein each R, R^1, m and X^- have the same meanings as before.

[0076] In a further aspect, the fabric softening active may comprise the Formula (VI):

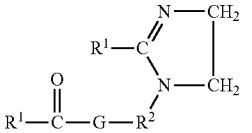
Formula (VI)



wherein each R and R^1 have the definitions given above; R^2 may comprise a C_{1-6} alkylene group, in one aspect an ethylene group; and G may comprise an oxygen atom or an —NR— group; and A^- is as defined below.

[0077] In a yet further aspect, the fabric softening active may comprise the Formula (VII):

Formula (VII)



wherein R^1, R^2 and G are defined as above.

[0078] In a further aspect, the fabric softening active may comprise condensation reaction products of fatty acids with dialkylenetriamines in, e.g., a molecular ratio of about 2:1, said reaction products containing compounds of the Formula (VIII):

$$R^1—C(O)—NH—R^2—NH—R^3—NH—C(O)—R^1 \quad \text{Formula (VIII)}$$

wherein R^1, R^2 are defined as above, and R^3 may comprise a C_{1-6} alkylene group, or an ethylene group and wherein the reaction products may optionally be quaternized by the additional of an alkylating agent such as dimethyl sulfate. Such quaternized reaction products are described in additional detail in U.S. Pat. No. 5,296,622.

[0079] In a yet further aspect, the fabric softening active may comprise the Formula (IX):

$$[R^1—C(O)—NR—R^2—N(R)_2—R^3—NR—C(O)—R^1]^+A^- \quad \text{Formula (IX)}$$

wherein R, R^1, R^2, and R^3 are defined as above; A^- is as defined below.

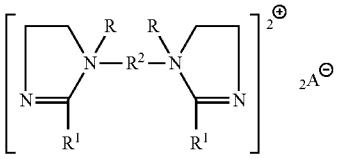
[0080] In a yet further aspect, the fabric softening active may comprise reaction products of fatty acid with hydroxyalkylalkylenediamines in a molecular ratio of about 2:1, said reaction products containing compounds of the Formula (X):

$$R^1—C(O)—NH—R^2—N(R^3OH)—C(O)—R^1 \qquad \text{Formula (X)}$$

wherein R, R^1, R^2, and R^3 are defined as above; A^- is as defined below.

[0081] In a yet further aspect, the fabric softening active may comprise the Formula (XI):

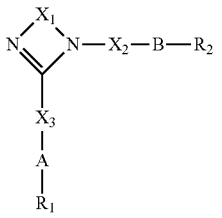
Formula (XI)



wherein R, R^1, R^2, and R^3 are defined as above; A^- is as defined below.

[0082] In yet a further aspect, the fabric softening active may comprise the Formula (XII);

Formula (XII)



Wherein X_1 may comprise a C_{2-3} alkyl group, in one aspect, an ethyl group; X_2 and X_3 may independently comprise C_{1-6} linear or branched alkyl or alkenyl groups, in one aspect, methyl, ethyl or isopropyl groups; R_1 and R_2 may independently comprise C_{8-22} linear or branched alkyl or alkenyl groups, characterized in that A and B are independently selected from the group comprising —O—(C═O)—, —(C═O)—O—, or mixtures thereof, in one aspect, —O—(C═O)—.

[0083] Non-limiting examples of fabric softening actives comprising Formula (II) are N,N-bis(stearoyl-oxy-ethyl) N,N-dimethyl ammonium chloride, N,N-bis(tallowoyl-oxy-ethyl) N,N-dimethyl ammonium chloride, N,N-bis(stearoyl-oxy-ethyl) N-(2 hydroxyethyl) N-methyl ammonium methylsulfate.

[0084] A non-limiting example of fabric softening actives comprising Formula (III) is 1,2 di (stearoyl-oxy) 3 trimethyl ammoniumpropane chloride.

[0085] Non-limiting examples of fabric softening actives comprising Formula (V) may include dialkylenedimethylammonium salts such as dicanoladimethylammonium chloride, di(hard)tallowedimethylammonium chloride dicanoladimethylammonium methylsulfate. An example of commercially available dialkylenedimethylammonium salts usable in the present invention is dioleyldimethylammonium chloride available from Witco Corporation under the trade name Adogen® 472 and dihardtallow dimethylammonium chloride available from Akzo Nobel Arquad® 2HT75.

[0086] A non-limiting example of fabric softening actives comprising Formula (VI) may include 1-methyl-1-stearoylamidoethyl-2-stearoylimidazolinium methylsulfate wherein R^1 is an acyclic aliphatic C_{15}-C_{17} hydrocarbon group, R^2 is an ethylene group, G is a NH group, R^5 is a methyl group and A^- is a methyl sulfate anion, available commercially from the Witco Corporation under the trade name Varisoft®.

[0087] A non-limiting example of fabric softening actives comprising Formula (VII) is 1-tallowylamidoethyl-2-tallowylimidazoline wherein R^1 may comprise an acyclic aliphatic C_{15}-C_{17} hydrocarbon group, R^2 may comprise an ethylene group, and G may comprise a NH group.

[0088] A non-limiting example of a fabric softening active comprising Formula (VIII) is the reaction products of fatty acids with diethylenetriamine in a molecular ratio of about 2:1, said reaction product mixture comprising N,N"-dialkyldiethylenetriamine having the Formula (XIII):

$$R^1—C(O)—NH—CH_2CH_2—NH—CH_2CH_2—NH—C(O)—R^1 \qquad \text{Formula (XIII)}$$

wherein R^1 is an alkyl group of a commercially available fatty acid derived from a vegetable or animal source, such as Emersol® 223LL or Emersol® 7021, available from Henkel Corporation, and R^2 and R^3 are divalent ethylene groups.

[0089] A non-limiting example of a fabric softening active comprising Formula (IX) is a difatty amidoamine based softener having the Formula (XIV):

$$[R^1—C(O)—NH—CH_2CH_2—N(CH_3)(CH_2CH_2OH)—CH_2CH_2—NH—C(O)—R^1]^+ CH_3SO_4^- \qquad \text{Formula (XIV)}$$

wherein R^1 is an alkyl group. An example of such compound is that commercially available from the Witco Corporation e.g. under the trade name Varisoft® 222LT.

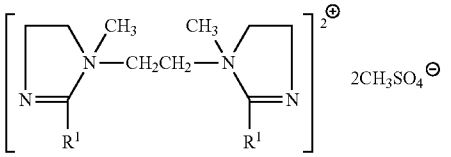
[0090] A non-limiting example of a fabric softening active comprising Formula (X) is the reaction products of fatty acids with N-2-hydroxyethylethylenediamine in a molecular ratio of about 2:1, said reaction product mixture comprising the Formula (XV):

$$R^1—C(O)—NH—CH_2CH_2—N(CH_2CH_2OH)—C(O)—R^1 \qquad \text{Formula (XV)}$$

wherein R^1—C(O) is an alkyl group of a commercially available fatty acid derived from a vegetable or animal source, such as Emersol® 223LL or Emersol® 7021, available from Henkel Corporation.

[0091] A non-limiting example of a fabric softening active comprising Formula (XI) is the diquaternary compound having the Formula (XVI):

Formula (XVI)



wherein R^1 is derived from fatty acid. Such compound is available from Witco Company.

[0092] A non-limiting example of a fabric softening active comprising Formula (XII) is a dialkyl imidazoline diester compound, where the compound is the reaction product of N-(2-hydroxyethyl)-1,2-ethylenediamine or N-(2-hydroxy-

isopropyl)-1,2-ethylenediamine with glycolic acid, esterified with fatty acid, where the fatty acid is (hydrogenated) tallow fatty acid, palm fatty acid, hydrogenated palm fatty acid, oleic acid, rapeseed fatty acid, hydrogenated rapeseed fatty acid or a mixture of the above.

[0093] It will be understood that combinations of softener actives disclosed above are suitable for use herein.

Anion A

[0094] In the cationic nitrogenous salts herein, the anion A^-, which comprises any softener compatible anion, provides electrical neutrality. Most often, the anion used to provide electrical neutrality in these salts is from a strong acid, especially a halide, such as chloride, bromide, or iodide. However, other anions can be used, such as methylsulfate, ethylsulfate, acetate, formate, sulfate, carbonate, and the like. In one aspect, the anion A may comprise chloride or methylsulfate. The anion, in some aspects, may carry a double charge. In this aspect, A^- represents half a group.

[0095] In one aspect, the fabric care and/or treatment composition may comprise a second softening agent selected from the group consisting of polyglycerol esters (PGEs), oily sugar derivatives, and wax emulsions. Suitable PGEs include those disclosed in U.S. PA 61/089,080. Suitable oily sugar derivatives and wax emulsions include those disclosed in USPA 2008-0234165 A1.

[0096] In one aspect, the compositions may comprise from about 0.001% to about 0.01% of an unsaturated aldehyde. In one aspect, the compositions are essentially free of an unsaturated aldehyde. Without being limited by theory, in this aspect, the compositions are less prone to the yellowing effect often encountered with amino-containing agents.

[0097] Builders—The compositions may also contain from about 0.1% to 80% by weight of a builder. Compositions in liquid form generally contain from about 1% to 10% by weight of the builder component. Compositions in granular form generally contain from about 1% to 50% by weight of the builder component. Detergent builders are well known in the art and can contain, for example, phosphate salts as well as various organic and inorganic nonphosphorus builders. Water-soluble, nonphosphorus organic builders useful herein include the various alkali metal, ammonium and substituted ammonium polyacetates, carboxylates, polycarboxylates and polyhydroxy sulfonates. Examples of polyacetate and polycarboxylate builders are the sodium, potassium, lithium, ammonium and substituted ammonium salts of ethylene diamine tetraacetic acid, nitrilotriacetic acid, oxydisuccinic acid, mellitic acid, benzene polycarboxylic acids, and citric acid. Other suitable polycarboxylates for use herein are the polyacetal carboxylates described in U.S. Pat. No. 4,144,226 and U.S. Pat. No. 4,246,495. Other polycarboxylate builders are the oxydisuccinates and the ether carboxylate builder compositions comprising a combination of tartrate monosuccinate and tartrate disuccinate described in U.S. Pat. No. 4,663,071, Builders for use in liquid detergents are described in U.S. Pat. No. 4,284,532, One suitable builder includes may be citric acid. Suitable nonphosphorus, inorganic builders include the silicates, aluminosilicates, borates and carbonates, such as sodium and potassium carbonate, bicarbonate, sesquicarbonate, tetraborate decahydrate, and silicates having a weight ratio of SiO_2 to alkali metal oxide of from about 0.5 to about 4.0, or from about 1.0 to about 2.4. Also useful are aluminosilicates including zeolites. Such materials and their use as detergent builders are more fully discussed in U.S. Pat. No. 4,605,509.

[0098] Dispersants—The compositions may contain from about 0.1%, to about 10%, by weight of dispersants Suitable water-soluble organic materials are the homo- or co-polymeric acids or their salts, in which the polycarboxylic acid may contain at least two carboxyl radicals separated from each other by not more than two carbon atoms. The dispersants may also be alkoxylated derivatives of polyamines, and/or quaternized derivatives thereof such as those described in U.S. Pat. Nos. 4,597,898, 4,676,921, 4,891,160, 4,659,802 and 4,661,288.

[0099] Enzymes—The compositions may contain one or more detergent enzymes which provide cleaning performance and/or fabric care benefits. Examples of suitable enzymes include hemicellulases, peroxidases, proteases, cellulases, xylanases, lipases, phospholipases, esterases, cutinases, pectinases, keratanases, reductases, oxidases, phenoloxidases, lipoxygenases, ligninases, pullulanases, tannases, pentosanases, malanases, β-glucanases, arabinosidases, hyaluronidase, chondroitinase, laccase, and amylases, or mixtures thereof. A typical combination may be a cocktail of conventional applicable enzymes like protease, lipase, cutinase and/or cellulase in conjunction with amylase. Enzymes can be used at their art-taught levels, for example at levels recommended by suppliers such as Novozymes and Genencor. Typical levels in the compositions are from about 0.0001% to about 5%. When enzymes are present, they can be used at very low levels, e.g., from about 0.001% or lower; or they can be used in heavier-duty laundry detergent formulations at higher levels, e.g., about 0.1% and higher. In accordance with a preference of some consumers for "non-biological" detergents, the compositions may be either or both enzyme-containing and enzyme-free.

[0100] Dye Transfer Inhibiting Agents—The compositions may also include from about 0.0001%, from about 0.01%, from about 0.05% by weight of the compositions to about 10%, about 2%, or even about 1% by weight of the compositions of one or more dye transfer inhibiting agents such as polyvinylpyrrolidone polymers, polyamine N-oxide polymers, copolymers of N-vinylpyrrolidone and N-vinylimidazole, polyvinyloxazolidones and polyvinylimidazoles or mixtures thereof.

[0101] Chelant—The compositions may contain less than about 5%, or from about 0.01% to about 3% of a chelant such as citrates; nitrogen-containing, P-free aminocarboxylates such as EDDS, EDTA and DTPA; aminophosphonates such as diethylenetriamine pentamethylenephosphonic acid and, ethylenediamine tetramethylenephosphonic acid; nitrogen-free phosphonates e.g., HEDP; and nitrogen or oxygen containing, P-free carboxylate-free chelants such as compounds of the general class of certain macrocyclic N-ligands such as those known for use in bleach catalyst systems.

[0102] Brighteners—The compositions may also comprise a brightener (also referred to as "optical brightener") and may include any compound that exhibits fluorescence, including compounds that absorb UV light and reemit as "blue" visible light. Non-limiting examples of useful brighteners include: derivatives of stilbene or 4,4'-diaminostilbene, biphenyl, five-membered heterocycles such as triazoles, pyrazolines, oxazoles, imidiazoles, etc., or six-membered heterocycles (coumarins, naphthalamide, s-triazine, etc.). Cationic, anionic, nonionic, amphoteric and zwitterionic brighteners

can be used. Suitable brighteners include those commercially marketed under the trade name Tinopal-UNPA-GX® by Ciba Specialty Chemicals Corporation (High Point, N.C.).

[0103] Bleach system—Bleach systems suitable for use herein contain one or more bleaching agents. Non-limiting examples of suitable bleaching agents include catalytic metal complexes; activated peroxygen sources; bleach activators; bleach boosters; photobleaches; bleaching enzymes; free radical initiators; H_2O_2; hypohalite bleaches; peroxygen sources, including perborate and/or percarbonate and combinations thereof. Suitable bleach activators include perhydrolyzable esters and perhydrolyzable imides such as, tetraacetyl ethylene diamine, octanoylcaprolactam, benzoyloxybenzenesulphonate, nonanoyloxybenzene-isulphonate, benzoylvalerolactam, dodecanoyloxybenzenesulphonate. Suitable bleach boosters include those described in U.S. Pat. No. 5,817,614. Other bleaching agents include metal complexes of transitional metals with ligands of defined stability constants. Such catalysts are disclosed in U.S. Pat. Nos. 4,430,243, 5,576,282, 5,597,936 and 5,595,967.

[0104] Stabilizer—The compositions may contain one or more stabilizers and thickeners. Any suitable level of stabilizer may be of use; exemplary levels include from about 0.01% to about 20%, from about 0.1% to about 10%, or from about 0.1% to about 3% by weight of the composition. Non-limiting examples of stabilizers suitable for use herein include crystalline, hydroxyl-containing stabilizing agents, trihydroxystearin, hydrogenated oil, or a variation thereof, and combinations thereof. In some aspects, the crystalline, hydroxyl-containing stabilizing agents may be water-insoluble wax-like substances, including fatty acid, fatty ester or fatty soap. In other aspects, the crystalline, hydroxyl-containing stabilizing agents may be derivatives of castor oil, such as hydrogenated castor oil derivatives, for example, castor wax. The hydroxyl containing stabilizers are disclosed in U.S. Pat. Nos. 6,855,680 and 7,294,611. Other stabilizers include thickening stabilizers such as gums and other similar polysaccharides, for example gellan gum, carrageenan gum, and other known types of thickeners and rheological additives. Exemplary stabilizers in this class include gum-type polymers (e.g. xanthan gum), polyvinyl alcohol and derivatives thereof, cellulose and derivatives thereof including cellulose ethers and cellulose esters and tamarind gum (for example, comprising xyloglucan polymers), guar gum, locust bean gum (in some aspects comprising galactomannan polymers), and other industrial gums and polymers.

[0105] For the purposes of the present invention, the non-limiting list of adjuncts illustrated hereinafter are suitable for use in the instant compositions and may be desirably incorporated in certain embodiments of the invention, for example to assist or enhance performance, for treatment of the substrate to be cleaned, or to modify the aesthetics of the composition as is the case with perfumes, colorants, dyes or the like. It is understood that such adjuncts are in addition to the components that are supplied via Applicants' perfumes and/or perfume systems. The precise nature of these additional components, and levels of incorporation thereof, will depend on the physical form of the composition and the nature of the operation for which it is to be used. Suitable adjunct materials include, but are not limited to, surfactants, builders, chelating agents, dye transfer inhibiting agents, dispersants, enzymes, and enzyme stabilizers, catalytic materials, bleach activators, polymeric dispersing agents, clay soil removal/anti-redeposition agents, brighteners, suds suppressors, dyes, additional perfume and perfume delivery systems, structure elasticizing agents, fabric softeners, carriers, hydrotropes, processing aids and/or pigments. In addition to the disclosure below, suitable examples of such other adjuncts and levels of use are found in U.S. Pat. Nos. 5,576,282, 6,306,812 B1 and 6,326,348 B1 that are incorporated by reference.

[0106] Silicones—Suitable silicones comprise Si—O moieties and may be selected from (a) non-functionalized siloxane polymers, (b) functionalized siloxane polymers, and combinations thereof. The molecular weight of the organosilicone is usually indicated by the reference to the viscosity of the material. In one aspect, the organosilicones may comprise a viscosity of from about 10 to about 2,000,000 centistokes at 25° C. In another aspect, suitable organosilicones may have a viscosity of from about 10 to about 800,000 centistokes at 25° C.

[0107] Suitable organosilicones may be linear, branched or cross-linked. In one aspect, the organosilicones may be linear.

[0108] In one aspect, the organosilicone may comprise a non-functionalized siloxane polymer that may have Formula (XVII) below, and may comprise polyalkyl and/or phenyl silicone fluids, resins and/or gums.

$$[R_1R_2R_3SiO_{1/2}]_n[R_4R_4SiO_{2/2}]_m[R_4SiO_{3/2}]_j \qquad \text{Formula (XVII)}$$

wherein:

i) each R_1, R_2, R_3 and R_4 may be independently selected from the group consisting of H, —OH, C_1-C_{20} alkyl, C_1-C_{20} substituted alkyl, C_6-C_{20} aryl, C_6-C_{20} substituted aryl, alkylaryl, and/or C_1-C_{20} alkoxy, moieties;

ii) n may be an integer from about 2 to about 10, or from about 2 to about 6; or 2; such that n=j+2;

iii) m may be an integer from about 5 to about 8,000, from about 7 to about 8,000 or from about 15 to about 4,000;

iv) j may be an integer from 0 to about 10, or from 0 to about 4, or 0;

[0109] In one aspect, R_2, R_3 and R_4 may comprise methyl, ethyl, propyl, C_4-C_{20} alkyl, and/or C_6-C_{20} aryl moieties. In one aspect, each of R_2, R_3 and R_4 may be methyl. Each R_1 moiety blocking the ends of the silicone chain may comprise a moiety selected from the group consisting of hydrogen, methyl, methoxy, ethoxy, hydroxy, propoxy, and/or aryloxy.

[0110] As used herein, the nomenclature SiO"n"/2 represents the ratio of oxygen and silicon atoms. For example, $SiO_{1/2}$ means that one oxygen is shared between two Si atoms. Likewise $SiO_{2/2}$ means that two oxygen atoms are shared between two Si atoms and $SiO_{3/2}$ means that three oxygen atoms are shared are shared between two Si atoms.

[0111] In one aspect, the organosilicone may be polydimethylsiloxane, dimethicone, dimethiconol, dimethicone crospolymer, phenyl trimethicone, alkyl dimethicone, lauryl dimethicone, stearyl dimethicone and phenyl dimethicone. Examples include those available under the names DC 200 Fluid, DC 1664, DC 349, DC 346G available from Dow Corning® Corporation, Midland, Mich., and those available under the trade names SF1202, SF1204, SF96, and Viscasil® available from Momentive Silicones, Waterford, N.Y.

[0112] In one aspect, the organo silicone may comprise a cyclic silicone. The cyclic silicone may comprise a cyclomethicone of the formula $[(CH_3)_2SiO]_n$ where n is an integer that may range from about 3 to about 7, or from about 5 to about 6.

[0113] In one aspect, the organosilicone may comprise a functionalized siloxane polymer. Functionalized siloxane polymers may comprise one or more functional moieties

selected from the group consisting of amino, amido, alkoxy, hydroxy, polyether, carboxy, hydride, mercapto, sulfate phosphate, and/or quaternary ammonium moieties. These moieties may be attached directly to the siloxane backbone through a bivalent alkylene radical, (i.e., "pendant") or may be part of the backbone. Suitable functionalized siloxane polymers include materials selected from the group consisting of aminosilicones, amidosilicones, silicone polyethers, silicone-urethane polymers, quaternary ABn silicones, amino ABn silicones, and combinations thereof.

[0114] In one aspect, the functionalized siloxane polymer may comprise a silicone polyether, also referred to as "dimethicone copolyol." In general, silicone polyethers comprise a polydimethylsiloxane backbone with one or more polyoxyalkylene chains. The polyoxyalkylene moieties may be incorporated in the polymer as pendent chains or as terminal blocks. Such silicones are described in USPA 2005/0098759, and U.S. Pat. Nos. 4,818,421 and 3,299,112. Exemplary commercially available silicone polyethers include DC 190, DC 193, FF400, all available from Dow Corning® Corporation, and various Silwet® surfactants available from Momentive Silicones.

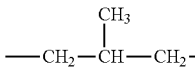
[0115] In another aspect, the functionalized siloxane polymer may comprise an aminosilicone. Suitable aminosilicones are described in U.S. Pat. Nos. 7,335,630 B2, 4,911,852, and USPA 2005/0170994A1. In one aspect the aminosilicone may be that described in USPA 61/221,632. In another aspect, the aminosilicone may comprise the structure of Formula (XVIII):

$$[R_1R_2R_3SiO_{1/2}]_n[(R_4Si(X—Z)O_{2/2}]_k[R_4R_4SiO_{2/2}]_m [R_4SiO_{3/2}]_j \quad \text{Formula (XVIII)}$$

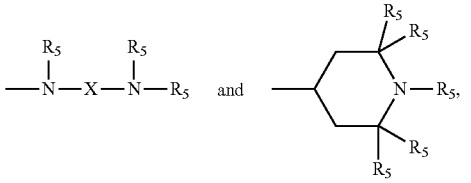
[0116] wherein

[0117] i. R_1, R_2, R_3 and R_4 may each be independently selected from H, OH, C_1-C_{20} alkyl, C_1-C_{20} substituted alkyl, C_6-C_{20} aryl, C_6-C_{20} substituted aryl, alkylaryl, and/or C_1-C_{20} alkoxy;

[0118] ii. Each X may be independently selected from a divalent alkylene radical comprising 2-12 carbon atoms, —(CH_2)s- wherein s may be an integer from about 2 to about 10; —CH_2—CH(OH)—CH_2—; and/or



[0119] iii. Each Z may be independently selected from —$N(R_5)_2$;



wherein each R_5 may be selected independently selected from H, C_1-C_{20} alkyl; and A^- may be a compatible anion. In one aspect, A^- may be a halide;

[0120] iv. k may be an integer from about 3 to about 20, from about 5 to about 18 more or even from about 5 to about 10;

[0121] v. m may be an integer from about 100 to about 2,000, or from about 150 to about 1,000;

[0122] vi. n may be an integer from about 2 to about 10, or about 2 to about 6, or 2, such that n=j+2; and

[0123] vii. j may be an integer from 0 to about 10, or from 0 to about 4, or 0;

[0124] In one aspect, R_1 may comprise —OH. In this aspect, the organosilicone is amidomethicone.

[0125] Exemplary commercially available aminosilicones include DC 8822, 2-8177, and DC-949, available from Dow Corning® Corporation, and KF-873, available from Shin-Etsu Silicones, Akron, Ohio.

[0126] In one aspect, the organosilicone may comprise amine ABn silicones and quat ABn silicones.

[0127] Such organosilicones are generally produced by reacting a diamine with an epoxide. These are described, for example, in U.S. Pat. Nos. 6,903,061 B2, 5,981,681, 5,807,956, 6,903,061 and 7,273,837. These are commercially available under the trade names Magnasoft® Prime, Magnasoft® JSS, Silsoft® A-858 (all from Momentive Silicones).

[0128] In another aspect, the functionalized siloxane polymer may comprise silicone-urethanes, such as those described in U.S. PA 61/170,150. These are commercially available from Wacker Silicones under the trade name SLM-21200®.

[0129] When a sample of organosilicone is analyzed, it is recognized by the skilled artisan that such sample may have, on average, the non-integer indices for Formula (XVII) and (XVIII) above, but that such average indices values will be within the ranges of the indices for Formula (XVII) and (XVIII) above.

Perfume: The optional perfume component may comprise a component selected from the group consisting of

[0130] (1) a perfume microcapsule, or a moisture-activated perfume microcapsule, comprising a perfume carrier and an encapsulated perfume composition, wherein said perfume carrier may be selected from the group consisting of cyclodextrins, starch microcapsules, porous carrier microcapsules, and mixtures thereof; and wherein said encapsulated perfume composition may comprise low volatile perfume ingredients, high volatile perfume ingredients, and mixtures thereof;

[0131] (2) a pro-perfume;

[0132] (3) a low odor detection threshold perfume ingredients, wherein said low odor detection threshold perfume ingredients may comprise less than about 25%, by weight of the total neat perfume composition; and

[0133] (4) mixtures thereof; and

[0134] The weight ratio of the fabric softening active to said carrier component may be from about 1:19 to about 19:1. In one aspect, the fabric conditioning composition exhibits a melting point greater than about 90° C.

[0135] Microcapsule—The compositions may comprise from about 0.05% to about 5%; or from about 0.1% to about 1% of a microcapsule. In one aspect, the microcapsule may comprise a shell comprising a polymer crosslinked with an aldehyde. In one aspect, the microcapsule may comprise a shell comprising a polymer selected from the group consisting of polyurea, polyurethane, polyamine, urea crosslinked with an aldehyde or melamine crosslinked with an aldehyde. Examples of materials suitable for making the shell of the

microcapsule include melamine-formaldehyde, urea-formaldehyde, phenol-formaldehyde, or other condensation polymers with formaldehyde.

[0136] In one aspect, the microcapsules may vary in size (i.e., the maximum diameter is from about 1 to about 75 microns, or from about 5 to about 30 microns). The capsules may have an average shell thickness ranging from about 0.05 to about 10 microns, alternatively from about 0.05 to about 1 micron.

[0137] In one aspect, the microcapsule may comprise a perfume microcapsule. In turn, the perfume core may comprise a perfume and optionally a diluent. Suitable perfume microcapsules may include those described in the following references: published USPA Nos 2003-215417 A1; 2003-216488 A1; 2003-158344 A1; 2003-165692 A1; 2004-071742 A1; 2004-071746 A1; 2004-072719 A1; 2004-072720 A1; 2003-203829 A1; 2003-195133 A1; 2004-087477 A1; 2004-0106536 A1; U.S. Pat. Nos. 6,645,479; 6,200,949; 4,882,220; 4,917,920; 4,514,461; RE32713; 4,234,627; EP 1393706 A1. Capsules having a perfume loading of from about 50% to about 95% by weight of the capsule may be employed.

[0138] The shell material surrounding the core to form the microcapsule can be any suitable polymeric material which is impervious or substantially impervious to the materials in the core (generally a liquid core) and the materials which may come in contact with the outer surface of the shell. In one aspect, the material making the shell of the microcapsule may comprise formaldehyde. Formaldehyde based resins such as melamine-formaldehyde or urea-formaldehyde resins are especially attractive for perfume encapsulation due to their wide availability and reasonable cost.

[0139] One method for forming shell capsules useful herein is polycondensation, which may be used to produce aminoplast encapsulates. Aminoplast resins are the reaction products of one or more amines with one or more aldehydes, typically formaldehyde. Non-limiting examples of amines are melamine and its derivatives, urea, thiourea, benzoguanamine, and acetoguanamine and combinations of amines. Suitable cross-linking agents (e.g. toluene diisocyanate, divinyl benzene, butane diol diacrylate, etc) may also be used and secondary wall polymers may also be used as appropriate, as described in the art, e.g., anhydrides and their derivatives, particularly polymers and copolymers of maleic anhydride as disclosed in published USPA 2004-0087477

[0140] A1.

[0141] Microcapsules having the liquid cores and polymer shell walls as described above can be prepared by any conventional process which produces capsules of the requisite size, friability and water-insolubility. Generally, such methods as coacervation and interfacial polymerization can be employed in known manner to produce microcapsules of the desired characteristics. Such methods are described in Ida et al, U.S. Pat. Nos. 3,870,542; 3,415,758; and 3,041,288.

[0142] Cyclodextrin. A suitable moisture-activated perfume carrier that may be useful in the disclosed multiple use fabric conditioning composition may comprise cyclodextrin. As used herein, the term "cyclodextrin" includes any of the known cyclodextrins such as unsubstituted cyclodextrins containing from six to twelve glucose units, especially beta-cyclodextrin, gamma-cyclodextrin, alpha-cyclodextrin, and/or derivatives thereof, and/or mixtures thereof. A more detailed description of suitable cyclodextrins is provided in U.S. Pat. No. 5,714,137. Suitable cylodextrins herein include beta-cyclodextrin, gamma-cyclodextrin, alpha-cyclodextrin, substituted beta-cyclodextrins, and mixtures thereof. In one aspect, the cyclodextrin may comprise beta-cyclodextrin. Perfume molecules are encapsulated into the cavity of the cyclodextrin molecules to form molecular microcapsules, commonly referred to as cyclodextrin/perfume complexes. The perfume loading in a cyclodextrin/perfume complex may comprise from about 3% to about 20%, or from about 5% to about 18%, or from about 7% to about 16%, by weight of the cyclodextrin/perfume complex.

[0143] The cyclodextrin/perfume complexes hold the encapsulated perfume molecules tightly, so that they can prevent perfume diffusion and/or perfume loss, and thus reducing the odor intensity of the multiple use fabric conditioning composition. However, the cyclodextrin/perfume complex can readily release some perfume molecules in the presence of moisture, thus providing a long lasting perfume benefit. Non-limiting examples of preparation methods are given in U.S. Pat. Nos. 5,552,378, and 5,348,667.

[0144] Suitable cyclodextrin/perfume complexes (or perfume cyclodextrin microcapsule) may have a small particle size, typically from about 0.01 to about 200 micrometer, or from about 0.1 less than about 150 micrometer, or from about 1.0 to about 100 micrometer, or from about 10 to about 50 micrometer.

[0145] The multiple use fabric conditioning compositions may comprise of from about 0.1% to about 25%, or from about 1% to about 20%, or from about 3% to about 15%, or from about 5% to about 10%, by weight of the total fabric conditioning composition, of cyclodextrin/perfume complex.

[0146] Moisture-Activated Cellular Matrix Microcapsule Moisture-activated and/or water-soluble perfume cellular matrix microcapsules are solid particles containing perfume stably held in the cells within the particles. Details about moisture-activated perfume cellular matrix microcapsules are disclosed in U.S. Pat. No. 3,971,852. A suitable moisture-activated perfume cellular matrix microcapsule may be perfume starch microcapsule which uses starch as the cellular matrix material.

[0147] Moisture-activated perfume cellular matrix microcapsules may have a size of from about 0.5 micron to about 300 microns, from about 1 micron to about 200 microns, or from about 2 microns to about 100 microns. The perfume loading in the cellular matrix microcapsules may range from about 20% to about 70%, or from about 40% to about 60%, by weight of the microcapsules. Sufficient amount of perfume moisture-activated microcapsules should be used to deliver the desired levels of perfume, depending on the perfume loading of the microcapsules. For microcapsules with a perfume loading of about 50%, typical level of the matrix microcapsules may comprise from about 0.1% to about 15%, from about 0.5% to about 7%, from about 0.8% to about 8%, or from about 1% to about 6%, by weight of the multiple use fabric conditioning composition.

[0148] A dispersing agent may be used to distribute the moisture-activated perfume cellular matrix microcapsules uniformly in the molten multiple use fabric conditioning composition. Suitable dispersing agents for use in combination with moisture-activated cellular microcapsules include block copolymer having blocks of terephthalate and polyethylene oxide. More specifically, these polymers are comprised of repeating units of ethylene and/or propylene terephthalate and polyethylene oxide terephthalate at a molar ratio of poly (ethylene/propylene) terephthalate units to polyethylene oxide terephthalate units of from about 25:75 to about 35:65, said polyethylene oxide terephthalate containing polyethylene oxide blocks having molecular weights of from about 300 to about 2,000. The molecular weight of this polymeric dispersing agent may be in the range of from about 5,000 to about 55,000.

[0149] Another suitable dispersing agent for use in combination with moisture-activated cellular microcapsules may be block copolymer having blocks of polyethylene oxide and of polypropylene oxide. Non-limiting examples of dispersing agent of this type include Pluronic® surfactants and Tetronic® surfactants.

[0150] In the process of preparing a multiple use fabric conditioning bar, a suitable dispersing agent may first be added to the fabric conditioning composition melt mixture with mixing, and the moisture-activated perfume starch microcapsules may then be added to the melt mixture with mixing, and the resulting mixture may be poured into a mold to form a multiple use fabric conditioning bar.

[0151] Porous Carrier Microcapsule—A portion of the perfume composition can also be absorbed onto and/or into a porous carrier, such as zeolites or clays, to form perfume porous carrier microcapsules in order to reduce the amount of free perfume in the multiple use fabric conditioning composition. When the perfume is to be adsorbed onto zeolite, the perfume ingredients forming the encapsulated perfume composition can be selected according to the description provided in U.S. Pat. No. 5,955,419.

[0152] Pro-perfume—The perfume composition may additionally include a pro-perfume. Pro-perfumes may comprise nonvolatile materials that release or convert to a perfume material as a result of, e.g., simple hydrolysis, or may be pH-change-triggered pro-perfumes (e.g. triggered by a pH drop) or may be enzymatically releasable pro-perfumes, or light-triggered pro-perfumes. The pro-perfumes may exhibit varying release rates depending upon the pro-perfume chosen. Pro-perfumes suitable for use in the disclosed compositions are described in the following: U.S. Pat. Nos. 5,378,468; 5,626,852; 5,710,122; 5,716,918; 5,721,202; 5,744,435; 5,756,827; 5,830,835; and 5,919,752.

Processes of Making Fabric and/or Hard Surface Cleaning and/or Treatment Compositions

[0153] The cleaning and/or treatment compositions of the present invention can be formulated into any suitable form and prepared by any process chosen by the formulator, non-limiting examples of which are described in U.S. Pat. No. 5,879,584; U.S. Pat. No. 5,691,297; U.S. Pat. No. 5,574,005; U.S. Pat. No. 5,569,645; U.S. Pat. No. 5,565,422; U.S. Pat. No. 5,516,448; U.S. Pat. No. 5,489,392; U.S. Pat. No. 5,486,303 all of which are incorporated herein by reference.

Method of Use

[0154] Certain of the consumer products disclosed herein can be used to clean or treat a situs inter alia a surface or fabric. Typically at least a portion of the situs is contacted with an embodiment of Applicants' composition, in neat form or diluted in a liquor, for example, a wash liquor and then the situs may be optionally washed and/or rinsed. In one aspect, a situs is optionally washed and/or rinsed, contacted with a particle according to the present invention or composition comprising said particle and then optionally washed and/or rinsed. For purposes of the present invention, washing includes but is not limited to, scrubbing, and mechanical agitation. The fabric may comprise most any fabric capable of being laundered or treated in normal consumer use conditions. Liquors that may comprise the disclosed compositions may have a pH of from about 3 to about 11.5. Such compositions are typically employed at concentrations of from about 500 ppm to about 15,000 ppm in solution. When the wash solvent is water, the water temperature typically ranges from about 5° C. to about 90° C. and, when the situs comprises a fabric, the water to fabric ratio is typically from about 1:1 to about 30:1.

[0155] In addition to the aforementioned methods, a situs treated with any of Applicants fabric and home care compositions is disclosed. In one aspect, such treatment may be achieved by treating a situs in accordance with at least one of the aforementioned methods.

[0156] While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

Example 1

Liquid Detergent Fabric Care Compositions

[0157] A liquid detergent fabric care is made by mixing together the ingredients listed in the proportions shown:

Ingredient	WT %
C_{12}-C_{15} alkyl polyethoxylate (1.8) sulfate[1]	20.1
C_{12} alkyl trimethyl ammonium chloride[4]	2.0
C_{12}-C_{14} alcohol 9 ethoxylate[3]	0.3
1,2 Propane diol[6]	4.5
Ethanol	3.4
C_{12}-C_{18} Fatty Acid[5]	2.1
Citric acid	3.4
Protease[7] (32 g/L)	0.42
Fluorescent Whitening Agent[8]	0.08
Diethylenetriamine pentaacetic acid[6]	0.5
Ethoxylated polyamine[9]	0.7
Hydrogenated castor oil[12]	0.2
Copolymer of acrylamide and methacrylamidopropyl trimethylammonium chloride[13]	0.3
Paraffin Emulsion[16]	6.0
Water, perfumes, dyes, buffers, solvents and other optional components	to 100% pH 8.0-8.2

Example 2

Liquid Detergent Fabric Care Compositions

[0158] A liquid detergent fabric care composition is made by mixing together the ingredients listed in the proportions shown

Ingredient (wt %)	Wt %
C_{12}-C_{15} alkyl polyethoxylate (1.8) sulfate[1]	16.6
$C_{11.8}$ linear alkylbenzene sulfonic acid[2]	4.9
C_{16}-C_{17} branched alkyl sulfate[1]	2.0
C_{12} alkyl dimethyl amine oxide[5]	0.7
C_{12}-C_{14} alcohol 9 ethoxylate[3]	0.8
1,2 Propane diol[6]	4.0
Ethanol	2.3
C_{12}-C_{18} Fatty Acid[5]	1.7
Citric acid	3.2
Protease[7] (32 g/L)	1.3
Fluorescent Whitening Agent[8]	0.2
Diethylenetriamine pentaacetic acid[6]	0.3
Ethoxylated polyamine[9]	1.8
Zwitterionic ethoxylated quaternized sulfated hexamethylene diamine[11]	1.5
Hydrogenated castor oil[12]	0.2
Copolymer of acrylamide and methacrylamidopropyl trimethylammonium chloride[13]	0.2
Paraffin Emulsion[16]	6.0
Water, perfumes, dyes, buffers, solvents and other optional components	to 100% pH 8.0-8.2

Example 3

Liquid Detergent Fabric Care Compositions

[0159] Liquid detergent fabric care composition is made by mixing together the ingredients listed in the proportions shown:

Ingredient (wt %)	Wt %
C_{12}-C_{15} alkyl polyethoxylate (1.8) sulfate[1]	20.1
C_{12} alkyl trimethyl ammonium chloride[4]	2.0
C_{12}-C_{14} alcohol 9 ethoxylate[3]	0.3
1,2 Propane diol[6]	4.5
Ethanol	3.4
C_{12}-C_{18} Fatty Acid[5]	2.1
Citric acid	3.4
Protease[7] (32 g/L)	0.42
Fluorescent Whitening Agent[8]	0.08
Diethylenetriamine pentaacetic acid[6]	0.5
Ethoxylated polyamine[9]	0.7
Hydrogenated castor oil[12]	0.2
Copolymer of acrylamide and methacrylamidopropyl trimethylammonium chloride[13]	0.3
Paraffin Emulsion[16]	3.0
X22-8699-3S[20]	3.0
Water, perfumes, dyes, buffers, solvents and other optional components	to 100% pH 8.0-8.2

Example 4

Liquid Detergent Fabric Care Compositions

[0160] Liquid detergent fabric care composition is made by mixing together the ingredients listed in the proportions shown:

Ingredient (wt %)	WT %
C_{12}-C_{15} alkyl polyethoxylate (1.8) sulfate[1]	16.6
$C_{11.8}$ linear alkylbenzene sulfonic acid[2]	4.9
C_{16}-C_{17} branched alkyl sulfate[1]	2.0
C_{12} alkyl dimethyl amine oxide[5]	0.7
C_{12}-C_{14} alcohol 9 ethoxylate[3]	0.8
1,2 Propane diol[6]	4.0
Ethanol	2.3
C_{12}-C_{18} Fatty Acid[5]	1.7
Citric acid[6]	3.2
Protease[7] (32 g/L)	1.3
Fluorescent Whitening Agent[8]	0.2
Diethylenetriamine pentaacetic acid[6]	0.3
Ethoxylated polyamine[9]	1.8
Zwitterionic ethoxylated quaternized sulfated hexamethylene diamine[11]	1.5
Hydrogenated castor oil[12]	0.2
Copolymer of acrylamide and methacrylamidopropyl trimethylammonium chloride[17]	0.2
Paraffin Emulsion[16]	3.0
X22-6699-3S[20]	3.0
Water, perfumes, dyes, buffers, solvents and other optional components	to 100% pH 8.0-8.2

Example 5

Liquid or Gel Detergents

[0161] Liquid or gel detergent fabric care compositions below are made by mixing together the ingredients listed in the proportions shown:

Ingredient (wt %)	5A	5B	5C	5D	5E
C_{12}-C_{15} alkyl polyethoxylate (3.0) sulfate[1]	8.5	2.9	2.9	2.9	6.8
$C_{11.8}$ linear alkylbenzene sulfonic acid[2]	11.4	8.2	8.2	8.2	1.2
C_{14}-C_{15} alkyl 7-ethoxylate[1]	—	5.4	5.4	5.4	3.0
C_{12}-C_{14} alkyl 7-ethoxylate[3]	7.6	—	—	—	1.0
1,2 Propane diol	6.0	1.3	1.3	6.0	0.2
Ethanol	—	1.3	1.3	—	1.4
Diethylene Glycol[6]	4.0	—	—	—	—
Na Cumene Sulfonate	—	1.0	1.0	0.9	—
C_{12}-C_{18} Fatty Acid[5]	9.5	3.5	3.5	3.5	4.5
Citric acid[6]	2.8	3.4	3.4	3.4	2.4
Protease (40.6 mg/g/)[7]	1.0	0.6	0.6	0.6	0.3
Natalase 200L (29.26 mg/g)[18]	—	0.1	0.1	0.1	—
Termamyl Ultra (25.1 mg/g)[18]	0.7	0.1	0.1	0.1	0.1
Mannaway 25L (25 mg/g)[18]	0.1	0.1	0.1	0.1	0.02
Whitezyme (20 mg/g)[18]	0.2	0.1	0.1	0.1	—
Fluorescent Whitening Agent[8]	0.2	0.1	0.1	0.1	—
Diethylene Triamine Penta Methylene Phosphonic acid[6]	—	0.3	0.3	0.3	0.1
Hydroxy Ethylidene 1,1 Di Phosphonic acid[6]	1.5	—	—	—	—
Zwitterionic ethoxylated quaternized sulfated hexamethylene diamine[11]	2.1	1.0	1.0	1.0	0.7
Grease Cleaning Alkoxylated Polyalkylenimine Polymer[10]	—	0.4	0.4	0.4	—
PEG-PVAc Polymer[19]	0.9	0.5	0.5	0.5	—

-continued

Ingredient (wt %)	5A	5B	5C	5D	5E
Hydrogenated castor oil[12]	0.8	0.4	0.4	0.4	0.3
Terpolymer of acrylamide, acrylic acid and methacrylamidopropyl trimethylammonium chloride[13]	—	0.2	0.2	0.2	0.2
Borate	—	1.3	—	—	1.2
4 Formyl Phenyl Boronic Acid	—	—	0.025	—	—
Paraffin Emulsion[16]	3.0	4.5	2.0	3.0	4.5
X22-8699-3S[20]	2.0	2.0	2.0	4.0	1.0
Water, perfumes, dyes, buffers, neutralizers, stabilizers and other optional components	to 100% pH 8.0-8.2	to 100% pH 8.0-8.2	to 100% pH 8.0-8.2	to 100% pH 8.0-8.2	to 100% pH 8.0-8.2

Example 6

Liquid Detergent Fabric Care Compositions

[0162] Liquid detergent fabric care compositions of Example 6 are made by mixing together the ingredients listed in the proportions shown;

Ingredient (wt %)	6A	6B	6C	6D	6E
C_{12}-C_{15} alkyl polyethoxylate (1.8) sulfate[1]	20.1	16.6	14.7	13.9	8.2
$C_{11.8}$ linear alkylbenzene sulfonic acid[2]	—	4.9	4.3	4.1	8.2
C_{16}-C_{17} branched alkyl sulfate[1]	—	2.0	1.8	1.6	—
C_{12} alkyl trimethyl ammonium chloride[4]	2.0		—	—	—
C_{12} alkyl dimethyl amine oxide[5]		0.7	0.6	—	—
C_{12}-C_{14} alcohol 9 ethoxylate[3]	0.3	0.8	0.9	0.6	0.7
C_{15}-C_{16} branched alcohol-7 ethoxylate[1]	—	—	—	—	4.6
1,2 Propane diol[6]	4.5	4.0	3.9	3.1	2.3
Ethanol	3.4	2.3	2.0	1.9	1.2
C_{12}-C_{18} Fatty Acid[5]	2.1	1.7	1.5	1.4	3.2
Citric acid[6]	3.4	3.2	3.5	2.7	3.9
Protease[7] (32 g/L)	0.42	1.3	0.07	0.5	1.12
Fluorescent Whitening Agent[8]	0.08	0.2	0.2	0.17	0.18
Diethylenetriamine pentaacetic acid[6]	0.5	0.3	0.3	0.3	0.2
Ethoxylated polyamine[9]	0.7	1.8	1.5	2.0	1.9
Grease Cleaning Alkoxylated Polyalkylenimine Polymer[10]	—	—	1.3	1.8	—
Zwitterionic ethoxylated quaternized sulfated hexamethylene diamine[11]	—	1.5	—	—	0.8
Hydrogenated castor oil[12]	0.2	0.2		0.12	0.3
Copolymer of acrylamide and methacrylamidopropyl trimethylammonium chloride[13]	0.3	0.2	0.3	0.1	0.3

-continued

Ingredient (wt %)	6A	6B	6C	6D	6E
Paraffin Emulsion[16]	6.0	6.0	3.0	0.5	3.0
Water, perfumes, dyes, buffers, solvents and other optional components	to 100% pH 8.0-8.2	to 100% pH 8.0-8.2	to 100% pH 8.0-8.2	to 100% pH 8.0-8.2	to 100% pH 8.0-8.2

[1]Available from Shell Chemicals, Houston, TX.

[2]Available from Huntsman Chemicals, Salt Lake City, UT.

[3]Available from Sasol Chemicals, Johannesburg, South Africa

[4]Available from Evonik Corporation, Hopewell, VA.

[5]Available from The Procter & Gamble Company, Cincinnati, OH.

[6]Available from Sigma Aldrich chemicals, Milwaukee, WI

[7]Available from Genencor International, South San Francisco, CA.

[8]Available from Ciba Specialty Chemicals, High Point, NC

[9]600 g/mol molecular weight polyethylenimine core with 20 ethoxylate groups per - NH and available from BASF (Ludwigshafen, Germany)

[10]600 g/mol molecular weight polyethylenimine core with 24 ethoxylate groups per - NH and 16 propoxylate groups per - NH. Available from BASF (Ludwigshafen, Germany).

[11]Described in WO 01/05874 and available from BASF (Ludwigshafen, Germany)

[12]Available under the trade name Thixin ® from Elementis Specialties, Highstown, NJ

[13]Available from Nalco Chemicals, Naperville, IL.

[14]Reserved

[15]Reserved

[16]Available under the trade name Paraffin 135-50 from Chemcor, Chester, NY

[17]Reserved

[18]Available from Novozymes, Copenhagen, Denmark.

[19]PEG-PVA graft copolymer is a polyvinyl acetate grafted polyethylene oxide copolymer having a polyethylene oxide backbone and multiple polyvinyl acetate side chains. The molecular weight of the polyethylene oxide backbone is about 6000 and the weight ratio of the polyethylene oxide to polyvinyl acetate is about 40 to 60 and no more than 1 grafting point per 50 ethylene oxide units. Available from BASF (Ludwigshafen, Germany).

[20]Aminofunctional silicone available from Shin-Etsu Silicones, Akron, OH

Example 7

Rinse-Added Fabric Care Compositions

[0163] Rinse-Added fabric care compositions are prepared by mixing together ingredients shown below:

Ingredient	7A	7B	7C
Fabric Softener Active[1]	11.0	11.0	11.0
Polyethylene imine[4]	0.25	0.25	0.25
Ammonium chloride	0.1	0.1	0.1
X22-8699-3S[20]	5.0	5.0	5.0
Paraffin Emulsion[8]	2.0	5.0	3.0
Perfume	2.0	2.0	2.0
Perfume microcapsule[7]	0.75	0.75	0.75
Water, suds suppressor, stabilizers, pH control agents, buffers, dyes & other optional ingredients	to 100% pH = 3.0	to 100% pH = 3.0	to 100% pH = 3.0

Example 8

Rinse-Added Fabric Care Compositions

[0164] Rinse-Added fabric care compositions are prepared by mixing together ingredients shown below:

Ingredient	8A	8B
Fabric Softener Active[1]	16.2	16.2
Cationic Starch[3]	1.5	1.5
Polyethylene imine[4]	0.25	0.25
Calcium chloride	0.15	0.15
Ammonium chloride	0.1	0.1

-continued

Ingredient	8A	8B
Paraffin Emulsion[8]	2.0	2.0
X22-8699-3S[20]	2.0	2.0
Perfume	0.85	0.85
Perfume microcapsule[7]	0.65	0.65
Water, suds suppressor, stabilizers, pH control agents, buffers, dyes & other optional ingredients	to 100% pH = 3.0	to 100% pH = 3.0

Example 9

Rinse-Added Fabric Care Compositions

[0165] Rinse-Added fabric care compositions are prepared by mixing together ingredients shown below:

Ingredient	9A	9B	9C	9D
Fabric Softener Active[1]	16.2	11.0	16.2	—
Fabric Softener Active[2]	—	—	—	5.0
Cationic Starch[3]	1.5	—	1.5	—
Polyethylene imine[4]	0.25	0.25	—	—
Quaternized polyacrylamide[5]	—		0.25	0.25
Calcium chloride	0.15	0.	0.15	—
Ammonium chloride	0.1	0.1	0.1	—
Suds Suppressor[6]	—	—	—	0.1
Paraffin Emulsion[16]	2.0	5.0	2.0	2.0
X22-8699-S[10]	2.0	2.0	2.0	2.0
Perfume	0.85	2.0	0.85	1.0
Perfume microcapsule[7]	0.65	0.75	0.65	0.3

-continued

Ingredient	9A	9B	9C	9D
Water, suds suppressor, stabilizers, pH control agents, buffers, dyes & other optional ingredients	to 100% pH = 3.0	to 100% pH = 3.0	to 100% pH = 3.0	to 100% pH = 3.0

[1]N,N di(tallowoyloxyethyl)-N,N dimethylammonium chloride available from Evonik Corporation, Hopewell, VA.

[2]Reaction product of fatty acid with Methyldiethanolamine, quaternized with Methyl chloride, resulting in a 2.5:1 molar mixture of N,N-di(tallowoyloxyethyl) N,N-dimethylammonium chloride and N-(tallowoyloxyethyl) N-hydroxyethyl N,N-dimethylammonium chloride available from Evonik Corporation, Hopewell, VA.

[3]Cationic starch based on common maize starch or potato starch, containing 25% to 95% amylose and a degree of substitution of from 0.02 to 0.09, and having a viscosity measured as Water Fluidity having a value from 50 to 84. Available from National Starch, Bridgewater, NJ

[4]Available from Nippon Shokubai Company, Tokyo, Japan under the trade name Epomin ® 1050.

[5]Cationic polyacrylamide polymer such as a copolymer of acrylamide/[2-(acryloylamino) ethyl]tri-methylammonium chloride (quaternized dimethyl aminoethyl acrylate) available from BASF, AG, Ludwigshafen under the trade name Sedipur ® 544.

[6]SILFOAM ® SE90 available from Wacker AG of Munich, Germany

[7]Available from Appleton Paper of Appleton, WI

[8]Available under the trade name Paraffin 135-50 from Chemcor, Chester, NY

[9]Available under the trade name Aqualast ® BL-100 from Lord Corporation, Erie, PA

[10]Aminofunctional silicone available from Shin-Etsu Silicones, Akron, OH

[0166] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm".

[0167] All documents cited in the Detailed Description of the Invention are, in relevant part, incorporated herein by reference; the citation of any document is not to be construed as an admission that it is prior art with respect to the present invention. To the extent that any meaning or definition of a term in this document conflicts with any meaning or definition of the same term in a document incorporated by reference, the meaning or definition assigned to that term in this document shall govern.

[0168] While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

What is claimed is:

1. A composition comprising, based on total composition weight:

a) from about 0.1% to about 50%, of a surfactant selected from the group consisting of anionic, cationic, zwitterionic, amphoteric, nonionic surfactants, and combinations thereof; and

b) from about 0.01% to about 20% of a paraffin wax having a melting point from about 30° C. to about 80° C.

2. The composition of claim **1**, said composition comprising, based on total composition weight, from about 0.1% to about 20% of a silicone.

3. The composition of claim **2**, wherein said silicone comprises a material selected from the group consisting of polydimethyl siloxane, aminosilicone, silicone polyether, silicone elastomer, silicone resin, quaternary silicone and cyclic silicones.

4. A composition according to claim **1** wherein the surfactant comprises a material selected from the group consisting of linear or branched alkyl benzene sulfonate, alkyl sulfate, alkyl ethoxy sulfate, alkyl ethoxylate, alkyl glyceryl sulfonate, quaternary ammonium surfactant, ester quaternary ammonium compound and mixtures thereof.

5. A composition according to claim **1** wherein the composition comprises a material selected from the group consisting of deposition aids, fluorescent whitening agents, enzymes, rheology modifiers, builders, perfumes, microcapsules and mixtures thereof.

6. A method of emulsifying a care polymer using a surfactant selected from the group consisting of nonionic surfactants, water soluble cationic surfactants or mixtures thereof; optionally mixing the care polymer with a solvent selected from the group consisting of paraffin, isoparaffin, cyclic silicone, silicone polyethers, linear polydimethyl siloxane, ethanol, isopropanol, butyl octanol, branched alcohols, olefin, hydrocarbon, kerosene, mineral oil and mixtures thereof prior to emulsification.

7. A method of using the composition of claims **1-6** comprising:

a) optionally rinsing and/or washing a situs

b) contacting said situs with the composition of any of claims **1-6** and mixtures thereof; and

c) optionally rinsing and/or washing a situs.

8. A situs treated with a composition according to any of claims **1-6** and mixtures thereof.

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