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WO-A1-2007/062833	**WO-A1-2011/020652**
WO-A2-2007/148274	**WO-A2-2010/079467**
WO-A2-2010/084480	**WO-A2-2013/107586**

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Description

FIELD OF INVENTION

[0001] The present application relates to particles and compositions, such as consumer products, comprising such particles as well as processes for making and using such particles and compositions comprising such particles.

BACKGROUND OF THE INVENTION

[0002] Benefit agents, such as perfumes, silicones, waxes, flavors, vitamins and fabric softening agents, are expensive and/or generally less effective when employed at high levels in consumer products, for example, personal care compositions, cleaning compositions, and fabric care compositions. As a result, there is a desire to maximize the effectiveness of such benefit agents. One method of achieving such objective is to improve the delivery efficiencies of such benefit agents. Unfortunately, it is difficult to improve the delivery efficiencies of benefit agents as such agents may be lost due to the agents' physical or chemical characteristics, or such agents may be incompatible with other compositional components or the situs that is treated. One method of improving the delivery efficiency of a benefit agent is to encapsulate such benefit agent. While such efforts may improve the delivery efficiency of the benefit agent, further delivery efficiency improvements are desired as encapsulated benefit agents may be lost before or after they are applied to the situs of interest due to factors such as mechanical or chemical interactions, for example the action of wash and or rinse liquors, and/or charge interactions. In certain applications, the deposition of encapsulated benefit agents is improved by coating the encapsulated benefit agent with a deposition aid that is typically a polymer. Unfortunately, the cationic charged species that are employed to increase deposition of such encapsulates onto clothes lead to an increased aggregation level of encapsulates which can lead to visible clumps in a consumer product and/or inhomogeneous deposition of perfume onto treated surfaces. Thus, what is needed is a encapsulate with a high capsule integrity and a minimized tendency to aggregate.

[0003] While not being bound by theory, Applicants believe that the aggregation problem is due to uncoated encapsulate attraction due to Van der Waals forces and bridging flocculation when the encapsulates are coated with a deposition aid. Thus, applicants recognized that the primary source of the aggregation problem was in the slurry making process. Once such problem was solved, the remaining aggregation influences could be managed.

[0004] In the present application, Applicants disclose encapsulated benefit agents and specific classes of amine containing polymers that, when combined, provide a high and even deposition profile across multiple different surfaces, for example, hair, skin, and multiple fabrics such as cotton, high surface cottons, polycotton and polyester.

[0005] WO201120652 relates to fabric conditioner compositions comprising core-shell particles to deliver enhanced perfume intensity to fabric. WO2010079467 and WO2010084480 relate to encapsulated benefit agents. WO2007062833 relates to a method for forming an encapsulate which comprises the step of forming a outer shell on a pre-existing core-shell benefit-agent encapsulate, wherein the outer shell is formed in the presence of a cellulose-substantive polymer. WO2013107586 relates to personal care composition, preferably for use on human skin and/or hair, including a core-shell benefit agent carrier particle. WO2007148274 relates to detergent compositions comprising selected deposition polymers for improved deposition of fabric care benefit agents.

SUMMARY OF THE INVENTION

[0006] The present application relates to a process of makingcompositions, such as consumer products, comprising perfume microcapsules.

DETAILED DESCRIPTION OF THE INVENTION

Definitions

[0007] As used herein "consumer product" means baby care, beauty care, fabric & home care, family care, feminine care, health care, snack and/or beverage 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 freshing), 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, tooth whitening; over-the-counter health care including cough and cold remedies, pain relievers, RX pharmaceuticals, pet health and nutrition; processed food products intended primarily for consumption between customary meals or as a meal accompaniment (non-limiting examples include potato chips, tortilla chips, popcorn, pretzels, corn chips, cereal bars, vegetable chips or crisps, snack mixes, party mixes, multigrain chips, snack crackers, cheese snacks, pork rinds, corn snacks, pellet snacks, extruded snacks and bagel chips); and coffee.

[0008] 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 freshing), 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.

[0009] 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 institutional 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 freshing 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 are 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.

[0010] 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.

[0011] As used herein, the terms "include", "includes" and "including" are meant to be non-limiting.

[0012] As used herein, the term "solid" includes granular, powder, bar and tablet product forms.

[0013] As used herein, the term "fluid" includes liquid, gel, paste and gas product forms.

[0014] As used herein, the term "situs" includes paper products, fabrics, garments, hard surfaces, hair and skin.

[0015] 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.

[0016] 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.

[0017] 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.

Particles

[0018] A composition having a viscosity of from about 10 cps to about 5000 cps, from about 10 cps to about 2000 cps, from about 50 cps to about 1500 cps or from about 100 cps to about 1000 cps comprising based on total composition weight:

a) from about 0.01% to about 10%, from about 0.1% to about 5%, from about 0.1% to about 2%, from about 0.1% to about 1% of perfume microcapsules, said perfume microcapsules comprising a deposition polymer disposed on the outer surface of said microcapsules;
b) from about 0.0001% to about 5% from about 0.001% to about 5%, from about 0.01% to about 4%, from about 0.3% to about 2% of an ion selected from the group consisting of Na^+, K^+, Mg^{2+}, Ca^{2+}, Cl^-, Br^-, HSO_4^- and SO_4^{2-} and mixtures thereof;
c) optionally, a material selected from the group consisting of a polymer in addition to said deposition polymer, a preservative, a formaldehyde scavenger, and

mixtures thereof; and
said composition having an aggregation index of less than 30, from about 0.01 to about 29, from about 0.05 to about 20, from about 0.1 to about 10, from about 0.1 to about 5 microcapsule aggregate particles per gram of composition.

[0019] In one aspect, the microcapsules comprise a core and a shell, the shell encapsulating the core, the microcapsules having a particle size of from about 0.01 microns to about 300 microns, from about 0.1 microns to about 100 microns, from about 0.5 microns to about 50 microns.

[0020] In one aspect, the microcapsules have a deposition polymer coating to wall ratio of from about 1:200 to about 5:1, from about 1:40 to about 1:1, in one aspect when the deposition polymer comprises a copolymer comprising polyvinyl formamide and polyvinylamine the deposition polymer coating to wall ratio may be from about 1:40 to about 1:5. In another aspect, when said deposition polymer comprises a methacrylate quaternized homopolymer the deposition polymer coating to wall ratio may be from about 1:10 to about 5:1.

[0021] In one embodiment, the microcapsules have a benefit agent leakage of a benefit agent leakage of from 0% to about 30%, from 0.001% to about 20%, from 0.1% to about 10%, or from 0.1% to 5%.

[0022] In a further embodiment, the above microcapsules further comprise:

i. A core where said core further comprises a material selected from the group consisting a brightener; a dye; a insect repellant; a silicone; a wax; a flavor; a vitamin; a fabric softening agent; a skin care agent in one aspect, a paraffin; a enzyme; anti-bacterial agent; a bleach; a sensate; and mixtures thereof;
ii. A wall mateiral where said wall material comprises a material selected from the group consisting of a polyethylene; a polyamide; a polystyrene; a polyisoprene; a polycarbonate; a polyester; a polyacrylate; an aminoplast, in one aspect said aminoplast comprises a polyurea, a polyurethane, and/or a polyureaurethane, in one aspect said polyurea comprises polyoxymethyleneurea and/or melamine formaldehyde; a polyolefin; a polysaccharide, in one aspect alginate and/or chitosan; gelatin; shellac; an epoxy resin; a vinyl polymer; a water insoluble inorganic; a silicone; and mixtures thereof; and
iii. A cationic deposition polymer where said deposition polymer is selected from the group consisting of a cationic polysaccharide, a cationically modified starch, a cationically modified guar, a cationic polysiloxane, a poly diallyl dimethyl ammonium halide, a copolymer of poly diallyl dimethyl ammonium chloride and vinyl pyrrolidone, a cationic acrylamide,a cationic imidazoles, an imidazolinium a halides, an imidazolium halide, a poly vinyl amine, a copolymer of poly vinylamine and N-vinyl formamide, a methacrylate quaternized homopolymer and mixtures thereof.

[0023] In one aspect, in the above microcapsules, the core comprises perfume and said wall comprises melamine formaldehyde and/or cross linked melamine formaldehyde.

[0024] In one aspect said core comprises perfume and said wall comprises melamine formaldehyde and/or cross linked melamine formaldehyde, poly(acrylic acid) and poly(acrylic acid-co-butyl acrylate).

[0025] In a further embodiment the composition comprises an adjunct ingredient selected from the group consisting of additional perfume and/or perfume delivery systems.

[0026] The invention comprises a process of making the above-described composition comprising: combining said microcapsule and deposition polymer with a material to form a slurry, the slurry produced by the process of:

a) adjusting the pH of a slurry of perfume microcapsule having an anionic charge, in one aspect a charge of from -1 mV to -100 mV, to a value below the pKa of the perfume microcapsule and a cationic polymer;
b) combining the slurry and said cationic polymer and dispersing said combined slurry and cationic polymer with mechanical energy

c) adjusting the pH of said combined slurry and cationic polymer to a value above the pKa of said slurry of particles but below the pKa of the cationic polymer;

[0027] Optionally, the slurry and cationic polymer can be further combined.

Consumer Product

[0028] A composition having a viscosity of from about 10 cps to about 5000 cps, from about 10 cps to about 2000 cps, from about 50 cps to about 1500 cps or from about 100 cps to about 1000 cps comprising based on total composition weight:

a) from about 0.01% to about 10%, from about 0.1% to about 5%, from about 0.1% to about 2%, from about 0.1% to about 1% of perfume microcapsules, said perfume microcapsules comprising a deposition polymer disposed on the outer surface of said microcapsules;
b) from about 0.0001% to about 5% from about 0.001% to about 5%, from about 0.01% to about 4%, from about 0.3% to about 2% of an ion selected from the group consisting of Na^+, K^+, Mg^{2+}, Ca^{2+}, Cl^-, Br^-, HSO_4^- and SO_4^{2-} and mixtures thereof;
c) optionally, a material selected from the group consisting of a polymer in addition to said deposition polymer, preservative, a formaldehyde scavenger, and mixtures thereof; and
d) 0.0001% to about 70%, from about 0.1% to about 50%, from about 15% to about 40% of a material selected from the group consisting of fabric enhancer, an enzyme, surfactant, a builder, a dye, a hueing agent, a nonaqueous solvent, a suds suppressor, a bleaching agent, chelating agents, optical brighteners, dye transfer inhibiting agents, dispersants, clay soil removal/anti-redeposition agents, structurants, perfumes, deposition agents, silicones, rheology modifiers, preservatives, stabilizers and mixtures thereof;

said composition having an aggregation index of less than 30, from about 0.01 to about 29, from about 0.05 to about 20, from about 0.1 to about 10, from about 0.1 to about 5 perfume microcapsule aggregate particles per gram of composition, said composition being a consumer product, is disclosed.

[0029] In one aspect, said composition comprises a surfactant, said surfactant being selected from the group consisting of anionic surfactant, cationic surfactant, nonionic surfactant, zwitterionic surfactant, ampholytic surfactant and mixtures thereof, preferably said composition comprises an anionic surfactant, more preferably said composition comprises an anionic surfactant is selected from the group consisting of a C_9-C_{18} alkyl benzene sulfonate surfactant; a C_{10}-C_{20} alkyl sulfate surfactant; a C_{10}-C_{18} alkyl alkoxy sulfate surfactant, said C_{10}-C_{18} alkyl alkoxy sulfate surfactant having an average degree of alkoxylation of from 1 to 30 and the alkoxy comprises a C_1-C_4 chain, and mixtures thereof.

[0030] In one aspect, said composition comprises:

a) a fabric enhancer that comprises a material selected from the group consisting of polyglycerol esters, oily sugar derivatives, wax emulsions, fatty acids, 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 and mixtures thereof, preferably said fabric enhancer comprises a material selected from the group consisting of selected from the group consisting of bis-(2-hydroxypropyl)-dimethylammonium methylsulphate fatty acid ester, 1,2-di(acyloxy)-3-trimethylammoniopropane chloride, 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, N,N-bis-(stearoyl-2-hydroxypropyl)-N,N-dimethylammonium methylsulphate, N,N-bis-(tallowoyl-2-hydroxypropyl)-N,N-dimethylammonium methylsulphate, N,N-bis-(palmitoyl-2-hydroxypropyl)-N,N-dimethylammonium methylsulphate, N,N-bis-(stearoyl-2-hydroxypropyl)-N,N-dimethylammonium chloride, 1,2 di(stearoyl-oxy) 3 trimethyl ammoniumpropane chloride, dicanoladimethylammonium chloride, di(hard)tallowdimethylammonium chloride dicanoladimethylammonium methylsulfate, 1-methyl-1-stearoylamidoethyl-2-stearoylimidazolinium methylsulfate, 1-tallowylamidoethyl-2-tallowylimidazoline, dipalmethyl hydroxyethylammoinum methosulfate and mixtures thereof;
b) deposition agent that comprises a deposition aid polymer, preferably said deposition polymer comprises a cationic polymer having a cationic charge of from about 0.005 meq/g to about 23 meq/g, preferably of from about 0.01 meq/g to about 12 meq/g, most preferably of from about 0.1 meq/g to about 7 meq/g at the pH of said composition;
c) an enzyme selected from the group consisting of protease, amylase, lipase, mannanase, cellulase, xyloglucanase, pectate lyase, and mixtures thereof;
e) a structurant that comprises a material selected from the group consisting of hydrogenated castor oil; derivatives of hydrogenated castor oil; microfibrillar cellulose; hydroxyfunctional crystalline materials, long-chain fatty alcohols, 12-hydroxystearic acid; clays; and mixtures thereof;

f) a dispersant that comprises a polymeric dispersing agent selected from the group consisting of polycarboxylates, soil release polymers, carboxymethylcelluloses, poly(vinyl-pyrrolidone), poly (ethylene glycol), poly(vinyl alcohol), poly(vinylpyridine-N-oxide), poly(vinylimidazole), zwitterionic ethoxylated quaternized sulfated hexamethylene diamine, alkoxylated polyalkylenimine, ethoxylated polyamine, polyethylene glycol-polyvinylacetate;
g) a hueing agent that comprises a material selected from the group consisting of from the group consisting of small molecule dyes, polymeric dyes, dye clay conjugates and pigments; and/or
h) an oligoamine that comprises a polyetheramine.

[0031] In one aspect, said microcapsules comprise a core and a shell, said shell encapsulating said core, said microcapsules having a particle size of from about 0.01 microns to about 300 microns, from about 0.1 microns to about 100 microns, from about 0.5 microns to about 50 microns.

[0032] In one aspect, said microcapsules have a deposition polymer coating to wall ratio of from about 1:200 to about 5:1, from about 1:40 to about 1:1, in one aspect when said deposition polymer comprises a copolymer comprising polyvinyl formamide and polyvinylamine said deposition polymer coating to wall ratio may be from about 1:40 to about 1:5, in another aspect, when said deposition polymer comprises a methacrylate quaternized homopolymer said deposition polymer coating to wall ratio may be from about 1:10 to about 5:1.

[0033] In one aspect, said microcapsules have a benefit agent leakage of from 0% to about 30%, from 0.001% to about 20%, from 0.1% to about 10%, or from 0.1% to 5%.

[0034] In one aspect:

a) said core comprises a material selected from the group consisting of a perfume; a brightener; a dye; a insect repellant; a silicone; a wax; a flavor; a vitamin; a fabric softening agent; a skin care agent in one aspect, a paraffin; a enzyme; anti-bacterial agent; a bleach; a sensate; and mixtures thereof;
b) said wall comprises a material selected from the group consisting of a polyethylene; a polyamide; a polystyrene; a polyisoprene; a polycarbonate; a polyester; a polyacrylate; an aminoplast, in one aspect said aminoplast comprises a polyurea, a polyurethane, and/or a polyureaurethane, in one aspect said polyurea comprises polyoxymethyleneurea and/or melamine formaldehyde; a polyolefin; a polysaccharide, in one aspect alginate and/or chitosan; gelatin; shellac; an epoxy resin; a vinyl polymer; a water insoluble inorganic; a silicone; and mixtures thereof; and
c) said deposition polymer is selected from the group consisting of a polysaccharide, a cationically modified starch, a cationically modified guar, a polysiloxane, a poly diallyl dimethyl ammonium halide, a copolymer of poly diallyl dimethyl ammonium chloride and vinyl pyrrolidone, an acrylamide,an imidazoles, an imidazolinium a halides, an imidazolium halide, a poly vinyl amine, a copolymer of poly vinylamine and N-vinyl formamide, a methacrylate quaternized homopolymer and mixtures thereof.

[0035] In one aspect, said core comprises perfume and said wall comprises melamine formaldehyde and/or cross linked melamine formaldehyde.

[0036] In one aspect, said core comprises perfume and said wall comprises melamine formaldehyde and/or cross linked melamine formaldehyde, poly(acrylic acid) and poly(acrylic acid-co-butyl acrylate).

[0037] In one aspect, said composition comprises an adjunct ingredient selected from the group consisting of additional perfume and/or perfume delivery systems.

[0038] In one aspect, said consumer product may be a liquid laundry detergent.

[0039] In one aspect said consumer product may be a fluid fabric softener. Said fluid fabric softener may, in one aspect, comprise, based on total fluid fabric softener weight, from about 30% to about 90%, from about 55% to about 90%, from about 65% to about 85%, or even from about 70% to about 85% water.

[0040] In one aspect, the fabric enhancing active of said fluid fabric softener comprises, as a fabric softener active, compounds of the formula

$$\{R4\text{-}m - N+ - [(CH_2)n - Y - R1]m\}\ X- \qquad (1)$$

wherein each R substituent is either hydrogen, a short chain C_1-C_6, in one aspect, C_1-C_3 alkyl or hydroxyalkyl group, e.g., methyl, ethyl, propyl, hydroxyethyl, and the like, poly ($C_{2\text{-}3}$ alkoxy), in one aspect, polyethoxy, benzyl, or mixtures thereof; both indices m are identical values selected from 2 or 3; each n is from 1 to about 4, in one aspect 2; each Y is -O-(O)C-, -C(O)-O-, -NR-C(O)-, or -C(O)-NR-; the sum of carbons in each R1, plus one when Y is -O-(O)C- or -NR-C(O) -, is C_{12}-C_{22}, in one aspect, C_{14}-C_{20}, with each R1 being a hydrocarbyl, or substituted hydrocarbyl group that contains no or some unsaturation, and X- can be any enhancer-compatible anion, in one aspect, chloride, bromide, methylsulfate, ethylsulfate, sulfate, and nitrate, in one aspect chloride or methyl sulfate;

[0041] In another embodiment, the fabric enhancing active has the general formula:

$$[R3N+CH_2CH(YR1)(CH_2YR1)]\ X-$$

wherein each Y, R, R1, and X- have the same meanings as before. Such compounds include those having the formula:

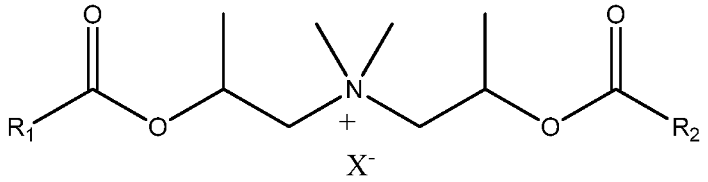
$$[CH_3]_3\ N(+)[CH_2CH(CH_2O(O)CR1)O(O)CR1]\ C1(-) \qquad (2)$$

wherein each R is a methyl or ethyl group and in one aspect each R1 is in the range of C_{15} to C_{19}. As used herein, when the diester is specified, it can include the monoester that is present.
These types of agents and general methods of making them are disclosed in U.S. Pat. No. 4,137,180. An example of a DEQA (2) is the "propyl" ester quaternary ammonium fabric enhancer active having the formula 1,2-di(acyloxy)-3-trimethylammoniopropane chloride.

[0042] In another embodiment, the fabric enhancing active has the formula:

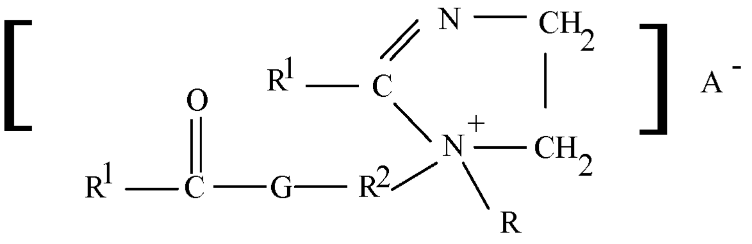
$$[R4\text{-}m\ -\ N+\ -\ R1m]\ X- \qquad (3)$$

wherein each R, R1, and X- have the same meanings as before.
In yet another embodiment, the fabric enhancing active has the formula:



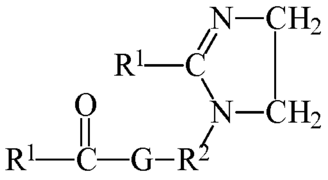
wherein each R_1 and R_2 is each independently a C_{15}-C_{17}, and wherein the C_{15}-C_{17} is unsaturated or saturated, branched or linear, substituted or unsubstituted and X^- has the definition given above.

[0043] In yet another embodiment, the fabric enhancing active has the formula:



(4)

wherein each R, R1, and A- have the definitions given above; each R2 is a $C_{1\text{-}6}$ alkylene group, in one aspect an ethylene group; and G is an oxygen atom or an -NR- group; In another embodiment, the fabric enhancing active has the formula:



(5)

wherein R1, R2 and G are defined as above.

[0044] In another embodiment, the fabric enhancing actives are 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:

$$R1\text{-}C(O)\text{-}NH\text{-}R2\text{-}NH\text{-}R3\text{-}NH\text{-}C(O)\text{-}R1 \qquad (6)$$

wherein R1, R2 are defined as above, and each R3 is a $C_{1\text{-}6}$ alkylene group, in one aspect, an ethylene group and wherein the reaction products may optionally be quaternized by the additional of an alkylating agent such as dimethyl sulfate.

[0045] In another aspect, the fabric enhancing active has the formula:

[R1-C(O)-NR-R2-N(R)2-R3-NR-C(O)-R1]+A- (7)

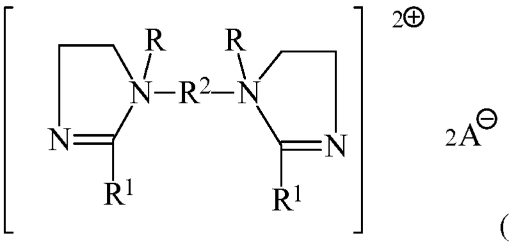
wherein R, R1, R2, R3 and A- are defined as above;

[0046] In yet another embodiment, the fabric enhancing active are reaction products of fatty acid with hydroxyalkylalkylenediamines in a molecular ratio of about 2:1, said reaction products containing compounds of the formula:

R1-C(O)-NH-R2-N(R3OH)-C(O)-R1 (8)

wherein R1, R2 and R3 are defined as above;

[0047] In another embodiment, the fabric enhancing active has the formula:



(9)

wherein R, R1, R2, and A- are defined as above.

[0048] Examples of compound (1) 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-oxyethyl) N-(2 hydroxyethyl) N-methyl ammonium methylsulfate.

Examples of compound (2) is 1,2 di (stearoyl-oxy) 3 trimethyl ammoniumpropane chloride. Examples of Compound (3) are dialkylenedimethylammonium salts such as dicanoladimethylammonium chloride, di(hard)tallowdimethylammonium 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.

[0049] An example of Compound (4) is 1-methyl-1-stearoylamidoethyl-2-stearoylimidazolinium methylsulfate wherein R1 is an acyclic aliphatic C_{15}-C_{17} hydrocarbon group, R2 is an ethylene group, G is a NH group, R5 is a methyl group and A- is a methyl sulfate anion, available commercially from the Witco Corporation under the trade name Varisoft®.

[0050] An example of Compound (5) is 1-tallowylamidoethyl-2-tallowylimidazoline wherein R1 is an acyclic aliphatic C_{15}-C_{17} hydrocarbon group, R2 is an ethylene group, and G is a NH group.

[0051] An example of Compound (6) is the reaction products of fatty acids with diethylenetriamine in a molecular ratio of about 2:1, said reaction product mixture containing N,N"-dialkyldiethylenetriamine with the formula:

R1-C(O)-NH-CH_2CH_2-NH-CH_2CH_2-NH-C(O)-R1

wherein R1-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, and R2 and R3 are divalent ethylene groups.

An example of Compound (7) is a difatty amidoamine based enhancer having the formula:

[R1-C(O)-NH-CH_2CH_2-N(CH_3)(CH_2CH_2OH)-CH_2CH_2-NH-C(O)-R1]+ CH_3SO_4-

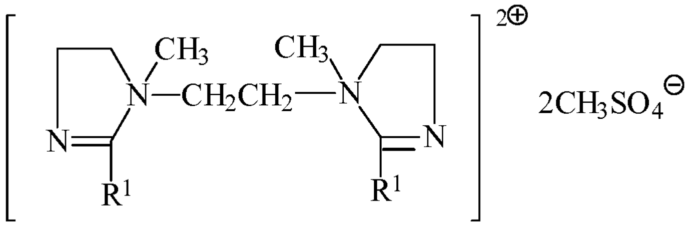
wherein R1-C(O) is an alkyl group, available commercially from the Witco Corporation e.g. under the trade name Varisoft® 222LT.

[0052] An example of Compound (8) is the reaction products of fatty acids with N-2-hydroxyethylethylenediamine in a molecular ratio of about 2:1, said reaction product mixture containing a compound of the formula:

R1-C(O)-NH-CH_2CH_2-N(CH_2CH_2OH)-C(O)-R1

wherein R1-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.

[0053] An example of Compound (9) is the diquaternary compound having the formula:



wherein R1 is derived from fatty acid, and the compound is available from Witco Company. It will be understood that combinations of enhancer actives disclosed above are suitable for use in this invention.

[0054] In the cationic nitrogenous salts herein, the anion A-, which is any enhancer 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. Chloride and methylsulfate are suitable herein as anion A. The anion can also, but less preferably, carry a double charge in which case A- represents half a group.

[0055] In one aspect, said consumer product may comprise a sufficient amount of slurry and/or encapsulate to provide said consumer product with an efficiency polymer level, based on total consumer product weight, of from about 0.0001% to about 0.1%, about 0.001% to about 0.1%, or even from about 0.001% to about 0.05%.

[0056] In one aspect, said consumer product may comprise a material selected from the group consisting of an anionic surfactant, cationic surfactant, silicone and mixtures thereof, said consumer product may also have:

a) an anionic surfactant to efficiency polymer ratio of from about 100.000:1 to about 1:1, from about 25.000:1 to about 10:1, or even from about 10.000:1 to about 100:1;
b) a cationic surfactant to efficiency polymer ratio of from about 100.000:1 to about 1:1, from about 25.000:1 to about 10:1, or even from about 10.000:1 to about 100: 1; and/or
c) a silicone to efficiency polymer ratio of from about 100.000:1 to about 1:1 from about 25.000:1 to about 10:1, or even from about 10.000:1 to about 100:1.

[0057] In one aspect, a consumer product said consumer product being a fluid detergent and comprising, based on total fluid detergent weight, less then about 80% water, less than about 60% to about 2% water, from about 45% to about 7% water, from about 35% to about 9% water is disclosed.

[0058] In one aspect, compositions of the present invention, for example shampoos, may include the following components:

A. Detersive Surfactant

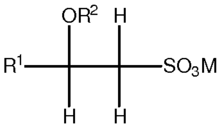
[0059] The composition of the present invention may include a detersive surfactant. The detersive surfactant component may comprise anionic detersive surfactant, zwitterionic or amphoteric detersive surfactant, or a combination thereof. The concentration of the anionic surfactant component in the composition should be sufficient to provide the desired cleaning and lather performance, and generally range from about 5% to about 50%.

[0060] Anionic surfactants suitable for use in the compositions are the alkyl and alkyl ether sulfates. Other suitable anionic detersive surfactants are the water-soluble salts of organic, sulfuric acid reaction products conforming to the formula [R^1-SO_3-M] where R^1 is a straight or branched chain, saturated, aliphatic hydrocarbon radical having from about 8 to about 24, or about 10 to about 18, carbon atoms; and M is a cation described hereinbefore. Still other suitable anionic detersive surfactants are the reaction products of fatty acids esterified with isethionic acid and neutralized with sodium hydroxide where, for example, the fatty acids are derived from coconut oil or palm kernel oil; sodium or potassium salts of fatty acid amides of methyl tauride in which the fatty acids, for example, are derived from coconut oil or palm kernel oil.

[0061] Other anionic detersive surfactants suitable for use in the compositions are the succinnates, examples of which include disodium N-octadecylsulfosuccinnate; disodium lauryl sulfosuccinate; diammonium lauryl sulfosuccinate; tetrasodium N-(1,2-dicarboxyethyl)-N-octadecylsulfosuccinnate; diamyl ester of sodium sulfosuccinic acid; dihexyl ester of sodium sulfosuccinic acid; and dioctyl esters of sodium sulfosuccinic acid.

[0062] Other suitable anionic detersive surfactants include olefin sulfonates having about 10 to about 24 carbon atoms. In addition to the true alkene sulfonates and a proportion of hydroxy-alkanesulfonates, the olefin sulfonates can contain minor amounts of other materials, such as alkene disulfonates depending upon the reaction conditions, proportion of reactants, the nature of the starting olefins and impurities in the olefin stock and side reactions during the sulfonation process.

[0063] Another class of anionic detersive surfactants suitable for use in the compositions is the beta-alkyloxy alkane sulfonates. These surfactants conform to the formula



$$R^1-\underset{H}{\overset{OR^2}{|}}-\underset{H}{\overset{H}{|}}-SO_3M$$

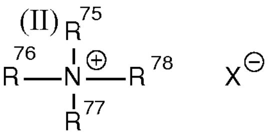
where R^1 is a straight chain alkyl group having from about 6 to about 20 carbon atoms, R^2 is a lower alkyl group having from about 1 to about 3 carbon atoms, or even 1 carbon atom, and M is a water-soluble cation.

B. Cationic Surfactant System

[0064] The composition of the present invention may comprise a cationic surfactant system. The cationic surfactant system can be one cationic surfactant or a mixture of two or more cationic surfactants. If present, the cationic surfactant system is included in the composition at a level by weight of from about 0.1% to about 10%, from about 0.5% to about 8%, from about 1% to about 5%, or even from about 1.4% to about 4%, in view of balance among ease-to-rinse feel, rheology and wet conditioning benefits.

[0065] A variety of cationic surfactants including mono- and di-alkyl chain cationic surfactants can be used in the compositions of the present invention. Examples of suitable materials include mono-alkyl chain cationic surfactants in view of the desired gel matrix and wet conditioning benefits. The mono-alkyl cationic surfactants are those having one long alkyl chain which has from 12 to 22 carbon atoms, from 16 to 22 carbon atoms, or a C_{18}-C_{22} alkyl group, in view of providing balanced wet conditioning benefits. The remaining groups attached to nitrogen are independently selected from an alkyl group of from 1 to about 4 carbon atoms or an alkoxy, polyoxyalkylene, alkylamido, hydroxyalkyl, aryl or alkylaryl group having up to about 4 carbon atoms. Such mono-alkyl cationic surfactants include, for example, mono-alkyl quaternary ammonium salts and mono-alkyl amines. Mono-alkyl quaternary ammonium salts include, for example, those having a non-functionalized long alkyl chain. Mono-alkyl amines include, for example, mono-alkyl amidoamines and salts thereof.

[0066] Mono-long alkyl quaternized ammonium salts useful herein are those having the formula (II):



(II)

$$R^{76}-\overset{R^{75}}{\underset{R^{77}}{N^{\oplus}}}-R^{78} \qquad X^{\ominus}$$

wherein one of R^{75} , R^{76}, R^{77} and R^{78} is selected from an alkyl group of from 12 to 30 carbon atoms or an aromatic, alkoxy, polyoxyalkylene, alkylamido, hydroxyalkyl, aryl or alkylaryl group having up to about 30 carbon atoms; the remainder of R^{75} , R^{76}, R^{77} and R^{78} are independently selected from an alkyl group of from 1 to about 4 carbon atoms or an alkoxy, polyoxyalkylene, alkylamido, hydroxyalkyl, aryl or alkylaryl group having up to about 4 carbon atoms; and X^- is a salt-forming anion such as those selected from halogen, (e.g. chloride, bromide), acetate, citrate, lactate, glycolate, phosphate, nitrate, sulfonate, sulfate, alkylsulfate, and alkyl sulfonate radicals. The alkyl groups can contain, in addition to carbon and hydrogen atoms, ether and/or ester linkages, and other groups such as amino groups. The longer chain alkyl groups, e.g., those of about 12 carbons, or higher, can be saturated or unsaturated. In one aspect,, one of R^{75}, R^{76}, R^{77} and R^{78} is selected from an alkyl group of from 12 to 30 carbon atoms, in another aspect, from 16 to 22 carbon atoms, in another aspect, from 18 to 22 carbon atoms, or even 22 carbon atoms; the remainder of R^{75}, R^{76}, R^{77} and R^{78} are independently selected from CH_3, C_2H_5, C_2H_4OH, and mixtures thereof; and X is selected from the group consisting of Cl, Br, CH_3OSO_3, $C_2H_5OSO_3$, and mixtures thereof.

[0067] Examples of suitable mono-long alkyl quaternized ammonium salt cationic surfactants include: behenyl trimethyl ammonium salt; stearyl trimethyl ammonium salt; cetyl trimethyl ammonium salt; and hydrogenated tallow alkyl trimethyl ammonium salt. Among them, highly useful materials are behenyl trimethyl ammonium salt and stearyl trimethyl ammonium salt.

[0068] Mono-alkyl amines are also suitable as cationic surfactants. Primary, secondary, and tertiary fatty amines are useful. Particularly useful are tertiary amido amines having an alkyl group of from about 12 to about 22 carbons. Exemplary tertiary amido amines include: stearamidopropyldimethylamine, stearamidopropyldiethylamine, stearamidoethyldiethylamine, stearamidoethyldimethylamine, palmitamidopropyldimethylamine, palmitamidopropyldiethylamine, palmitamidoethyldiethylamine, palmitamidoethyldimethylamine, behenamidopropyldimethylamine, behenamidopropyldiethylamine, behenamidoethyldiethylamine, behenamidoethyldimethylamine, arachidamidopropyldimethylamine, arachidamidopropyldiethylamine, arachidamidoethyldiethylamine, arachidamidoethyldimethylamine, diethylaminoethylstearamide. These amines can also be used in combination with acids such as f-glutamic acid, lactic acid, hydrochloric acid, malic acid, succinic acid, acetic acid, fumaric acid, tartaric acid, citric acid, f-glutamic hydrochloride, maleic acid, and mixtures thereof; in one aspect, f-glutamic acid, lactic acid, citric acid are highly useful. In one aspect, amines herein are partially neutralized with any of the acids at a molar ratio of the amine to the acid of from about 1 : 0.3 to about 1 : 2, or even from about 1 : 0.4 to about 1 : 1.

[0069] Although the mono-alkyl chain cationic surfactants are useful, other cationic surfactants such as di-alkyl chain cationic surfactants may also be used alone, or in combination with the mono-alkyl chain cationic surfactants. Such di-alkyl chain cationic surfactants include, for example, dialkyl (14-18) dimethyl ammonium chloride, ditallow alkyl dimethyl ammonium chloride, dihydrogenated tallow alkyl dimethyl ammonium chloride, distearyl dimethyl ammonium chloride, and dicetyl dimethyl ammonium chloride.

C. High Melting Point Fatty Compound

[0070] The composition of the present invention may include a high melting point fatty compound. The high melting point fatty compound useful herein has a melting point of 25°C or higher, and is selected from the group consisting of fatty alcohols, fatty acids, fatty alcohol derivatives, fatty acid derivatives, and mixtures thereof. It is understood by the artisan that the compounds disclosed in this section of the specification can in some instances fall into more than one classification, e.g., some fatty alcohol derivatives can also be classified as fatty acid derivatives. However, a given classification is not intended to be a limitation on that particular compound, but is done so for convenience of classification and nomenclature. Further, it is understood by the artisan that, depending on the number and position of double bonds, and length and position of the branches, certain compounds having certain required carbon atoms may have a melting point of less than 25°C. Such compounds of low melting point are not intended to be included in this section.

[0071] Among a variety of high melting point fatty compounds, fatty alcohols are used in one aspect the present invention. The fatty alcohols useful herein are those having from about 14 to about 30 carbon atoms, or even from about 16 to about 22 carbon atoms. These fatty alcohols are saturated and can be straight or branched chain alcohols. In one aspect, fatty alcohols include, for example, cetyl alcohol, stearyl alcohol, behenyl alcohol, and mixtures thereof.

[0072] High melting point fatty compounds of a single compound of high purity are typically used. In one aspect, single compounds of pure fatty alcohols selected from the group of pure cetyl alcohol, stearyl alcohol, and behenyl alcohol are employed. By "pure" herein, what is meant is that the compound has a purity of at least about 90%, or even at least about 95%. These single compounds of high purity provide good rinsability from the hair when the consumer rinses off the composition.

[0073] The high melting point fatty compound is included in the composition at a level of from about 0.1% to about 40%, from about 1% to about 30%, from about 1.5% to about 16% by weight of the composition, or even from about 1.5% to about 8% in view of providing improved conditioning benefits such as slippery feel during the application to wet hair, softness and moisturized feel on dry hair.

D. Cationic Polymers

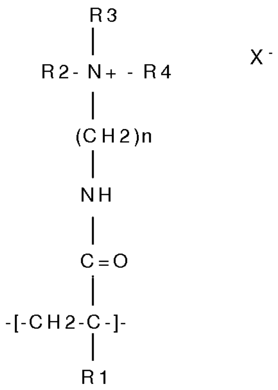
[0074] The compositions of the present invention may contain a cationic polymer. Concentrations of the cationic polymer in the composition typically range from about 0.05% to about 3%, in another embodiment from about 0.075% to about 2.0%, and in yet another embodiment from about 0.1% to about 1.0%. Suitable cationic polymers will have cationic charge densities of at least about 0.5 meq/gm, in another embodiment at least about 0.9 meq/gm, in another embodiment at least about 1.2 meq/gm, in yet another embodiment at least about 1.5 meq/gm, but in one embodiment also less than about 7 meq/gm, and in another embodiment less than about 5 meq/gm, at the pH of intended use of the composition, which pH will generally range from about pH 3 to about pH 9, in one embodiment between about pH 4 and about pH 8. Herein, "cationic charge density" of a polymer refers to the ratio of the number of positive charges on the polymer to the molecular weight of the polymer. The average molecular weight of such suitable cationic polymers will generally be between about 10,000 and 10 million, in one embodiment between about 50,000 and about 5 million, and in another embodiment between about 100,000 and about 3 million.

[0075] Suitable cationic polymers for use in the compositions of the present invention contain cationic nitrogen-containing moieties such as quaternary ammonium or cationic protonated amino moieties. The cationic protonated amines can be primary, secondary, or tertiary amines (in one aspect, secondary or tertiary), depending upon the particular species and the selected pH of the composition. Any anionic counterion can be used in association with the cationic polymers so long as the polymers remain soluble in water, in the composition, or in a coacervate phase of the composition, and so long as the counterions are physically and chemically compatible with the essential components of the composition or do not otherwise unduly impair product performance, stability or aesthetics. Non limiting examples of such counterions include halides (e.g., chloride, fluoride, bromide, iodide), sulfate and methyl sulfate.

[0076] Non limiting examples of suitable cationic polymers include copolymers of vinyl monomers having cationic protonated amine or quaternary ammonium functionalities with water soluble spacer monomers such as acrylamide, methacrylamide, alkyl and dialkyl acrylamides, alkyl and dialkyl methacrylamides, alkyl acrylate, alkyl methacrylate, vinyl caprolactone or vinyl pyrrolidone.

[0077] Suitable cationic protonated amino and quaternary ammonium monomers, for inclusion in the cationic polymers of the composition herein, include vinyl compounds substituted with dialkylaminoalkyl acrylate, dialkylaminoalkyl methacrylate, monoalkylaminoalkyl acrylate, monoalkylaminoalkyl methacrylate, trialkyl methacryloxyalkyl ammonium salt, trialkyl acryloxyalkyl ammonium salt, diallyl quaternary ammonium salts, and vinyl quaternary ammonium monomers having cyclic cationic nitrogen-containing rings such as pyridinium, imidazolium, and quaternized pyrrolidone, e.g., alkyl vinyl imidazolium, alkyl vinyl pyridinium, alkyl vinyl pyrrolidone salts.

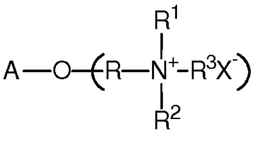
[0078] Other suitable cationic polymers for use in the compositions include copolymers of 1-vinyl-2-pyrrolidone and 1-vinyl-3-methylimidazolium salt (e.g., chloride salt) (referred to in the industry by the Cosmetic, Toiletry, and Fragrance Association, "CTFA", as Polyquaternium-16); copolymers of 1-vinyl-2-pyrrolidone and dimethylaminoethyl methacrylate (referred to in the industry by CTFA as Polyquaternium-11); cationic diallyl quaternary ammonium-containing polymers, including, for example, dimethyldiallylammonium chloride homopolymer, copolymers of acrylamide and dimethyldiallylammonium chloride (referred to in the industry by CTFA as Polyquaternium 6 and Polyquaternium 7, respectively); amphoteric copolymers of acrylic acid including copolymers of acrylic acid and dimethyldiallylammonium chloride (referred to in the industry by CTFA as Polyquaternium 22), terpolymers of acrylic acid with dimethyldiallylammonium chloride and acrylamide (referred to in the industry by CTFA as Polyquaternium 39), and terpolymers of acrylic acid with methacrylamidopropyl trimethylammonium chloride and methyl acrylate (referred to in the industry by CTFA as Polyquaternium 47). In one aspect, cationic substituted monomers may be the cationic substituted dialkylaminoalkyl acrylamides, dialkylaminoalkyl methacrylamides, and combinations thereof. Such monomers conform the to the formula



$$\begin{array}{c} R3 \\ | \\ R2-N^{+}-R4 \qquad X^{-} \\ | \\ (CH_2)n \\ | \\ NH \\ | \\ C=O \\ | \\ -[-CH_2-C-]- \\ | \\ R1 \end{array}$$

wherein R^1 is hydrogen, methyl or ethyl; each of R^2, R^3 and R^4 are independently hydrogen or a short chain alkyl having from about 1 to about 8 carbon atoms, from about 1 to about 5 carbon atoms, or even from about 1 to about 2 carbon atoms; n is an integer having a value of from about 1 to about 8, or even from about 1 to about 4; and X is a counterion. The nitrogen attached to R^2, R^3 and R^4 may be a protonated amine (primary, secondary or tertiary), but is in one aspect, a quaternary ammonium wherein each of R^2, R^3 and R^4 are alkyl groups a non limiting example of which is polymethacrylamidopropyl trimonium chloride, available under the trade name Polycare®133, from Rhone-Poulenc, Cranberry, N.J., U.S.A.

[0079] Other suitable cationic polymers for use in the composition include polysaccharide polymers, such as cationic cellulose derivatives and cationic starch derivatives. Suitable cationic polysaccharide polymers include those which conform to the formula



$$A-O-\left(R-\overset{R^1}{\underset{R^2}{N^+}}-R^3X^-\right)$$

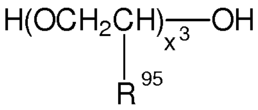
wherein A is an anhydroglucose residual group, such as a starch or cellulose anhydroglucose residual; R is an alkylene oxyalkylene, polyoxyalkylene, or hydroxyalkylene group, or combination thereof; R^1, R^2, and R^3 independently are alkyl, aryl, alkylaryl, arylalkyl, alkoxyalkyl, or alkoxyaryl groups, each group containing up to about 18 carbon atoms, and the total number of carbon atoms for each cationic moiety (i.e., the sum of carbon atoms in R1, R2 and R3) is typically about 20 or less; and X is an anionic counterion as described in hereinbefore.

[0080] Useful cationic cellulose polymers include salts of hydroxyethyl cellulose reacted with trimethyl ammonium substituted epoxide, referred to in the industry (CTFA) as Polyquaternium 10 and available from Amerchol Corp. (Edison, N.J., USA) in their Ucare™ Polymer LR, Ucare™ Polymer JR, and Ucare™ Polymer KG series of polymers. Other suitable types of cationic cellulose include the polymeric quaternary ammonium salts of hydroxyethyl cellulose reacted with lauryl dimethyl ammonium-substituted epoxide referred to in the industry (CTFA) as Polyquaternium 24. These materials are available from Amerchol Corp. under the trade name Ucare™ Polymer LM-200.

[0081] Other suitable cationic polymers include cationic guar gum derivatives, such as guar hydroxypropyltrimonium chloride, specific examples of which include the Jaguar series commercially available from Rhone-Poulenc Incorporated and the N-Hance® series commercially available from Aqualon Division of Hercules, Inc. Other suitable cationic polymers include quaternary nitrogen-containing cellulose ethers. Other suitable polymers include synthetic polymers. Other suitable cationic polymers include copolymers of etherified cellulose, guar and starch. When used, the cationic polymers herein are either soluble in the composition or are soluble in a complex coacervate phase in the composition formed by the cationic polymer and the anionic, amphoteric and/or zwitterionic detersive surfactant component described hereinbefore. Complex coacervates of the cationic polymer can also be formed with other charged materials in the composition.

E. Nonionic polymers

[0082] The composition of the present invention may include a nonionic polymer. Polyalkylene glycols having a molecular weight of more than about 1000 are useful herein. Useful are those having the following general formula:



$$H(OCH_2\underset{\displaystyle R^{95}}{\underset{|}{C}}H)_{x^3}\text{—}OH$$

wherein R^{95} is selected from the group consisting of H, methyl, and mixtures thereof. Polyethylene glycol polymers useful herein are PEG-2M (also known as Polyox WSR® N-10, which is available from Union Carbide and as PEG-2,000); PEG-5M (also known as Polyox WSR® N-35 and Polyox WSR® N-80, available from Union Carbide and as PEG-5,000 and Polyethylene Glycol 300,000); PEG-7M (also known as Polyox WSR® N-750 available from Union Carbide); PEG-9M (also known as Polyox WSR® N-3333 available from Union Carbide); and PEG-14 M (also known as Polyox WSR® N-3000 available from Union Carbide).

F. Conditioning agents

[0083] Conditioning agents, and in particular silicones, may be included in the composition. Conditioning agents include any material which is used to give a particular conditioning benefit to hair and/or skin. In hair treatment compositions, suitable conditioning agents are those which deliver one or more benefits relating to shine, softness, compatibility, antistatic properties, wet-handling, damage, manageability, body, and greasiness. The conditioning agents useful in the compositions of the present invention typically comprise a water insoluble, water dispersible, non-volatile, liquid that forms emulsified, liquid particles. Suitable conditioning agents for use in the composition are those conditioning agents characterized generally as silicones (e.g., silicone oils, cationic silicones, silicone gums, high refractive silicones, and silicone resins), organic conditioning oils (e.g., hydrocarbon oils, polyolefins, and fatty esters) or combinations thereof, or those conditioning agents which otherwise form liquid, dispersed particles in the aqueous surfactant matrix herein. Such conditioning agents should be physically and chemically compatible with the essential components of the composition, and should not otherwise unduly impair product stability, aesthetics or performance.

[0084] The concentration of the conditioning agent in the composition should be sufficient to provide the desired conditioning benefits, and as will be apparent to one of ordinary skill in the art. Such concentration can vary with the conditioning agent, the conditioning performance desired, the average size of the conditioning agent particles, the type and concentration of other components, and other like factors.

1. Silicones

[0085] The conditioning agent of the compositions of the present invention can be an insoluble silicone conditioning agent. The silicone conditioning agent particles may comprise volatile silicone, non-volatile silicones, or combinations thereof. In one aspect, non-volatile silicones conditioning agents are employed. If volatile silicones are present, it will typically be incidental to their use as a solvent or carrier for commercially available forms of non-volatile silicone materials ingredients, such as silicone gums and resins. The silicone conditioning agent particles may comprise a silicone fluid conditioning agent and may also comprise other ingredients, such as a silicone resin to improve silicone fluid deposition efficiency or enhance glossiness of the hair.

[0086] The concentration of the silicone conditioning agent typically ranges from about 0.01% to about 10%, from about 0.1% to about 8%, from about 0.1% to about 5%, or even from about 0.2% to about 3%. The silicone conditioning agents for use in the compositions of the present invention typically have a viscosity, as measured at 25°C, from about 20 centistokes to about 2,000,000 centistokes ("cst"), from about 1,000 cst to about 1,800,000 cst, from about 50,000cst to about 1,500,000 cst, or even from about 100,000 cst to about 1,500,000 csk.

[0087] The dispersed silicone conditioning agent particles typically have a number average particle diameter ranging from about 0.01μm to about 50μm. For small particle application to hair, the number average particle diameters typically range from about 0.01μm to about 4μm, from about 0.01μm to about 2μm, or even from about 0.01μm to about 0.5μm. For larger particle application to hair, the number average particle diameters typically range from about 4μm to about 50μm, from about 6μm to about 30μm, from about 9μm to about 20μm, or even from about 12μm to about 18μm.

a. Silicone oils

[0088] Silicone fluids may include silicone oils, which are flowable silicone materials having a viscosity, as measured at 25°C, less than 1,000,000 cst, from about 5 cst to about 1,000,000 cst, or even from about 100 cst to about 600,000 cst. Suitable silicone oils for use in the compositions of the present invention include polyalkyl siloxanes, polyaryl siloxanes, polyalkylaryl siloxanes, polyether siloxane copolymers, and mixtures thereof. Other insoluble, non-volatile silicone fluids having hair conditioning properties may also be used.

b. Amino and Cationic silicones

[0089] Compositions of the present invention may include an aminosilicone. Aminosilicones, as provided herein, are silicones containing at least one primary amine, secondary amine, tertiary amine, or a quaternary ammonium group. Useful aminosilicones may have less than about 0.5% nitrogen by weight of the aminosilicone, less than about 0.2%, or even less than about 0.1%. Higher levels of nitrogen (amine functional groups) in the amino silicone tend to result in less friction reduction, and consequently less conditioning benefit from the aminosilicone. It should be understood that in some product forms, higher levels of nitrogen are acceptable in accordance with the present invention.

[0090] In one aspect, the aminosilicones used in the present invention have a particle size of less than about 50μ once incorporated into the final composition. The particle size measurement is taken from dispersed droplets in the final composition. Particle size may be measured by means of a laser light scattering technique, using a Horiba model LA-930 Laser Scattering Particle Size Distribution Analyzer (Horiba Instruments, Inc.).

[0091] In one embodiment, the aminosilicone typically has a viscosity of from about 1,000 cst (centistokes) to about 1,000,000 cst, from about 10,000 to about 700,000 cst, from about 50,000 cst to about 500,000 cst, or even from about 100,000 cst to about 400,000 cst. This embodiment may also comprise a low viscosity fluid, such as, for example, those materials described below in Section F.(1). The viscosity of aminosilicones discussed herein is measured at 25°C.

[0092] In another embodiment, the aminosilicone typically has a viscosity of from about 1,000 cst to about 100,000 cst, from about 2,000 cst to about 50,000 cst, from about 4,000 cst to about 40,000 cst, or even from about 6,000 cst to about 30,000 cs.

[0093] The aminosilicone typically is contained in the composition of the present invention at a level by weight of from about 0.05% to about 20%, from about 0.1% to about 10%, and or even from about 0.3% to about 5%.

c. Silicone gums

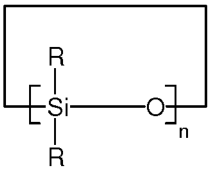
[0094] Other silicone fluids suitable for use in the compositions of the present invention are the insoluble silicone gums. These gums are polyorganosiloxane materials having a viscosity, as measured at 25°C, of greater than or equal to 1,000,000 csk. Specific non-limiting examples of silicone gums for use in the compositions of the present invention include polydimethylsiloxane, (polydimethylsiloxane) (methylvinylsiloxane) copolymer, poly(dimethylsiloxane) (diphenyl siloxane)(methylvinylsiloxane) copolymer and mixtures thereof.

d. High refractive index silicones

[0095] Other non-volatile, insoluble silicone fluid conditioning agents that are suitable for use in the compositions of the present invention are those known as "high refractive index silicones," having a refractive index of at least about

1.46, at least about 1.48, m at least about 1.52, or even at least about 1.55. The refractive index of the polysiloxane fluid will generally be less than about 1.70, typically less than about 1.60. In this context, polysiloxane "fluid" includes oils as well as gums.

[0096] The high refractive index polysiloxane fluid includes those represented by general Formula (III) above, as well as cyclic polysiloxanes such as those represented by Formula (VIII) below:



wherein R is as defined above, and n is a number from about 3 to about 7, or even from about 3 to about 5.

e. Silicone resins

[0097] Silicone resins may be included in the conditioning agent of the compositions of the present invention. These resins are highly cross-linked polymeric siloxane systems. The cross-linking is introduced through the incorporation of trifunctional and tetrafunctional silanes with monofunctional or difunctional, or both, silanes during manufacture of the silicone resin.

[0098] Silicone materials and silicone resins in particular, can conveniently be identified according to a shorthand nomenclature system known to those of ordinary skill in the art as "MDTQ" nomenclature. Under this system, the silicone is described according to presence of various siloxane monomer units which make up the silicone. Briefly, the symbol M denotes the monofunctional unit $(CH_3)_3SiO_{0.5}$; D denotes the difunctional unit $(CH_3)_2SiO$; T denotes the trifunctional unit $(CH_3)SiO_{1.5}$; and Q denotes the quadra- or tetra-functional unit SiO_2. Primes of the unit symbols (e.g. M’, D’, T’, and Q’) denote substituents other than methyl, and must be specifically defined for each occurrence.

[0099] In one aspect, silicone resins for use in the compositions of the present invention include, but are not limited to MQ, MT, MTQ, MDT and MDTQ resins. In one aspect, Methyl is a highly suitable silicone substituent. In another aspect, silicone resins are typically MQ resins, wherein the M:Q ratio is typically from about 0.5:1.0 to about 1.5:1.0 and the average molecular weight of the silicone resin is typically from about 1000 to about 10,000.

f. Modified silicones or silicone copolymers

[0100] Other modified silicones or silicone copolymers are also useful herein. Examples include silicone-based quaternary ammonium compounds (Kennan quats), end-terminal quaternary siloxanes; silicone aminopolyalkyleneoxide block copolymers; hydrophilic silicone emulsions; and polymers made up of one or more crosslinked rake or comb silicone copolymer segments.

[0101] In alternative embodiments of the present invention, the above-noted silicone-based quaternary ammonium compounds may be combined with the silicone polymers.

2. Organic conditioning oils

[0102] The compositions of the present invention may also comprise from about 0.05% to about 3%, from about 0.08% to about 1.5%, or even from about 0.1% to about 1%, of at least one organic conditioning oil as the conditioning agent, either alone or in combination with other conditioning agents, such as the silicones (described herein). Suitable conditioning oils include hydrocarbon oils, polyolefins, and fatty esters. Suitable hydrocarbon oils include, but are not limited to, hydrocarbon oils having at least about 10 carbon atoms, such as cyclic hydrocarbons, straight chain aliphatic hydrocarbons (saturated or unsaturated), and branched chain aliphatic hydrocarbons (saturated or unsaturated), including polymers and mixtures thereof. Straight chain hydrocarbon oils are typically from about C_{12} to about C_{19}. Branched chain hydrocarbon oils, including hydrocarbon polymers, typically will contain more than 19 carbon atoms. Suitable polyolefins include liquid polyolefins, liquid poly-α-olefins, or even hydrogenated liquid poly-α-olefins. Polyolefins for use herein may be prepared by polymerization of C_4 to about C_{14} or even C_6 to about C_{12}. Suitable fatty esters include, but are not limited to, fatty esters having at least 10 carbon atoms. These fatty esters include esters with hydrocarbyl chains derived from fatty acids or alcohols (e.g. mono-esters, polyhydric alcohol esters, and di- and tri-carboxylic acid esters). The hydrocarbyl radicals of the fatty esters hereof may include or have covalently bonded thereto other compatible functionalities, such as amides and alkoxy moieties (e.g., ethoxy or ether linkages, etc.).

3. Other conditioning agents

[0103] Also suitable for use in the compositions herein are the conditioning agents.

G. Anti-dandruff Actives

[0104] The compositions of the present invention may also contain an anti-dandruff agent. Suitable, non-limiting examples of anti-dandruff actives include: antimicrobial actives, pyridinethione salts, azoles, selenium sulfide, particulate sulfur, keratolytic acid, salicylic acid, octopirox (piroctone olamine), coal tar, and combinations thereof. In one aspect, the anti-dandruff actives typically are pyridinethione salts. Such anti-dandruff particulate should be physically and chemically compatible with the essential components of the composition, and should not otherwise unduly impair product stability, aesthetics or performance.

[0105] It is contemplated that when ZPT is used as the anti-dandruff particulate in the compositions herein, that the growth or re-growth of hair may be stimulated or regulated, or both, or that hair loss may be reduced or inhibited, or that hair may appear thicker or fuller.

H. Humectant

[0106] The compositions of the present invention may contain a humectant. The humectants herein are selected from the group consisting of polyhydric alcohols, water soluble alkoxylated nonionic polymers, and mixtures thereof. The humectants, when used herein, are typically used at levels of from about 0.1% to about 20%, or even from about 0.5% to about 5%.

I. Suspending Agent

[0107] The compositions of the present invention may further comprise a suspending agent at concentrations effective for suspending water-insoluble material in dispersed form in the compositions or for modifying the viscosity of the composition. Such concentrations range from about 0.1% to about 10%, or even from about 0.3% to about 5.0%.

[0108] Suspending agents useful herein include anionic polymers and nonionic polymers. Useful herein are vinyl polymers such as cross linked acrylic acid polymers with the CTFA name Carbomer, cellulose derivatives and modified cellulose polymers such as methyl cellulose, ethyl cellulose, hydroxyethyl cellulose, hydroxypropyl methyl cellulose, nitro cellulose, sodium cellulose sulfate, sodium carboxymethyl cellulose, crystalline cellulose, cellulose powder, polyvinylpyrrolidone, polyvinyl alcohol, guar gum, hydroxypropyl guar gum, xanthan gum, arabia gum, tragacanth, galactan, carob gum, guar gum, karaya gum, carrageenan, pectin, agar, quince seed (Cydonia oblonga Mill), starch (rice, corn, potato, wheat), algae colloids (algae extract), microbiological polymers such as dextran, succinoglucan, pulleran, starch-based polymers such as carboxymethyl starch, methylhydroxypropyl starch, alginic acid-based polymers such as sodium alginate, alginic acid propylene glycol esters, acrylate polymers such as sodium polyacrylate, polyethylacrylate, polyacrylamide, polyethyleneimine, and inorganic water soluble material such as bentonite, aluminum magnesium silicate, laponite, hectonite, and anhydrous silicic acid.

[0109] Commercially available viscosity modifiers highly useful herein include Carbomers with trade names Carbopol® 934, Carbopol® 940, Carbopol® 950, Carbopol® 980, and Carbopol® 981, all available from B. F. Goodrich Company, acrylates/steareth-20 methacrylate copolymer with trade name ACRYSOL™ 22 available from Rohm and Hass, nonoxynyl hydroxyethylcellulose with trade name Amercell™ POLYMER HM-1500 available from Amerchol, methylcellulose with trade name BENECEL®, hydroxyethyl cellulose with trade name NATROSOL®, hydroxypropyl cellulose with trade name KLUCEL®, cetyl hydroxyethyl cellulose with trade name POLYSURF® 67, all supplied by Hercules, ethylene oxide and/or propylene oxide based polymers with trade names CARBOWAX® PEGs, POLYOX WASRs, and UCON® FLUIDS, all supplied by Amerchol. Other optional suspending agents include crystalline suspending agents which can be categorized as acyl derivatives, long chain amine oxides, and mixtures thereof.

[0110] These suspending agents include ethylene glycol esters of fatty acids in one aspect having from about 16 to about 22 carbon atoms. In one aspect, useful suspending agents include ethylene glycol stearates, both mono and distearate, but in one aspect, the distearate containing less than about 7% of the mono stearate. Other suitable suspending agents include alkanol amides of fatty acids, having from about 16 to about 22 carbon atoms, or even about 16 to 18 carbon atoms, examples of which include stearic monoethanolamide, stearic diethanolamide, stearic monoisopropanolamide and stearic monoethanolamide stearate. Other long chain acyl derivatives include long chain esters of long chain fatty acids (e.g., stearyl stearate, cetyl palmitate, etc.); long chain esters of long chain alkanol amides (e.g., stearamide diethanolamide distearate, stearamide monoethanolamide stearate); and glyceryl esters (e.g., glyceryl distearate, trihydroxystearin, tribehenin) a commercial example of which is Thixin® R available from Rheox, Inc. Long chain acyl derivatives, ethylene glycol esters of long chain carboxylic acids, long chain amine oxides, and alkanol amides of long chain carboxylic acids in addition to the materials listed above may be used as suspending agents.

[0111] Other long chain acyl derivatives suitable for use as suspending agents include N,N-dihydrocarbyl amido benzoic acid and soluble salts thereof (e.g., Na, K), particularly N,N-di(hydrogenated) C_{16}, C_{18} and tallow amido benzoic acid species of this family, which are commercially available from Stepan Company (Northfield, Ill., USA).

[0112] Examples of suitable long chain amine oxides for use as suspending agents include alkyl dimethyl amine oxides, e.g., stearyl dimethyl amine oxide.

[0113] Other suitable suspending agents include primary amines having a fatty alkyl moiety having at least about 16 carbon atoms, examples of which include palmitamine or stearamine, and secondary amines having two fatty alkyl moieties each having at least about 12 carbon atoms, examples of which include dipalmitoylamine or di(hydrogenated tallow)amine. Still other suitable suspending agents include di(hydrogenated tallow)phthalic acid amide, and crosslinked maleic anhydride-methyl vinyl ether copolymer.

J. Aqueous Carrier

[0114] The formulations of the present invention can be in the form of pourable liquids (under ambient conditions). Such compositions will therefore typically comprise an aqueous carrier, which is present at a level of from about 20% to about 95%, or even from about 60% to about 85%. The aqueous carrier may comprise water, or a miscible mixture of water and organic solvent, and in one aspect may comprise water with minimal or no significant concentrations of organic solvent, except as otherwise incidentally incorporated into the composition as minor ingredients of other essential or optional components.

[0115] The carrier useful in the present invention includes water and water solutions of lower alkyl alcohols and polyhydric alcohols. The lower alkyl alcohols useful herein are monohydric alcohols having 1 to 6 carbons, in one aspect, ethanol and isopropanol. The polyhydric alcohols useful herein include propylene glycol, hexylene glycol, glycerin, and propane diol.

K. Dispersed Particles

[0116] The compositions may optionally comprise particles. The particles may be dispersed water-insoluble particles. The particles may be inorganic, synthetic, or semi-synthetic. In one embodiment, the particles have an average mean particle size of less than about 300 μm.

L. Gel Matrix

[0117] The above cationic surfactants, together with high melting point fatty compounds and an aqueous carrier, may form a gel matrix in the composition of the present invention.

[0118] The gel matrix is suitable for providing various conditioning benefits such as slippery feel during the application to wet hair and softness and moisturized feel on dry hair. In view of providing the above gel matrix, the cationic surfactant and the high melting point fatty compound are contained at a level such that the weight ratio of the cationic surfactant to the high melting point fatty compound is in the range of, from about 1:1 to about 1:10, or even from about 1:1 to about 1:6.

Process of Making

[0119] In one aspect, a process of making the compositions disclosed herein comprises combining a perfume microcapsule and a deposition polymer and then combining said combination of perfume microcapsule and deposition polymer with a material selected from the group consisting of a fabric enhancer, an enzyme, surfactant, a builder, a dye, a hueing agent, a nonaqueous solvent, a suds suppressor, a bleaching agent, chelating agents, optical brighteners, dye transfer inhibiting agents, dispersants, clay soil removal/anti-redeposition agents, structurants, perfumes, deposition agents, silicones, rheology modifiers, preservatives, stabilizers, and mixtures thereof.

[0120] In one aspect, a process of making a composition comprising: combining a material selected from the group consisting of a material selected from the group consisting of a fabric enhancer, an enzyme, surfactant, a builder, a dye, a hueing agent, a nonaqueous solvent, a suds suppressor, a bleaching agent, chelating agents, optical brighteners, dye transfer inhibiting agents, dispersants, clay soil removal/anti-redeposition agents, dye polymer conjugates; dye clay conjugates, structurants, perfumes, deposition agents, silicones, rheology modifiers, preservatives, stabilizers, and mixtures thereof with a slurry produced by the process of

a) adjusting the pH of a slurry of particles having an anionic charge, in one aspect a charge of from -1 mV to -100 mV, to a value below the pKa of the particle and the cationic polymer;

b) combining slurry and said cationic polymer and dispersing said combined slurry and cationic polymer with mechanical energy

c) adjusting the pH of said combined slurry and cationic polymer to a value above the pKa of said slurry of particles but below the pKa of the cationic polymer;

d) combining said combined slurry and cationic polymer; is disclosed.

[0121] Suitable capsules can be purchased from Appvion Inc. of Appleton, Wisconsin USA or made in accordance with the teachings in the art.

[0122] In addition, the materials for making the aforementioned encapsulates can be obtained from CP Kelco Corp. of San Diego, California, USA; BASF AG of Ludwigshafen, Germany; Rhodia Corp. of Cranbury, New Jersey, USA; Hercules Corp. of Wilmington, Delaware, USA; Agrium Inc. of Calgary, Alberta, Canada, ISP of New Jersey U.S.A., Akzo Nobel of Chicago, IL, USA; Stroever Shellac Bremen of Bremen, Germany; Dow Chemical Company of Midland, MI, USA; Bayer AG of Leverkusen, Germany; Sigma-Aldrich Corp., St. Louis, Missouri, USA.

[0123] Suitable efficiency polymers such as polyvinylamide-polyvinylamine copolymers can be produced by selective hydrolization of the polyvinylformamide starting polymer.

[0124] Suitable efficiency polymers can also be formed by copolymerisation of vinylformamide with arcylamide, acrylic acid, acrylonitrile, ethylene, sodium acrylate, methyl acrylate, maleic anhydride, vinyl acetate, n-vinylpyrrolidine.

[0125] Suitable efficiency polymers or oligomers can also be formed by cationic polymerisation of vinylformamide with protonic acids, such as methylsulfonic acid, and or Lewis acids, such as boron trifluoride.

[0126] Suitable efficiency polymers can be obtained from BASF AG of Ludwigshafen, Germany and include Lupamin® 9010 and Lupamin® 9030.

Adjunct Materials

[0127] 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' encapsulates and slurries. 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, perfume delivery systems 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. Patent Nos. 5,576,282, 6,306,812 B1 and 6,326,348 B1 that are incorporated by reference.

[0128] Each adjunct ingredients is not essential to Applicants' compositions. Thus, certain embodiments of Applicants' compositions do not contain one or more of the following adjuncts materials: perfume delivery systems, 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:
Perfume delivery systems that may be used in the aforementioned compositions and/or consumer products. Methods of making such perfume delivery systems and methods of making such perfume delivery systems are disclosed in USPA 2007/0275866 A1. Such perfume delivery systems include: Polymer Assisted Delivery (PAD), Molecule-Assisted Delivery (MAD), Fiber-Assisted Delivery (FAD), Amine Assisted Delivery (AAD), Cyclodextrin Delivery System (CD), Starch Encapsulated Accord (SEA), Inorganic Carrier Delivery System (ZIC), Pro-Perfume (PP). Such perfume delivery systems may be used in any combination in any type of consumer product, cleaning and/or treatment composition, fabric and hard surface cleaning and/or treatment composition, detergent, and highly compact detergent.

[0129] Surfactants - The compositions according to the present invention can comprise a surfactant or surfactant system wherein the surfactant can be selected from nonionic and/or anionic and/or cationic surfactants and/or ampholytic and/or zwitterionic and/or semi-polar nonionic surfactants. The surfactant is typically present at a level of from about 0.1%, from about 1%, or even from about 5% by weight of the cleaning compositions to about 99.9%, to about 80%, to about 35%, or even to about 30% by weight of the cleaning compositions.

[0130] Builders - The compositions of the present invention can comprise one or more detergent builders or builder systems. When present, the compositions will typically comprise at least about 1% builder, or from about 5% or 10% to about 80%, 50%, or even 30% by weight, of said builder. Builders include, but are not limited to, the alkali metal, ammonium and alkanolammonium salts of polyphosphates, alkali metal silicates, alkaline earth and alkali metal carbonates, aluminosilicate builders polycarboxylate compounds, ether hydroxypolycarboxylates, copolymers of maleic anhydride with ethylene or vinyl methyl ether, 1,3,5-trihydroxybenzene-2,4,6-trisulphonic acid, and carboxymethyl-oxysuccinic acid, the various alkali metal, ammonium and substituted ammonium salts of polyacetic acids such as ethylenediamine tetraacetic acid and nitrilotriacetic acid, as well as polycarboxylates such as mellitic acid, succinic acid, oxydisuccinic acid, polymaleic acid, benzene 1,3,5-tricarboxylic acid, carboxymethyloxysuccinic acid, and soluble salts thereof.

[0131] Chelating Agents - The compositions herein may also optionally contain one or more copper, iron and/or manganese chelating agents. If utilized, chelating agents will generally comprise from about 0.1% by weight of the compositions herein to about 15%, or even from about 3.0% to about 15% by weight of the compositions herein.

[0132] Dye Transfer Inhibiting Agents - The compositions of the present invention may also include one or more dye transfer inhibiting agents. Suitable polymeric dye transfer inhibiting agents include, but are not limited to, polyvinylpyrrolidone polymers, polyamine N-oxide polymers, copolymers of N-vinylpyrrolidone and N-vinylimidazole, polyvinyloxazolidones and polyvinylimidazoles or mixtures thereof. When present in the compositions herein, the dye transfer inhibiting agents are present at levels from about 0.0001%, from about 0.01%, from about 0.05% by weight of the cleaning compositions to about 10%, about 2%, or even about 1% by weight of the cleaning compositions.

Hueing Agents

[0133] The composition may comprise a fabric hueing agent (sometimes referred to as shading, bluing or whitening agents). Typically the hueing agent provides a blue or violet shade to fabric. Hueing agents can be used either alone or in combination to create a specific shade of hueing and/or to shade different fabric types. This may be provided for example by mixing a red and green-blue dye to yield a blue or violet shade. Hueing agents may be selected from any known chemical class of dye, including but not limited to acridine, anthraquinone (including polycyclic quinones), azine, azo (e.g., monoazo, disazo, trisazo, tetrakisazo, polyazo), including premetallized azo, benzodifurane and benzodifuranone, carotenoid, coumarin, cyanine, diazahemicyanine, diphenylmethane, formazan, hemicyanine, indigoids, methane, naphthalimides, naphthoquinone, nitro and nitroso, oxazine, phthalocyanine, pyrazoles, stilbene, styryl, triarylmethane, triphenylmethane, xanthenes and mixtures thereof.

[0134] Suitable fabric hueing agents include dyes, dye-clay conjugates, and organic and inorganic pigments. Suitable dyes include small molecule dyes and polymeric dyes. Suitable small molecule dyes include small molecule dyes selected from the group consisting of dyes falling into the Colour Index (C.I.) classifications of Direct, Basic, Reactive or hydrolysed Reactive, Solvent or Disperse dyes for example that are classified as Blue, Violet, Red, Green or Black, and provide the desired shade either alone or in combination. In another aspect, suitable small molecule dyes include small molecule dyes selected from the group consisting of Colour Index (Society of Dyers and Colourists, Bradford, UK) numbers Direct Violet dyes such as 9, 35, 48, 51, 66, and 99, Direct Blue dyes such as 1, 71, 80 and 279, Acid Red dyes such as 17, 73, 52, 88 and 150, Acid Violet dyes such as 15, 17, 24, 43, 49 and 50, Acid Blue dyes such as 15, 17, 25, 29, 40, 45, 75, 80, 83, 90 and 113, Acid Black dyes such as 1, Basic Violet dyes such as 1, 3, 4, 10 and 35, Basic Blue dyes such as 3, 16, 22, 47, 66, 75 and 159, Disperse or Solvent dyes and mixtures thereof. In another aspect, suitable small molecule dyes include small molecule dyes selected from the group consisting of C. I. numbers Acid Violet 17, Direct Blue 71, Direct Violet 51, Direct Blue 1, Acid Red 88, Acid Red 150, Acid Blue 29, Acid Blue 113 or mixtures thereof.

[0135] Suitable polymeric dyes include polymeric dyes selected from the group consisting of polymers containing covalently bound (sometimes referred to as conjugated) chromogens, (dye-polymer conjugates), for example polymers with chromogens co-polymerized into the backbone of the polymer and mixtures thereof.

In another aspect, suitable polymeric dyes include polymeric dyes selected from the group consisting of fabric-substantive colorants sold under the name of Liquitint® (Milliken, Spartanburg, South Carolina, USA), dye-polymer conjugates formed from at least one reactive dye and a polymer selected from the group consisting of polymers comprising a moiety selected from the group consisting of a hydroxyl moiety, a primary amine moiety, a secondary amine moiety, a thiol moiety and mixtures thereof. In still another aspect, suitable polymeric dyes include polymeric dyes selected from the group consisting of Liquitint® Violet CT, carboxymethyl cellulose (CMC) covalently bound to a reactive blue, reactive violet or reactive red dye such as CMC conjugated with C.I. Reactive Blue 19, sold by Megazyme, Wicklow, Ireland under the product name AZO-CM-CELLULOSE, product code S-ACMC, alkoxylated triphenyl-methane polymeric colourants, alkoxylated thiophene polymeric colourants, and mixtures thereof.

[0136] Suitable dye clay conjugates include dye clay conjugates selected from the group comprising at least one cationic/basic dye and a smectite clay, and mixtures thereof. In another aspect, suitable dye clay conjugates include dye clay conjugates selected from the group consisting of one cationic/basic dye selected from the group consisting of C.I. Basic Yellow 1 through 108, C.I. Basic Orange 1 through 69, C.I. Basic Red 1 through 118, C.I. Basic Violet 1 through

51, C.I. Basic Blue 1 through 164, C.I. Basic Green 1 through 14, C.I. Basic Brown 1 through 23, CI Basic Black 1 through 11, and a clay selected from the group consisting of Montmorillonite clay, Hectorite clay, Saponite clay and mixtures thereof. In still another aspect, suitable dye clay conjugates include dye clay conjugates selected from the group consisting of: Montmorillonite Basic Blue B7 C.I. 42595 conjugate, Montmorillonite Basic Blue B9 C.I. 52015 conjugate, Montmorillonite Basic Violet V3 C.I. 42555 conjugate, Montmorillonite Basic Green G1 C.I. 42040 conjugate, Montmorillonite Basic Red R1 C.I. 45160 conjugate, Montmorillonite C.I. Basic Black 2 conjugate, Hectorite Basic Blue B7 C.I. 42595 conjugate, Hectorite Basic Blue B9 C.I. 52015 conjugate, Hectorite Basic Violet V3 C.I. 42555 conjugate, Hectorite Basic Green G1 C.I. 42040 conjugate, Hectorite Basic Red R1 C.I. 45160 conjugate, Hectorite C.I. Basic Black 2 conjugate, Saponite Basic Blue B7 C.I. 42595 conjugate, Saponite Basic Blue B9 C.I. 52015 conjugate, Saponite Basic Violet V3 C.I. 42555 conjugate, Saponite Basic Green G1 C.I. 42040 conjugate, Saponite Basic Red R1 C.I. 45160 conjugate, Saponite C.I. Basic Black 2 conjugate and mixtures thereof.

[0137] Suitable pigments include pigments selected from the group consisting of flavanthrone, indanthrone, chlorinated indanthrone containing from 1 to 4 chlorine atoms, pyranthrone, dichloropyranthrone, monobromodichloropyranthrone, dibromodichloropyranthrone, tetrabromopyranthrone, perylene-3,4,9,10-tetracarboxylic acid diimide, wherein the imide groups may be unsubstituted or substituted by C_1-C_3 -alkyl or a phenyl or heterocyclic radical, and wherein the phenyl and heterocyclic radicals may additionally carry substituents which do not confer solubility in water, anthrapyrimidinecarboxylic acid amides, violanthrone, isoviolanthrone, dioxazine pigments, copper phthalocyanine which may contain up to 2 chlorine atoms per molecule, polychloro-copper phthalocyanine or polybromochloro-copper phthalocyanine containing up to 14 bromine atoms per molecule and mixtures thereof.

[0138] In another aspect, suitable pigments include pigments selected from the group consisting of Ultramarine Blue (C.I. Pigment Blue 29), Ultramarine Violet (C.I. Pigment Violet 15) and mixtures thereof.

[0139] The aforementioned fabric hueing agents can be used in combination (any mixture of fabric hueing agents can be used).

[0140] Dispersants - The compositions of the present invention can also contain dispersants. Suitable water-soluble organic materials are the homo- or co-polymeric acids or their salts, in which the polycarboxylic acid may comprise at least two carboxyl radicals separated from each other by not more than two carbon atoms.

[0141] Enzymes - The compositions can comprise one or more detergent enzymes which provide cleaning performance and/or fabric care benefits. Examples of suitable enzymes include, but are not limited to, 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 is a cocktail of conventional applicable enzymes like protease, lipase, cutinase and/or cellulase in conjunction with amylase.

[0142] Enzyme Stabilizers - Enzymes for use in compositions, for example, detergents can be stabilized by various techniques. The enzymes employed herein can be stabilized by the presence of water-soluble sources of calcium and/or magnesium ions in the finished compositions that provide such ions to the enzymes.

[0143] Catalytic Metal Complexes - Applicants' compositions may include catalytic metal complexes. One type of metal-containing bleach catalyst is a catalyst system comprising a transition metal cation of defined bleach catalytic activity, such as copper, iron, titanium, ruthenium, tungsten, molybdenum, or manganese cations, an auxiliary metal cation having little or no bleach catalytic activity, such as zinc or aluminum cations, and a sequestrate having defined stability constants for the catalytic and auxiliary metal cations, particularly ethylenediaminetetraacetic acid, ethylenediaminetetra (methyl-enephosphonic acid) and water-soluble salts thereof. Such catalysts are disclosed in U.S. patent 4,430,243.

[0144] If desired, the compositions herein can be catalyzed by means of a manganese compound. Such compounds and levels of use are well known in the art and include, for example, the manganese-based catalysts disclosed in U.S. patent 5,576,282.

[0145] Cobalt bleach catalysts useful herein are known, and are described, for example, in U.S. patents 5,597,936 and 5,595,967. Such cobalt catalysts are readily prepared by known procedures, such as taught for example in U.S. patents 5,597,936, and 5,595,967.

[0146] Compositions herein may also suitably include a transition metal complex of a macropolycyclic rigid ligand - abbreviated as "MRL". As a practical matter, and not by way of limitation, the compositions and cleaning processes herein can be adjusted to provide on the order of at least one part per hundred million of the benefit agent MRL species in the aqueous washing medium, and may provide from about 0.005 ppm to about 25 ppm, from about 0.05 ppm to about 10 ppm, or even from about 0.1 ppm to about 5 ppm, of the MRL in the wash liquor.

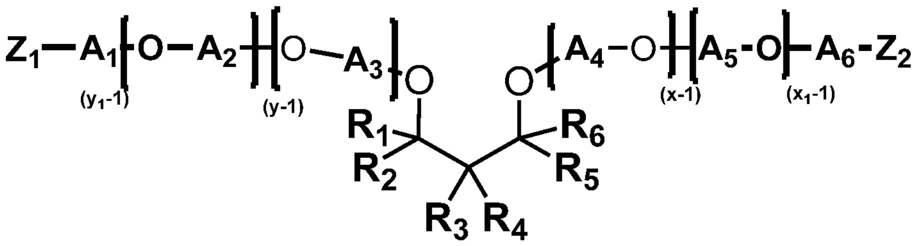
[0147] Suitable transition-metals in the instant transition-metal bleach catalyst include manganese, iron and chromium. Suitable MRL's herein are a special type of ultra-rigid ligand that is cross-bridged such as 5,12-diethyl-1,5,8,12-tetraazabicyclo[6.6.2]hexa-decane.

[0148] Suitable transition metal MRLs are readily prepared by known procedures, such as taught for example in WO 00/32601, and U.S. patent 6,225,464.

Amines

[0149] Various amines may be used in the cleaning compositions described herein for added removal of grease and particulates from soiled materials. The detergent compositions described herein may comprise from about 0.1% to about 10%, in some examples, from about 0.1% to about 4%, and in other examples, from about 0.1% to about 2%, by weight of the cleaning composition, of additional amines. Non-limiting examples of amines include, but are not limited to, polyamines, oligoamines, triamines, diamines, pentamines, tetraamines, polyetheramines, or combinations thereof. Specific examples of suitable additional amines include tetraethylenepentamine, triethylenetetraamine, diethylenetriamine, polyetheramines, or a mixture thereof. In one aspect, The compositions described herein may comprise a polyetheramine for added removal of grease and particulates from soiled materials. In one aspect, the compositions described herein may comprise from about 0.1% to about 10%, in some examples, from about 0.1% to about 6% or from about 0.2% to about 5% or from about 0.1% to about 2%, and in other examples, from about 0.5% to about 3% by weight of the cleaning composition, of a polyetheramine.

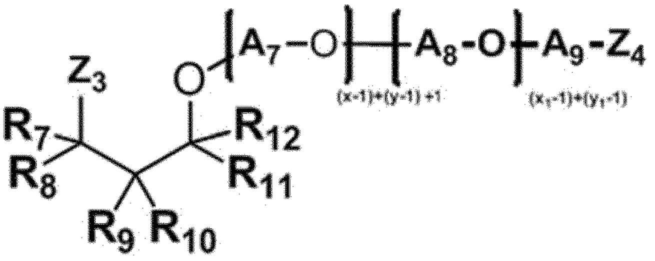
[0150] A suitable polyetheramine is represented by the structure of Formula (I):



Formula (I)

where each of R_1-R_6 is independently selected from H, alkyl, cycloalkyl, aryl, alkylaryl, or arylalkyl, where at least one of R_1-R_6 is different from H, typically at least one of R_1-R_6 is an alkyl group having 2 to 8 carbon atoms, each of A_1-A_6 is independently selected from linear or branched alkylenes having 2 to 18 carbon atoms, typically 2 to 10 carbon atoms, more typically, 2 to 5 carbon atoms, each of Z_1-Z_2 is independently selected from OH or NH_2, where at least one of Z_1-Z_2 is NH_2, typically each of Z_1 and Z_2 is NH_2, where the sum of x+y is in the range of about 2 to about 200, typically about 2 to about 20 or about 3 to about 20, more typically about 2 to about 10 or about 3 to about 8 or about 4 to about 6, where $x \geq 1$ and $y \geq 1$, and the sum of $x_1 + y_1$ is in the range of about 2 to about 200, typically about 2 to about 20 or about 3 to about 20, more typically about 2 to about 10 or about 3 to about 8 or about 2 to about 4, where $x_1 \geq 1$ and $y_1 \geq 1$.

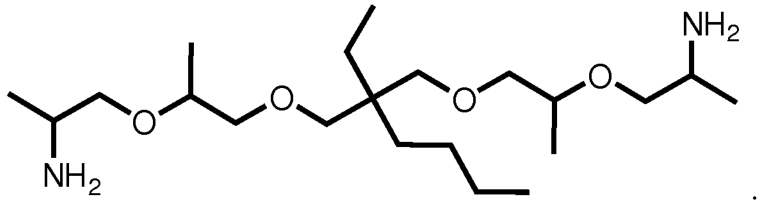
[0151] Another suitable polyetheramine is represented by the structure of Formula (II):



Formula (II)

where each of R_7-R_{12} is independently selected from H, alkyl, cycloalkyl, aryl, alkylaryl, or arylalkyl, where at least one of R_7-R_{12} is different from H, typically at least one of R_7-R_{12} is an alkyl group having 2 to 8 carbon atoms, each of A_7-A_9 is independently selected from linear or branched alkylenes having 2 to 18 carbon atoms, typically 2 to 10 carbon atoms, more typically, 2 to 5 carbon atoms, each of Z_3-Z_4 is independently selected from OH or NH_2, where at least one of Z_3-Z_4 is NH_2, typically each of Z_3 and Z_4 is NH_2, where the sum of x+y is in the range of about 2 to about 200, typically about 2 to about 20 or about 3 to about 20, more typically about 2 to about 10 or about 3 to about 8 or about 2 to about 4, where $x \geq 1$ and $y \geq 1$, and the sum of $x_1 + y_1$ is in the range of about 2 to about 200, typically about 2 to about 20 or about 3 to about 20, more typically about 2 to about 10 or about 3 to about 8 or about 2 to about 4, where $x_1 \geq 1$ and $y_1 \geq 1$.

[0152] Another suitable polyetheramine is represented by the structure of Formula III:



Formula (III)

Rheology Modifier

[0153] The liquid compositions of the present invention may comprise a rheology modifier. The rheology modifier may be selected from the group consisting of non-polymeric crystalline, hydroxyfunctional materials, polymeric rheology modifiers which impart shear thinning characteristics to the aqueous liquid matrix of the composition. In one aspect, such rheology modifiers impart to the aqueous liquid composition a high shear viscosity, at 20 sec^{-1} shear rate and at 21°C, of from 1 to 7000 cps and a viscosity at low shear (0.5 sec^{-1} shear rate at 21°C) of greater than 1000 cps, or even 1000 cps to 200,000 cps. In one aspect, for cleaning and treatment compositions, such rheology modifiers impart to the aqueous liquid composition a high shear viscosity, at 20 sec^{-1} and at 21°C, of from 50 to 3000 cps and a viscosity at low shear (0.5 sec^{-1} shear rate at 21°C) of greater than 1000 cps, or even 1000 cps to 200,000 cps. Viscosity according to the present invention is measured using an AR 2000 rheometer from TA instruments using a plate steel spindle having a plate diameter of 40 mm and a gap size of 500 μm. The high shear viscosity at 20 sec^{-1} and low shear viscosity at 0.5sec^{-1} can be obtained from a logarithmic shear rate sweep from 0.1 sec^{-1} to 25 sec^{-1} in 3 minutes time at 21° C. Crystalline hydroxyl functional materials are rheology modifiers which form thread-like structuring systems throughout the matrix of the composition upon in situ crystallization in the matrix. Polymeric rheology modifiers are preferably selected from polyacrylates, polymeric gums, other non-gum polysaccharides, and combinations of these polymeric materials.

[0154] Generally the rheology modifier will comprise from 0.01% to 1% by weight, preferably from 0.05% to 0.75% by weight, more preferably from 0.1% to 0.5% by weight, of the compositions herein.

[0155] Structuring agents which are especially useful in the compositions of the present invention may comprise non-polymeric (except for conventional alkoxylation), crystalline hydroxyfunctional materials which can form thread-like structuring systems throughout the liquid matrix when they are crystallized within the matrix in situ. Such materials can be generally characterized as crystalline, hydroxyl-containing fatty acids, fatty esters or fatty waxes. In one aspect, rheology modifiers include crystalline, hydroxyl-containing rheology modifiers include castor oil and its derivatives. In one aspect, rheology modifiers include may be hydrogenated castor oil derivatives such as hydrogenated castor oil and hydrogenated castor wax. Commercially available, castor oilbased, crystalline, hydroxyl-containing rheology modifiers include THIXCIN™ from Rheox, Inc. (now Elementis).

[0156] Other types of rheology modifiers, besides the non-polymeric, crystalline, hydroxyl-containing rheology modifiers described heretofore, may be utilized in the liquid detergent compositions herein. Polymeric materials which provide shear-thinning characteristics to the aqueous liquid matrix may also be employed.

[0157] Suitable polymeric rheology modifiers include those of the polyacrylate, polysaccharide or polysaccharide derivative type. Polysaccharide derivatives typically used as rheology modifiers comprise polymeric gum materials. Such gums include pectine, alginate, arabinogalactan (gum Arabic), carrageenan, gellan gum, xanthan gum and guar gum.

[0158] If polymeric rheology modifiers are employed herein, a preferred material of this type is gellan gum. Gellan gum is a heteropolysaccharide prepared by fermentation of Pseudomonaselodea ATCC 31461. Gellan gum is commercially marketed by CP Kelco U.S., Inc. under the KELCOGEL tradename.

[0159] A further alternative and suitable rheology modifier include a combination of a solvent and a polycarboxylate polymer. More specifically the solvent may be an alkylene glycol. In one aspect, the solvent may comprise dipropylene glycol. In one aspect, the polycarboxylate polymer may comprise a polyacrylate, polymethacrylate or mixtures thereof. In one aspect, solvent may be present, based on total composition weight, at a level of from 0.5% to 15%, or from 2% to 9% of the composition. In one aspect, polycarboxylate polymer may be present, based on total composition weight, at a level of from 0.1% to 10%, or from 2% to 5%. In one aspect, the solvent component may comprise mixture of dipropylene glycol and 1,2-propanediol. In one aspect, the ratio of dipropylene glycol to 1,2-propanediol may be 3:1 to 1:3, or even 1:1. In one aspect, the polyacrylate may comprise a copolymer of unsaturated mono- or di-carbonic acid and C_1-C_{30} alkyl ester of the (meth) acrylic acid. In another aspect, the rheology modifier may comprise a polyacrylate of unsaturated mono- or di-carbonic acid and C_1-C_{30} alkyl ester of the (meth) acrylic acid. Such copolymers are available from Noveon Inc under the tradename Carbopol Aqua 30®.

[0160] In the absence of rheology modifier and in order to impart the desired shear thinning characteristics to the liquid composition, the liquid composition can be internally structured through surfactant phase chemistry or gel phases.

Silicone Emulsion

[0161] The compositions of the present invention can comprise a silicone emulsion. An emulsion is a mixture of one liquid (the dispersed phase) dispersed in another (the continuous phase). In the context of the present, silicone emulsion also encompasses macroemulsion and microemulsion.

[0162] In one embodiment, the silicone emulsion of the present invention is added as an emulsion of Silicone oil in water or a solvent containing watery solution in a range of 35-65 (w/w%). In one embodiment, the silicone emulsion of the present invention can be any silicone emulsion. In one embodiment the mean particle size of the Silicone emulsion is 0.01 to 2 micrometer, more preferable from 0.2 to 0.8 micrometer mean particle size.
Preferably, the emulsified silicone oil is selected from the group comprising non-ionic nitrogen free silicone oils, amino-functional silicone oils and mixtures thereof.

[0163] In one embodiment of the present invention, the silicone emulsion is an aminofunctional silicone, preferably aminodimethicone.

[0164] In a preferred embodiment of the present invention, the silicone emulsion is a non-ionic nitrogen free silicone emulsion, preferably, selected from the group comprising polydialkyl silicone, polydimethyl silicone, alkyloxylated silicone, ethoxylated silicone, propoxylated silicone, ethoxylated propoxylated silicone, quaternary silicone or derivatives thereof and mixtures thereof. In a more preferred embodiment, the non-ionic nitrogen free silicone emulsion is selected from the group comprising polydialkyl silicone, polydimethyl silicone and mixtures thereof. In one embodiment, the silicone emulsion is polydimethyl silicone.

[0165] In this preferred embodiment, wherein the silicone emulsion is polydimethyl silicone, the polydimethyl silicone has a viscosity between 0.0001 $m^2.s^{-1}$ and 0.1 $m^2.s^{-1}$, preferably between 0.0003 $m^2.s^{-1}$ and 0.06 $m^2.s^{-1}$, more preferably between 0.00035 $m^2.s^{-1}$ and 0.012 $m^2.s^{-1}$.

[0166] Suitable solvents for use in the solvent containing watery solution can be selected from the group comprising C1-C20 linear, branched, cyclic, saturated and/or unsaturated alcohols with one or more free hydroxy groups; amines, alkanolamines, and mixtures thereof. Preferred solvents are monoalcohols, diols, monoamine derivatives, glycerols, glycols, and mixtures thereof, such as ethanol, propanol, propandiol, monoethanolamin, glycerol, sorbitol, alkylene glycols, polyalkylene glycols, and mixtures thereof. Most preferred solvents are selected from the group comprising 1,2-propandiol, 1.3-propandiol, glycerol, ethylene glycol, diethyleneglycol, and mixtures thereof. The emulsion contains a water soluble emulsifier, selected from the group of commercially available emulsifiers encompassing cationic, anionic, nonionic or zwitter - ionic emulsifiers. In a preferred embodiment of this invention the emulsifier is a nonionic surfactant.

[0167] Alternatively premixes of silicone emulsions and solvents are utilized in order to overcome process problems in terms of proper dispersion or dissolution of all ingredients throughout the composition. Premixes of the silicone emulsion in the context of the present invention, include high internal phase emulsion ("HIPE"). That is achieved by premixing a silicone emulsion, such as polydimethyl silicone, and an emulsifier to create a HIPE, then mixing this HIPE into the composition, thereby achieving good mixing resulting in an homogeneous mixture. Such HIPEs are comprised of at least 65%, alternatively at least 70%, alternatively at least 74%, alternatively at least 80%; alternatively not greater than 95%, by weight of an internal phase (dispersed phase), wherein the internal phase may comprise a silicone emulsion. The internal phase can also be other water insoluble fabric care benefit agents that are not already pre-emulsified. The internal phase is dispersed by using an emulsifying agent. Examples of the emulsifying agent include a surfactant or a surface tension reducing polymer. In one embodiment, the range of the emulsifying agent is from at least 0.1% to 25%, alternatively from 1% to 10%, and alternatively from 2% to 6% by weight of the HIPE. In another embodiment, the emulsifying agent is water soluble and reduces the surface tension of water, at a concentration less than 0.1% by weight of deionized water, to less than 0.0007 N (70 dynes), alternatively less than 0.0006 N (60 dynes), alternatively less than 0.0005 N (50 dynes); alternatively at or greater than 0.0002 N (20 dynes). In another embodiment, the emulsifying agent is at least partially water insoluble.

[0168] The external phase (continuous phase), in one embodiment, is water, alternatively may comprise at least some water, alternatively may comprise little or no water. In another embodiment, the external phase of water may comprise from less than 35%, alternatively less than 30%, alternatively less than 25%; alternatively at least 1%, by weight of HIPE. Non-aqueous HIPEs can be prepared as well with a solvent as the external phase with low or no water present. Typical solvents include glycerin and propylene glycol.

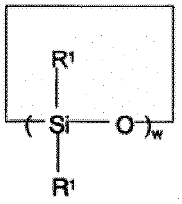
[0169] In another embodiment, the composition is a non-concentrated composition. In this embodiment, the silicone emulsion is not, at least initially, emulsified and can be emulsified in the fabric care composition itself.

[0170] The composition of the present invention may comprise a silicone emulsion which acts to maintain the physical stability of the liquid fabric softening composition following a freeze-thaw cycle and also upon prolonged storage at low temperatures.

[0171] The silicone emulsion of the present invention is at a level from 0.5% to 10%. In another embodiment, the silicone emulsion of the present invention is at a level from 0.3% to 10%, preferably from 0.3% to 5%, and most preferably from 0.5% to 3.0% by weight of the liquid fabric softening composition.

1. Non-ionic nitrogen free silicone emulsions:

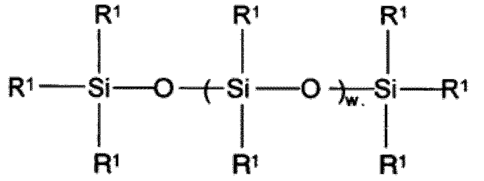
[0172] In the context of the present invention, preferably the silicone emulsion is selected from the group comprising non-ionic nitrogen free silicone emulsions having the formulae (I), (II), (III), and mixtures thereof:



$$\left(-\overset{\displaystyle R^1}{\underset{\displaystyle R^1}{Si}}-O-\right)_w$$

(I);

R^2-$(R^1)2SiO$-$[(R^1)_2SiO]_a$-$[(R^1)(R^2)SiO]_b$-$Si(R^1)_2$-R^2 (II);



$$R^1-\overset{\displaystyle R^1}{\underset{\displaystyle R^1}{Si}}-O-\left(\overset{\displaystyle R^1}{\underset{\displaystyle R^1}{Si}}-O\right)_w-\overset{\displaystyle R^1}{\underset{\displaystyle R^1}{Si}}-R^1$$

(III);

wherein each R^1 is independently selected from the group consisting of linear, branched or cyclic substituted or unsubstituted alkyl groups having from 1 to 20 carbon atoms; linear, branched or cyclic substituted or unsubstituted alkenyl groups having from 2 to 20 carbon atoms; substituted or unsubstituted aryl groups having from 6 to 20 carbon atoms; substituted or unsubstituted alkylaryl, substituted or unsubstituted arylalkyl and substituted or unsubstituted arylalkenyl groups having from 7 to 20 carbon atoms and mixtures thereof; each R^2 is independently selected from the group consisting of linear, branched or cyclic substituted or unsubstituted alkyl groups having from 1 to 20 carbon atoms; linear, branched or cyclic substituted or unsubstituted alkenyl groups having from 2 to 20 carbon atoms; substituted or unsubstituted aryl groups having from 6 to 20 carbon atoms; substituted or unsubstituted alkylaryl groups, substituted or unsubstituted arylalkyl, substituted or unsubstituted arylalkenyl groups having from 7 to 20 carbon atoms and from a poly(ethyleneoxide/propyleneoxide) copolymer group having the general formula;

$$-(CH_2)_nO(C_2H_4O)_c(C_3H_6O)_dR^3 \qquad \text{(IV)}$$

polydialkyl silicone, polydimethyl silicone, alkyloxylated silicone, quaternary silicone
with at least one R^2 being a poly(ethyleneoxy/propyleneoxy) copolymer group (ethoxylated silicone, propoxylated silicone, ethoxylated propoxylated silicone emulsions), and each R^3 is independently selected from the group consisting of hydrogen, an alkyl having 1 to 4 carbon atoms, an acetyl group, and mixtures thereof, wherein the index w has the value as such that the viscosity of the nitrogen-free silicone polymer of formulae (I) and (III) is between 0.0001 $m^2.s^{-1}$ (100 centistokes) and 0.1 $m^2.s^{-1}$ (100,000 centistokes); wherein a is from 1 to 50; b is from 1 to 50; n is 1 to 50; total c (for all polyalkyleneoxy side groups) has a value of from 1 to 100; total d is from 0 to 14; total c+d has a value of from 5 to 150 More preferably, the non-ionic nitrogen free silicone emulsion is selected from the group consisting of linear non-ionic nitrogen-free silicone emulsions having the formulae (II) to (III) as above, wherein R^1 is selected from the group consisting of methyl, phenyl, phenylalkyl, and mixtures thereof; wherein R^2 is selected from the group consisting of methyl, phenyl, phenylalkyl, and mixtures thereof; and from the group having the general formula (IV), as defined above, and mixtures thereof; wherein R^3 is defined as above and wherein the index w has a value such that the viscosity of the nitrogen-free silicone emulsion of formula (III) is between 0.0001 $m^2.s^{-1}$ (100 centistokes) and 0.1 $m^2.s^{-1}$ (100,000 centistokes); a is from 1 to 30, b is from 1 to 30, n is from 3 to 5, total c is from 6 to 100, total d is from 0 to 3, and total c + d is from 7 to 100.

[0173] Most preferably, the nitrogen-free silicone emulsion is selected from the group comprising linear non-ionic nitrogen free silicone emulsions having the general formula (III) as above, wherein R^1 is methyl, i.e. the silicone emulsion is polydimethyl silicone In this preferred embodiment, wherein the silicone emulsion is polydimethyl silicone, index w has a value such that the polydimethyl silicone has a viscosity between 0.0001 $m^2.s^{-1}$ and 0.1 $m^2.s^{-1}$, preferably between 0.0003 $m^2.s^{-1}$ and 0.06 $m^2.s^{-1}$, more preferably between 0.00035 $m^2.s^{-1}$ and 0.012 $m^2.s^{-1}$.

II, Aminofunctional silicone emulsions:

[0174] In one embodiment of the present invention, the silicone emulsion is an aminofunctional silicone. Aminofunctional silicone emulsions are materials of the formula:

$$HO[Si(CH_3)_2\text{-}O]_x\{Si(OH)[(CH_2)_3\text{-}NH\text{-}(CH_2)_2\text{-}NH_2]O\}_yH$$

wherein x and y are integers which depend on the viscosity of the silicone emulsion. Preferably, the aminofunctional silicone emulsion has a molecular weight such that it exhibits a viscosity of from 0.0005 $m^2.s^{-1}$ (500 centistokes) to 0.5 $m^2.s^{-1}$ (500,000 centistokes). This material is also known as "aminodimethicone.

Method of Use

[0175] 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. In one aspect, a method of cleaning or treating a situs comprising optionally washing and/or rinsing said situs, contacting said situs with the composition selected from the compositions and mixtures thereof disclosed herein and optionally washing and/or rinsing said situs is disclosed. For purposes of the present invention, washing includes but is not limited to, scrubbing, and mechanical agitation. The fabric may comprise most any type of fiber 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. In one aspect, a method of cleaning or treating a situs comprising optionally washing and/or rinsing said situs, contacting said situs with a composition disclosed herein, and optionally washing and/or rinsing said situs and/or drying said situs via passive or active drying in a machine.

TEST METHODS

(1) Extraction of benefit agent delivery particles from finished products.

[0176] Except where otherwise specified herein, the preferred method to isolate benefit agent delivery particles from finished products is based on the fact that the density of most such particles is different from that of water. The finished product is mixed with water in order to dilute and/or release the particles. The diluted product suspension is centrifuged to speed up the separation of the particles. Such particles tend to float or sink in the diluted solution/dispersion of the finished product. Using a pipette or spatula, the top and bottom layers of this suspension are removed, and undergo further rounds of dilution and centrifugation to separate and enrich the particles. The particles are observed using an optical microscope equipped with crossed-polarized filters or differential interference contrast (DIC), at total magnifications of 100 x and 400 x. The microscopic observations provide an initial indication of the presence, size, quality and aggregation of the delivery particles.

[0177] For extraction of delivery particles from a liquid fabric enhancer finished product conduct the following procedure:

1. Place three aliquots of approximately 20 ml of liquid fabric enhancer into three separate 50 ml centrifuge tubes and dilute each aliquot 1:1 with DI water (eg 20 ml fabric enhancer + 20 ml DI water), mix each aliquot well and centrifuge each aliquot for 30 minutes at approximately 10000 x g.
2. After centrifuging per Step 1, discard the bottom water layer (around 10 ml) in each 50 ml centrifuge tube then add 10 ml of DI water to each 50 ml centrifuge tube.
3. For each aliquot, repeat the process of centrifuging, removing the bottom water layer and then adding 10 ml of DIwater to each 50 ml centrifuge tube two additional times.
4. Remove the top layer with a spatula or a pipette, and
5. Transfer this top layer into a 1.8 ml centrifuge tube and centrifuge for 5 minutes at approximately 20000 x g.
6. Remove the top layer with a spatula and transfer into a new 1.8 ml centrifuge tube and add DI water until the tube is completely filled, then centrifuge for 5 minutes at approximately 20000 x g.

7. Remove the bottom layer with a fine pipette and add DI water until tube is completely filled and centrifuge for 5 minutes at approximately 20000 x g.
8. Repeat step 7 for an additional 5 times (6 times in total).

[0178] If both a top layer and a bottom layer of enriched particles appear in the above described step 1, then, immediately move to step 3 (i.e., omit step 2) and proceed steps with steps 4 through 8. Once those steps have been completed, also remove the bottom layer from the 50ml centrifuge tube from step 1, using a spatula or/and a pipette. Transfer the bottom layer into a 1.8 ml centrifuge tube and centrifuge 5 min at approximately 20000 x g. Remove the bottom layer in a new tube and add DI water until the tube is completely filled then centrifuge for 5 minutes approximately 20000 x g. Remove the top layer (water) and add DI water again until the tube is full. Repeat this another 5 times (6 times in total). Recombine the particle enriched and isolated top and bottom layers back together.

[0179] If the fabric enhancer has a white color or is difficult to distinguish the particle enriched layers add 4 drops of dye (such as Liquitint Blue JH 5% premix from Miliken & Company, Spartanburg, South Carolina, USA) into the centrifuge tube of step 1 and proceed with the isolation as described.

[0180] For extraction of delivery particles from solid finished products which disperse readily in water, mix 1L of DI water with 20 g of the finished product (eg., detergent foams, films, gels and granules; or water-soluble polymers; soap flakes and soap bars; and other readily water-soluble matrices such as salts, sugars, clays, and starches). When extracting particles from finished products which do not disperse readily in water, such as waxes, dryer sheets, dryer bars, and greasy materials, it may be necessary to add detergents, agitation, and/or gently heat the product and diluent in order to release the particles from the matrix. The use of organic solvents or drying out of the particles should be avoided during the extraction steps as these actions may damage the delivery particles during this phase.

[0181] For extraction of delivery particles from liquid finished products which are not fabric softeners or fabric enhancers (eg., liquid laundry detergents, liquid dish washing detergents, liquid hand soaps, lotions, shampoos, conditioners, and hair dyes), mix 20 ml of finished product with 20 ml of DI water. If necessary, NaCl (eg., 100-200 g NaCl) can be added to the diluted suspension in order to increase the density of the solution and facilitate the particles floating to the top layer. If the product has a white color which makes it difficult to distinguish the layers of particles formed during centrifugation, a water-soluble dye can be added to the diluent to provide visual contrast. The water and product mixture is subjected to sequential rounds of centrifugation, involving removal of the top and bottom layers, re-suspension of those layers in new diluent, followed by further centrifugation, isolation and re-suspension. Each round of centrifugation occurs in tubes of 1.5 to 50 ml in volume, using centrifugal forces of up to 20,000 x g, for periods of 5 to 30 minutes. At least six rounds of centrifugation are typically needed to extract and clean sufficient particles for testing. For example, the initial round of centrifugation may be conducted in 50ml tubes spun at 10,000 x g for 30 mins, followed by five more rounds of centrifugation where the material from the top and bottom layers is resuspended separately in fresh diluent in 1.8 ml tubes and spun at 20,000 x g for 5 mins per round.

[0182] If delivery particles are observed microscopically in both the top and bottom layers, then the particles from these two layers are recombined after the final centrifugation step, to create a single sample containing all the delivery particles extracted from that product. The extracted particles should be analyzed as soon as possible but may be stored as a suspension in DI water for up to 14 days before they are analyzed.

[0183] One skilled in the art will recognize that various other protocols may be constructed for the extraction and isolation of delivery particles from finished products, and will recognize that such methods require validation via a comparison of the resulting measured values, as measured before and after the particles' addition to and extraction from finished product.

(2) Particle Size (Diameter):

[0184] A drop of the particle suspension or finished product is placed onto a glass microscope slide and dried under ambient conditions for several minutes to remove the water and achieve a sparse, single layer of solitary particles on the dry slide. Adjust the concentration of particles in the suspension as needed to achieve a suitable particle density on the slide. The slide is placed on a sample stage of an optical microscope equipped and examined at a total magnification of 100 x or 400 x. Images are captured and calibrated for the accurate measurement of particle diameters. Three replicate slides are prepared and analyzed.

[0185] For particle size measurement, at least 50 benefit agent delivery particles on each slide are selected for measurement, in a manner which is unbiased by their size and so creates a representative sample of the distribution of particle sizes present. This may be achieved by examining fields-of-view which are selected at random or according to a predefined grid pattern, and by measuring the diameter of all the delivery particles present in each field-of-view examined. Delivery particles which appear obviously non-spherical, deflated, leaking, or damaged are unsuitable for measurement, are excluded from the selection process and their diameters are not recorded. The diameter of each suitable delivery particle examined is measured using the microscope and the value is recorded. The recorded particle diameter measurements are used to calculate the percentage of the particles having a particle size within the claimed size range(s), and also to calculate the mean particle size.

(3) Benefit Agent Leakage

[0186] The amount of benefit agent leakage from the delivery particles is determined according to the following method:

a.) Obtain two 1 g samples of the raw material slurry of benefit delivery particles.
b.) Add 1 g of the raw material slurry of benefit delivery particles to 99 g of the product matrix in which the particles will be employed, and label the mixture as Sample 1. Immediately use the second 1 g sample of raw material particle slurry in Step d below, in its neat form without contacting product matrix, and label it as Sample 2.
c.) Age the particle-containing product matrix (Sample 1) for 2 weeks at 35°C in a sealed, glass jar.
d.) Using filtration, recover the particles from both samples. The particles in Sample 1 (in product matrix) are recovered after the aging step. The particles in Sample 2 (neat raw material slurry) are recovered at the same time that the aging step began for sample 1.
e.) Treat the recovered particles with a solvent to extract the benefit agent materials from the particles.
f.) Analyze the solvent containing the extracted benefit agent from each sample, via chromatography. Integrate the resultant benefit agent peak areas under the curve, and sum these areas to determine the total quantity of benefit agent extracted from each sample.
g.) Determine the percentage of benefit agent leakage by calculating the difference in the values obtained for the total quantity of benefit agent extracted from Sample 2 minus Sample 1, expressed as a percentage of the total quantity of benefit agent extracted from Sample 2, as represented in the equation below:

$$\text{Percentage of Benefit Agent Leakage} = \left(\frac{Sample\ 2 - Sample\ 1}{Sample\ 2}\right) \times 100$$

(4) Viscosity

[0187] Viscosity of liquid finished product is measured using an AR 550 rheometer / viscometer from TA instruments (New Castle, DE, USA), using parallel steel plates of 40 mm diameter and a gap size of 500 μm. The high shear viscosity at 20 s^{-1} and low shear viscosity at 0.05 s^{-1} is obtained from a logarithmic shear rate sweep from 0.1 s^{-1} to 25 s^{-1} in 3 minutes time at 21 °C.

(5) Aggregation Index

[0188] The aggregation index in finished product is determined using the following method:

a. Clean a 212 micron standard laboratory sieve (W.S. Tyler Company, Mentor, Ohio, USA 44060) with water to remove any residues & dry manually &/or allow to air dry.
b. Place ~20g of product via syringe on the sieve, spread in line over the sieve. Record weight in grams.
c. Tap sieve lightly to allow product to flow through sieve. Light air or nitrogen may be blown over sample to help alleviate air bubbles trapped on the sieve.
d. Count the number of particles remaining on sieve after finished product has passed through the sieve. Record the number of particles. Repeat counting 3 times. Take care to ensure that aggregates are counted and distinguished from air bubbles. Additional air/nitrogen can be used if needed.
e. Repeat steps 1 - 4 up to 4 more times but no less than 3 times.
f. Divide average number of counts by weight used to get aggregation index per gram of sample.
g. Average the three readings of aggregation index per gram of sample for an overall determination.

EXAMPLES

[0189]

Example 1 A particle slurry consisting of 32% by weight aminoplast capsules with a median volume weighted particle size of 18 microns, a surface charge of about -30mV, & a pH of 6.45, is mixed with a formaldehyde scavenger & a structurant. A cationic modified co polymer of poly vinylamine and N-vinyl formamide is added at levels shown in the table below at a temperature of about 55°C. Then an inorganic salt is added into the slurry at levels shown in the table at a temperature of about 50°C. The slurry is cooled to a temperature of 25°C and the final pH is adjusted to 5.3. The slurry is passed through a 425 micron filter & the aggregation index is about 10 particles/gram of slurry.

Formulation (% active unless otherwise noted)	Formula 1	Formula 2	Formula 3	Formula 4
Cationic modified co polymer of poly vinylamine and N-vinyl formamide	0.10	0.25	0.5	0.75
Magnesium chloride	0.1-4	0	0.1-4	0
Calcium sulfate	0	0.1-4	0	0.1-4

Example 2 A slurry from Example 1 is mixed into a heavy duty liquid detergent with the following compositions at a temperature of about 20°C. The aggregation index is about 0.1 particles/gram of liquid detergent.

Formulation (% active unless otherwise noted)	Formula 5	Formula 6	Formula 7	Formula 8	Formula 9
Alkyl Ether Sulphate	7-9	5-7	3-5	8-10	10-12
Dodecyl Benzene Sulphonic Acid	4-6	6-8	10-12	1-3	3-5
Ethoxylated Alcohol	3-5	3-5	1-3	5-7	1-3
Amine Oxide	0-2	1-4	2-4	3-5	0-2
Citric Acid	0.5-2	0-1	2-5	2-4	1-3
Fatty Acid	2-4	2-5	3-5	0-2	1-3
Calcium formate	0	0	0-1	0-1	0-1
Sodium formate	0-1	0	0-1	0	0-1
Diethylene triamine penta acetic acid	0-1	0-2	1-2	0-1	0-1
Enzymes	0-1	2-4	1-3	0-2	0-2
Brightener (disulphonated diamino stilbene based FWA)	0	0-1	0-0.5	0	0-0.5
Sodium bisulfate	0	0-1	0-0.5	0	0-1
Hydrogenated Castor Oil Structurant	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Borax	0	1-3	1-4	0-2	2-4
Ethanol	0	3-5	2-3	0.5-1.5	1-2
1, 2 propanediol	3-5	0	3-5	3-5	2-3
Diethyleneglycol (DEG)	2-3	2-3	0	1.5-2.5	2-3
PEG 4000	0.5-1	0	0.2-0.6	1-1.5	0-0.5
Mono Ethanol Amine	2-3	0-1	2-4	0	1-2
PEI-EO-PO Polymer	0	0.5-2.0	0	1-2	0.5-1
PEI Ethoxylate	0-1	0.5-2.5	1-2	2-4	1-3
Sodium Cumene Sulphonate (NaCS)	1-2	3-3.5	2-3	0	0.5-1
Silicone (PDMS) emulsion	0.01-0.05	0.01-0.05	0.01-0.05	0.01-0.05	0.01-0.05
Perfume	0.1-2	0.1-2	0.1-2	0.1-2	0.1-2
Polymer Coated Perfume Microcapsule	0.1-1	0.1-1	0.1-1	0.1-1	0.1-1
Dye	0.01-0.1	0.01-0.1	0.01-0.1	0.01-0.1	0.01-0.1
Water	Balance	Balance	Balance	Balance	Balance

Example 3 The particle slurry from Example 1 is adjusted with water to a particle concentration of about 24%, adjusted

to a pH of 3 and mixed with 2% by weight of a second cationic polymer selected from group consisting of a polysaccharide, a cationically modified starch, a cationically modified guar, a polysiloxane, a poly diallyl dimethyl ammonium halide, a copolymer of poly diallyl dimethyl ammonium chloride and vinyl pyrrolidone, a methacrylate quaternized homopolymer , an acrylamide, an imidazole, an imidazolinium, a halide, or an imidazolium halide, at a temperature of 25°C. Then the slurry is adjusted to a pH of 5.1, passed through a 425 micron filter, & the aggregation index is about 10 particles/gram of slurry.

Example 4 A particle slurry from Example 3 is mixed into a liquid fabric enhancer with the following compositions at a temperature of about 20°C. The aggregation index is about 0.1 particles/gram of liquid fabric enhancer.

Formulation (% active unless otherwise noted)	Formula 10	Formula 11	Formula 12	Formula 13	Formula 14	Formula 15
Fabric Enhancing Active[a]	16.8	16.8	14.4	12	10	8
Formic acid (ppm)	250	250	250	250	250	250
Antifoam[b] (ppm)	150	150	150	150	150	150
Hydrochloric Acid (ppm)	225	225	225	225	225	225
DTPA[c] (ppm)	79	79	79	79	79	79
Preservative[d] (ppm)	75	75	75	75	75	75
Salt[e] (ppm)	1000	750	450	100	100	0
Rheology Modifier[f]	.05	0	.10	.15	.15	.35
Cationic surfactant[g]	.25	.25	.25	0	0	0
Perfume	0.1-3	0.1-3	0.1-3	0.1-3	0.1-3	0.1-3
Polymer Coated Perfume Microcapsules	.05-1	.05-1	.05-1	.05-1	.05-1	.05-1
Dye	.003-.03	.003-.03	.003-.03	.003-.03	.003-.03	.003-.03
Deionized Water	Balance	Balance	Balance	Balance	Balance	Balance

[a] An ester quaternary ammonium compound mixture with 9 parts ethanol and 3 parts coco oil.

[b] Silicone antifoam agent available from Dow Corning Corp. under the trade name DC2310

[c] Diethylenetriaminepentaacetic acid

[d] Proxel® available from Arch Chemicals

[e] Salt as Calcium Chloride as a 2.5% solution in water

[f] Polymer available from BASF under the trade name Rheovis CDE

[g] Cationic surfactant available from Evonik under the trade name Variquat K1215

EXAMPLE 5. Microcapsules in Shampoo

A subset of the capsules from the above examples is formulated into a rinse-off Shampoo formulation as follows: to 90.0 grams of shampoo formulation (with a typical formulation given below) is added an appropriate amount of microcapsule slurry to deliver a fragrance usage level of 0.5wt%. The microcapsules and water are added on top of the shampoo formulation, then the contents are mixed using a SpeedMixer by Hauschild DAC 400FVZ mixer, at 1850 RPM for 1 minute. Typical composition of shampoo formulations are given in the examples below.

EXAMPLE COMPOSITION	**I**	**II**	**III**
Ingredient			
Water	q.s.	q.s.	q.s.
Polyquaternium 76[1]	2.50	--	--
Guar, Hydroxylpropyl Trimonium Chloride[2]	--	0.25	--
Polyquaterium 6[3]	--	--	0.79
Sodium Laureth Sulfate (SLE3S)[4]	21.4 3	21.4 3	21.43

(continued)

EXAMPLE COMPOSITION	**I**	**II**	**III**
Ingredient			
Sodium Lauryl Sulfate (SLS)	20.6 9	20.6 9	20.69
Silicone[6]	0.75	1.00	0.5
Cocoamidopropyl Betaine [7]	3.33	3.33	3.33
Cocoamide MEA[8]	1.0	1.0	1.0
Ethylene Glycol Distearate [9]	1.50	1.50	1.50
Sodium Chloride [10]	0.25	0.25	0.25
Fragrance	0.70	0.70	0.70
Fragrance Microcapsule	1.2	1.2	1.2
Preservatives, pH adjusters	Up to 1%	Up to 1%	Up to 1%

1 Mirapol AT-1, Copolymer of Acrylamide(AM) and TRIQUAT, MW=1,000,000; CD= 1.6 meq./gram; 10% active ; Supplier Rhodia
2 Jaguar C500, MW - 500,000, CD=0.7, supplier Rhodia
3 Mirapol 100S, 31.5% active, supplier Rhodia
4 Sodium Laureth Sulfate, 28% active, supplier: P&G
5 Sodium Lauryl Sulfate, 29% active supplier: P&G
6 Glycidol Silicone VC2231-193C
7 Tegobetaine F-B, 30% active supplier: Goldschmidt Chemicals
8 Monamid CMA, 85% active , supplier Goldschmidt Chemical
9 Ethylene Glycol Distearate, EGDS Pure, supplier Goldschmidt Chemical
10 Sodium Chloride USP (food grade), supplier Morton; note that salt is an adjustable ingredient, higher or lower levels may be added to achieve target viscosity.

EXAMPLE COMPOSITION	IV	V	VI
Ingredient			
Water	q.s.	q.s.	q.s.
Silicone A [1]	1.0	--	--
Silicone B [2]	--	0.5	--
Silicone C[3]	--	--	0.5
Cyclopentasiloxane[4]	--	0.61	1.5
Behenyl trimethyl ammonium chloride[5]	2.25	2.25	2.25
Isopropyl alcohol	0.60	0.60	0.60
Cetyl alcohol [6]	1.86	1.86	1.86
Stearyl alcohol[7]	4.64	4.64	4.64
Disodium EDTA	0.13	0.13	0.13
NaOH	0.01	0.01	0.01
Benzyl alcohol	0.40	0.40	0.40
Methylchloroisothiazolinone/ Methylisothiazolinone [8]	0.000 5	0.0005	0.000 5
Panthenol [9]	0.10	0.10	0.10
Panthenyl ethyl ether [10]	0.05	0.05	0.05
Fragrance	0.35	0.35	0.35

(continued)

EXAMPLE COMPOSITION	IV	V	VI
Ingredient			
Fragrance Microcapsules	1.2	1.2	1.2

1 Glycidol Silicone VC2231-193
2 Glycidol Silicone VC2231-193F
3 Glycidol Silicone VC2231-193A
4 Cyclopentasiloxane: SF1202 available from Momentive Performance Chemicals
5 Behenyl trimethyl ammonium chloride/Isopropyl alcohol: Genamin™ KMP available from Clariant
6 Cetyl alcohol: Konol™ series available from Shin Nihon Rika
7 Stearyl alcohol: Konol™ series available from Shin Nihon Rika
8 Methylchloroisothiazolinone/Methylisothiazolinone: Kathon TM CG available from Rohm & Haas
9 Panthenol: Available from Roche
10 Panthenyl ethyl ether: Available from Roche

EXAMPLE COMPOSITION Ingredient	**VII**	**VIII**
Sodium Laureth Sulfate	10.00	10.00
Sodium Lauryl Sulfate	1.50	1.50
Cocamidopropyl betaine	2.00	2.00
Guar Hydroxypropyl trimonium chloride (**1**)	0.40	
Guar Hydroxypropyl trimonium chloride (**2**)		0.40
Dimethicone (**3**)	2.00	2.00
Gel Network (**4**)		27.27
Ethylene Glycol Distearate	1.50	1.50
5-Chloro-2-methyl-4-isothiazolin-3-one, Kathon CG	0.0005	0.0005
Sodium Benzoate	0.25	0.25
Disodium EDTA	0.13	0.13
Perfume	0.70	0.70
Fragrance Microcapsules of Example 3	1.0	1.0
Citric Acid/ Sodium Citrate Dihydrate	pH QS	pH QS
Sodium Chloride/ Ammonium Xylene Sulfonate	Visc. QS	Visc. QS
Water	QS	QS

(1) Jaguar C17 available from Rhodia
(2) N-Hance 3269 (with Mol. W. of ~500,000 and 0.8meq/g) available from Aqulaon/Hercules
(3) Viscasil 330M available from General Electric Silicones
(4) Gel Networks; See Composition below. The water is heated to about 74°C and the Cetyl Alcohol, Stearyl Alcohol, and the SLES Surfactant are added to it. After incorporation, this mixture is passed through a heat exchanger where it is cooled to about 35°C. As a result of this cooling step, the Fatty Alcohols and surfactant crystallized to form a crystalline gel network.

Ingredient	**Wt. %**
Water	86.14%

(continued)

Ingredient	Wt. %
Cetyl Alcohol	3.46%
Steary Alcohol	6.44%
Sodium laureth-3 sulfate (28% Active)	3.93%
5-Chloro-2-methyl-4-isothiazolin-3-one, Kathon CG	0.03%

EXAMPLE 6. Microcapsules in Lotion

Example	I	II	III
PHASE A			
DC-9040 [1]	8.60	3.00	5.00
Dimethicone	4.09	4.00	4.00
Polymethylsilsesquioxane [2]	4.09	4.00	4.00
Cyclomethicone	11.43	0.50	11.33
KSG-210 [3]	5.37	5.25	5.40
Polyethylene wax [4]	3.54		2.05
DC-2503 Cosmetic Wax[5]	7.08	10.00	3.77
Hydrophobic TiO2			0.50
Iron oxide coated Mica			0.65
TiO2 Coated Mica	1.00	1.00	
Fragrance Particles	1.00	1.00	1.00
PHASE B			
Glycerin	10.00	10.00	10.00
Dexpanthenol	0.50	0.50	0.50
Pentylene Glycol	3.00	3.00	3.00
Hexamidine Diisethionate [6]	0.10	0.10	0.10
Niacinamide [7]	5.00	5.00	5.00
Methylparaben	0.20	0.20	0.20
Ethylparaben	0.05	0.05	0.05
Sodium Citrate	0.20	0.20	0.20
Citric Acid	0.03	0.03	0.03
Sodium Benzoate	0.05	0.05	0.05
Sodium Chloride	0.50	0.50	0.50
FD&C Red #40 (1%)	0.05	0.05	0.05
Water	q.s to 100	q.s to 100	q.s to 100
Hardness at 21 °C (g)	33.3	15.4	14.2

(continued)

PHASE B			
Hardness at 33 °C (g)	6.4	0.7	4.0
1. 12.5% Dimethicone Crosspolymer in Cyclopentasiloxane. Available from Dow Corning™. 2. E.g., Tospearl™ 145A or Tospearl 2000. Available from GE Toshiba Silicone™. 3. 25% Dimethicone PEG-10/15 Crosspolymer in Dimethicone. Available from Shin-Etsu™. 4. Jeenate™ 3H polyethylene wax from Jeen™ 5. Stearyl Dimethicone. Available from Dow Coming. 6. Hexamidine diisethionate, available from Laboratoires Serobiologiques. 7. Additionally or alternatively, the composition may comprise one or more other skin care actives, their salts and derivatives, as disclosed herein, in amounts also disclosed herein as would be deemed suitable by one of skill in the art.			

[0190] For the examples above, in a suitable container, combine the ingredients of Phase A. In a separate suitable container, combine the ingredients of Phase B. Heat each phase to 73°C-78°C while mixing each phase using a suitable mixer (e.g., Anchor blade, propeller blade, or IKA T25) until each reaches a substantially constant desired temperature and is homogenous. Slowly add Phase B to Phase A while continuing to mix Phase A. Continue mixing until batch is uniform. Pour product into suitable containers at 73-78°C and store at room temperature. Alternatively, continuing to stir the mixture as temperature decreases results in lower observed hardness values at 21 and 33 °C.

Claims

1. A process of making a composition having a viscosity of from 10 cps to 5000 cps, preferably from 10 cps to 2000 cps, more preferably from 50 cps to 1500 cps, most preferably from 100 cps to 1000 cps as measured in a viscometer using parallel steel plates of 40 mm diameter and a gap size of 500 μm a shear rate of 20 s^{-1} at 21 °C comprising based on total composition weight:

    a) from 0.01% to 10 wt%, preferably from 0.1% to 5 wt% , more preferably from 0.1% to 2 wt%, most preferably from 0.1% to 1 wt% of microcapsules, said microcapsules comprising a cationic deposition polymer disposed on the outer surface of said microcapsules, wherein said microcapsules are perfume microcapsules;
    b) from 0.0001 % to 5 wt%, preferably from 0.001% to 5 wt%, from 0.01% to 4 wt%, more preferably from 0.3% to 2 wt% of an ion selected from the group consisting of Na^+, K^+, Mg^{2+}, Ca^{2+}, Cl^-, Br^-, HSO_4^- and SO_4^{2-} and mixtures thereof;
    c) optionally, a material selected from the group consisting of a polymer in addition to said deposition polymer, preservative, a formaldehyde scavenger, and mixtures thereof; and
    d) 0.0001% to 70 wt%, preferably from 0.1% to 50 wt%, more preferably from 15% to 40 wt% of a material selected from the group consisting of a fabric enhancer, an enzyme, surfactant, a builder, a dye, a hueing agent, a nonaqueous solvent, a suds suppressor, a bleaching agent, chelating agents, optical brighteners, dye transfer inhibiting agents, dispersants, clay soil removal/anti-redeposition agents, structurants, perfumes, deposition agents, silicones, rheology modifiers, preservatives, stabilizers, and mixtures thereof; said composition having an aggregation index determined as described herein under the sub-heading "Aggregation Index", of less than 30, preferably from 0.01 to 29, more preferably from 0.05 to 20, more preferably from 0.1 to 10, most preferably from 0.1 to 5 perfume microcapsule aggregate particles per gram of composition, said composition being a consumer product; said process comprising producing a slurry produced by the process of :

        i) adjusting the pH of a slurry of perfume microcapsules having an anionic charge, preferably a charge of from -1 mV to -100 mV, to a value below the pKa of the perfume microcapsule and the cationic polymer;
        ii) combining slurry and said cationic polymer and dispersing said combined slurry and cationic polymer with mechanical energy
        iii) adjusting the pH of said combined slurry and cationic polymer to a value above the pKa of said slurry of particles but below the pKa of the cationic polymer;
        iv) combining said combined slurry and cationic polymer with a material selected from the group consisting of a fabric enhancer, an enzyme, surfactant, a builder, a dye, a hueing agent, a nonaqueous solvent, a suds suppressor, a bleaching agent, chelating agents, optical brighteners, dye transfer inhibiting agents, dispersants, clay soil removal/anti-redeposition agents, structurants, perfumes, deposition agents, silicones,

rheology modifiers, preservatives, stabilizers, and mixtures thereof.

2. A process according to Claim 1 comprising a surfactant, said surfactant being selected from the group consisting of anionic surfactant, cationic surfactant, nonionic surfactant, zwitterionic surfactant, ampholytic surfactant and mixtures thereof, preferably said composition comprises an anionic surfactant, more preferably said composition comprises an anionic surfactant is selected from the group consisting of a C_9-C_{18} alkyl benzene sulfonate surfactant; a C_{10}-C_{20} alkyl sulfate surfactant; a C_{10}-C_{18} alkyl alkoxy sulfate surfactant, said C_{10}-C_{18} alkyl alkoxy sulfate surfactant having an average degree of alkoxylation of from 1 to 30 and the alkoxy comprises a C_1-C_4 chain, and mixtures thereof.

3. A process according to any preceding claim wherein:

a) said fabric enhancer comprises a material selected from the group consisting of polyglycerol esters, oily sugar derivatives, wax emulsions, fatty acids, 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 and mixtures thereof, preferably said fabric enhancer comprises a material selected from the group consisting of selected from the group consisting of bis-(2-hydroxypropyl)-dimethylammonium methylsulphate fatty acid ester, 1,2-di(acyloxy)-3-trimethylammoniopropane chloride, 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, N,N-bis-(stearoyl-2-hydroxypropyl)-N,N-dimethylammonium methylsulphate, N,N-bis-(tallowoyl-2-hydroxypropyl)-N,N-dimethylammonium methylsulphate, N,N-bis-(palmitoyl-2-hydroxypropyl)-N,N-dimethylammonium methylsulphate, N,N-bis-(stearoyl-2-hydroxypropyl)-N,N-dimethylammonium chloride, 1, 2 di (stearoyl-oxy) 3 trimethyl ammoniumpropane chloride, dicanoladimethylammonium chloride, di(hard)tallowdimethylammonium chloride dicanoladimethylammonium methylsulfate, 1-methyl-1-stearoylamidoethyl-2-stearoylimidazolinium methylsulfate, 1-tallowylamidoethyl-2-tallowylimidazoline, dipalmethyl hydroxyethylammoinum methosulfate and mixtures thereof;
b) said deposition polymer, preferably said deposition polymer comprises a cationic polymer having a cationic charge of from 0.005 meq/g to 23 meq/g, preferably of from 0.01 meq/g to 12 meq/g, most preferably of from 0.1 meq/g to 7 meq/g at the pH of said composition;
c) said enzyme is selected from the group consisting of protease, amylase, lipase, mannanase, cellulase, xyloglucanase, pectate lyase, and mixtures thereof;
d) said a structurant comprises a material selected from the group consisting of hydrogenated castor oil; derivatives of hydrogenated castor oil; microfibrillar cellulose; hydroxyfunctional crystalline materials, long-chain fatty alcohols, 12-hydroxystearic acid; clays; and mixtures thereof;
e) said dispersant comprises a polymeric dispersing agent selected from the group consisting of polycarboxylates, soil release polymers, carboxymethylcelluloses, poly(vinyl-pyrrolidone), poly (ethylene glycol), poly(vinyl alcohol), poly(vinylpyridine-N-oxide), poly(vinylimidazole), zwitterionic ethoxylated quaternized sulfated hexamethylene diamine, alkoxylated polyalkylenimine, ethoxylated polyamine, polyethylene glycol-polyvinylacetate;
f) said hueing agent comprises a material selected from the group consisting of from the group consisting of small molecule dyes, polymeric dyes, dye clay conjugates and pigments; and/or
g) an oligoamine that comprises a polyetheramine.

4. The process according to any preceding claim wherein said microcapsules comprise a core and a shell, said shell encapsulating said core, said microcapsules having a particle size of from 0.01 microns to 300 microns, preferably from 0.1 microns to 100 microns, more preferably from 0.5 microns to 50 microns.

5. The process according to claim 4 wherein said microcapsules have a deposition polymer coating to shell (wall) ratio of from 1:200 to 5:1, preferably from 1:40 to 1:1, preferably when said deposition polymer comprises a copolymer comprising polyvinyl formamide and polyvinylamine said deposition polymer coating to shell (wall) ratio may be from 1:40 to 1:5, more preferably, when said deposition polymer comprises a methacrylate quaternized homopolymer said deposition polymer coating to shell (wall) ratio may be from 1:10 to 5:1.

6. The process according to claim 4 or claim 5 wherein said microcapsules have a benefit agent leakage of a benefit agent leakage of from 0% to 30%, preferably from 0.001% to 20%, more preferably from 0.1% to 10%, most preferably from 0.1% to 5%.

7. The process according to any of claims 4, 5 or 6 wherein:

a) said core further comprises a material selected from the group consisting of a brightener; a dye; a insect repellant; a silicone; a wax; a flavor; a vitamin; a fabric softening agent; a skin care agent in one aspect, a paraffin; a enzyme; anti-bacterial agent; a bleach; a sensate; and mixtures thereof;
b) said shell (wall) comprises a material selected from the group consisting of a polyethylene; a polyamide; a polystyrene; a polyisoprene; a polycarbonate; a polyester; a polyacrylate; an aminoplast, in one aspect said aminoplast comprises a polyurea, a polyurethane, and/or a polyureaurethane, in one aspect said polyurea comprises polyoxymethyleneurea and/or melamine formaldehyde; a polyolefin; a polysaccharide, in one aspect alginate and/or chitosan; gelatin; shellac; an epoxy resin; a vinyl polymer; a water insoluble inorganic; a silicone; and mixtures thereof; and
c) said cationic deposition polymer is selected from the group consisting of a cationic polysaccharide, a cationically modified starch, a cationically modified guar, a cationic polysiloxane, a poly diallyl dimethyl ammonium halide, a copolymer of poly diallyl dimethyl ammonium chloride and vinyl pyrrolidone, a cationic acrylamide, a cationic imidazoles, an imidazolinium a halides, an imidazolium halide, a cationic poly vinyl amine, a cationic copolymer of poly vinylamine and N-vinyl formamide, a methacrylate quaternized homopolymer and mixtures thereof.

8. A process according to any preceding claim, wherein said microcapsules comprise a core and a shell and wherein said core comprises perfume and said shell (wall) comprises melamine formaldehyde and/or cross linked melamine formaldehyde.

9. A process according to any preceding claim, wherein said microcapsules comprise a core and a shell and wherein said core comprises perfume and said shell (wall) comprises melamine formaldehyde and/or cross linked melamine formaldehyde, poly(acrylic acid) and poly(acrylic acid-co-butyl acrylate).

10. Aprocess according to any preceding claim comprising an adjunct ingredient selected from the group consisting of additional perfume and/or perfume delivery systems.

11. A method of cleaning or treating a situs comprising optionally washing and/or rinsing said situs, contacting said situs with a composition prepared according to any preceding claim, and optionally washing and/or rinsing said situs and/or drying said situs via passive or active drying in a machine.

Patentansprüche

1. Verfahren zur Herstellung einer Zusammensetzung mit einer Viskosität von 10 cP bis 5000 cP, vorzugsweise 10 cP bis 2000 cP, mehr bevorzugt 50 cP bis 1500 cP, am meisten bevorzugt 100 cP bis 1000 cP, gemessen in einem Viskosimeter unter Verwendung paralleler Stahlplatten von 40 Millimeter Durchmesser und einer Spaltgröße von 500 μm, einer Scherrate von 20 s^{-1} bei 21 °C, umfassend, bezogen auf das Gesamtgewicht der Zusammensetzung:

a) von 0,01 bis 10 Gew.-%, vorzugsweise von 0,1 bis 5 Gew.-%, mehr bevorzugt von 0,1 bis 2 Gew.-%, am meisten bevorzugt von 0,1 bis 1 Gew.-% Mikrokapseln, wobei die Mikrokapseln ein auf der Außenoberfläche der Mikrokapseln angeordnetes, kationisch geladenes Abscheidepolymer umfassen, wobei es sich bei den Mikrokapseln um Duftstoff-Mikrokapseln handelt;
b) von 0,0001 bis 5 Gew.-%, vorzugsweise von 0,001 bis 5 Gew.-%, von 0,01 bis 4 Gew.-%, mehr bevorzugt von 0,3 bis 2 Gew.-% eines Ions, ausgewählt aus der Gruppe bestehend aus Na^+, K^+, Mg^{2+}, Ca^{2+}, Cl^-, Br, HSO_4^- und SO_4^{2-} und Mischungen davon;
c) wahlweise ein Material, ausgewählt aus der Gruppe bestehend aus einem Polymer zusätzlich zu dem Abscheidungspolymer, einem Konservierungsmittel, einem Formaldehydfänger und Mischungen davon; und
d) 0,0001 bis 70 Gew.-%, vorzugsweise von 0,1 bis 50 Gew.-%, mehr bevorzugt von 15 bis 40 Gew.-% eines Materials, ausgewählt aus der Gruppe bestehend aus einem Textilveredler, einem Enzym, einem Tensid, einem Builder, einem Farbstoff, einem Färbemittel, einem nichtwässrigen Lösungsmittel, einem Schaumunterdrücker, einem Bleichmittel, Chelatbildnern, optischen Aufhellern, Farbstoffübertragungshemmern, Dispersanten, Lehmschmutzentfernungs-/Antiwiederablagerungsmitteln, Strukturmitteln, Duftstoffen, Abscheidungsmitteln, Silikonen, Rheologiemodifikatoren, Konservierungsmitteln, Stabilisatoren und Mischungen davon; wobei die Zusammensetzung einen Aggregationsindex, wie hierin unter der Unterposition "Aggregationsindex" beschrieben, von weniger als 30, vorzugsweise von 0,01 bis 29, mehr bevorzugt von 0,05 bis 20, mehr bevorzugt von 0,1 bis 10, am meisten bevorzugt von 0,1 bis 5 Duftstoff-Mikrokapsel-Aggregatteilchen pro Gramm der Zusammensetzung aufweist, wobei die Zusammensetzung ein Verbraucherprodukt ist; wobei das Verfahren die Herstellung einer

Aufschlämmung umfasst, hergestellt durch das Verfahren:

i) Einstellen des pH-Wertes einer Aufschlämmung aus Duftstoff-Mikrokapseln mit einer anionischen Ladung, vorzugsweise einer Ladung von -1 mV bis -100 mV, auf einen Wert unterhalb des pKa-Werts der Duftstoff-Mikrokapsel und des kationischen Polymers;
ii) Verbinden der Aufschlämmung und des kationischen Polymers und Dispergieren der Verbindung aus Aufschlämmung und kationischem Polymer mit mechanischer Energie;
iii) Einstellen des pH-Werts der Verbindung aus Aufschlämmung und kationischem Polymer auf einen Wert über dem pKa-Wert der Aufschlämmung von Teilchen, aber unter dem pKa-Wert des kationischen Polymers;
iv) Verbinden der Verbindung aus Aufschlämmung und kationischem Polymer mit einem Material, das ausgewählt ist aus der Gruppe bestehend aus einem Textilveredler, einem Enzym, einem Tensid, einem Builder, einem Farbstoff, einem Färbemittel, einem nichtwässrigen Lösungsmittel, einem Schaumunterdrücker, einem Bleichmittel, einem Chelatbildner, optischen Aufhellern, Farbstoffübertragungshemmern, Dispergiermitteln, Lehmschmutzentfernungs-/Antiwiederablagerungsmitteln, Strukturmitteln, Duftstoffen, Abscheidungsmitteln, Silikonen, Rheologiemodifikatoren, Konservierungsmitteln, Stabilisatoren und Mischungen davon.

2. Verfahren nach Anspruch 1, umfassend ein Tensid, wobei das Tensid ausgewählt ist aus der Gruppe bestehend aus anionischem Tensid, kationischem Tensid, nichtionischem Tensid, zwitterionischem Tensid, ampholytischem Tensid und Mischungen davon, wobei die Zusammensetzung vorzugsweise ein anionisches Tensid umfasst, wobei die Zusammensetzung mehr bevorzugt ein anionisches Tensid umfasst, das ausgewählt wird aus der Gruppe bestehend aus einem C_9-C_{18}-Alkylbenzolsulfonat-Tensid; einem C_{10}-C_{20}-Alkylsulfat-Tensid; einem C_{10}-C_{18}-Alkylalkoxysulfat-Tensid, wobei das C_{10}-C_{18}-Alkylalkoxysulfat-Tensid einen durchschnittlichen Alkoxylierungsgrad von 1 bis 30 aufweist und das Alkoxy eine C_1-C_4-Kette umfasst, und Mischungen davon.

3. Verfahren nach einem der vorstehenden Ansprüche, wobei:

a) der Textilveredler ein Material ausgewählt aus der Gruppe bestehend aus Polyglycerinestern, öligen Zuckerderivaten, Wachsemulsionen, Fettsäuren, N,N-Bis(stearoyl-oxy-ethyl)-N,N-dimethylammoniumchlorid, N,N-Bis(talgoyl-oxy-ethyl)-N,N-dimethylammoniumchlorid, N,N-Bis(stearoyl-oxy-ethyl)-N-(2hydroxyethyl)-N-methylammoniummethylsulfat und Mischungen davon umfasst, vorzugsweise umfasst der Textilveredler ein Material, das ausgewählt ist aus der Gruppe bestehend aus Bis-(2-hydroxypropyl)-dimethylammoniummethylsulfat-Fettsäureester, 1,2-Di(acyloxy)-3-trimethylammoniopropanchlorid, N,N-Bis(stearoyl-oxy-ethyl)-N,N-dimethylammoniumchlorid, N,N-Bis(talgoyl-oxy-ethyl)-N,N-Dimethylammoniumchlorid, N,N-Bis(stearoyl-oxy-ethyl)-N-(2-hydroxyethyl)-N-methylammoniummethylsulfat, N,N-Bis-(stearoyl-2-hydroxypropyl)-N,N-dimethylammoniummethylsulfat, N,N-Bis-(talgoyl-2-hydroxypropyl)-N,N-Dimethylammoniummethylsulfat, N,N-Bis-(palmitoyl-2-hydroxypropyl)-N,N-Dimethylammoniummethylsulfat, N,N-Bis-(stearoyl-2-hydroxypropyl)-N,N-Dimethylammoniumchlorid, 1,2-Di(stearoyl-oxy)-3-Trimethylammoniumpropanchlorid, Dicanoladimethylammoniumchlorid, Di(hart)talgdimethylammoniumchlorid, Dicanoladimethylammoniummethylsulfat, 1-Methyl-1-stearoylamidoethyl-2-stearoyl-imidazoliniummethylsulfat, 1-Talgylamidoethyl-2-talgylimidazolin, Dipalmethylhydroxyethylammoniummethosulfat und Mischungen davon;
b) das Abscheidungspolymer vorzugsweise ein kationisches Polymer mit einer kationischen Ladung von 0,005 meq/g bis 23 meq/g, vorzugsweise von 0,01 meq/g bis 12 meq/g, am meisten bevorzugt von 0,1 meq/g bis 7 meq/g bei dem pH-Wert der Zusammensetzung umfasst;
c) das Enzym ausgewählt ist aus der Gruppe bestehend aus Protease, Amylase, Lipase, Mannanase, Cellulase, Xyloglucanase, Pektatlyase und Mischungen davon;
d) das Strukturmittel ein Material umfasst, ausgewählt aus der Gruppe bestehend aus gehärtetem Rizinusöl; Derivaten von gehärtetem Rizinusöl; mikrofibrillärer Cellulose; hydroxyfunktionellen kristallinen Materialien, langkettigen Fettalkoholen, 12-Hydroxystearinsäure; Tonen und Mischungen davon;
e) das Dispergiermittel ein polymeres Dispergiermittel, ausgewählt aus der Gruppe bestehend aus Polycarboxylaten, Schmutzabweisungspolymeren, Carboxymethylcellulosen, Poly(vinylpyrrolidon), Poly(ethylenglykol), Poly(vinylalkohol), Poly(vinylpyridin-N-oxid), Poly(vinylimidazol), zwitterionisch ethoxyliertem, quaternisiertem sulfatiertem Hexamethylendiamin, alkoxyliertem Polyalkylenimin, ethoxyliertem Polyamin, Polyethylenglykolpolyvinylacetat, umfasst;
f) das Färbemittel ein Material umfasst, ausgewählt aus der Gruppe bestehend aus niedermolekularen Farbstoffen, polymeren Farbstoffen, Farbstoff-Ton-Konjugaten und Pigmenten besteht, und/oder
g) ein Oligoamin, das ein Polyetheramin umfasst.

4. Verfahren nach einem der vorstehenden Ansprüche, wobei die Mikrokapseln einen Kern und eine Schale umfassen, wobei die Schale den Kern einkapselt, wobei die Mikrokapseln eine Teilchengröße von 0,01 Mikrometern bis 300 Mikrometern, vorzugsweise von 0,1 Mikrometern bis 100 Mikrometern, mehr bevorzugt von 0,5 Mikrometern bis 50 Mikrometern aufweisen.

5. Verfahren nach Anspruch 4, wobei die Mikrokapseln ein Verhältnis von Abscheidungspolymerbeschichtung zu Schale (Wand) von 1:200 bis 5:1, vorzugsweise von 1:40 bis 1:1 aufweisen, wobei vorzugsweise, wenn das Abscheidungspolymer ein Copolymer umfasst, umfassend Polyvinylformamid und Polyvinylamin, das Verhältnis von Abscheidungspolymerbeschichtung zu Schale (Wand) von 1:40 bis 1:5 betragen kann, mehr bevorzugt, wenn das Abscheidungspolymer ein quaternisiertes Methacrylat-Homopolymer umfasst, das Verhältnis von Abscheidungspolymerbeschichtung zu Schale (Wand) von 1:10 bis 5:1 betragen kann.

6. Verfahren nach Anspruch 4 oder Anspruch 5, wobei die Mikrokapseln eine Wirkstoffableitung von 0 % bis 30 %, vorzugsweise von 0,001 % bis 20 %, mehr bevorzugt von 0,1 % bis 10 %, am meisten bevorzugt von 0,1 % bis 5 % aufweisen.

7. Verfahren nach einem der Ansprüche 4, 5 oder 6, wobei:

   a) der Kern ferner ein Material umfasst, ausgewählt aus der Gruppe bestehend aus einem Aufheller, einem Farbstoff, einem Insektenschutzmittel, einem Silikon, einem Wachs, einem aromatischen Geschmacksstoff, einem Vitamin, einem Gewebeweichmacher, einem Hautpflegemittel unter einem Gesichtspunkt, einem Paraffin, einem Enzym, einem antibakteriellen Mittel, einem Bleichmittel, einer sinnlich wahrgenommenen Substanz; und Mischungen davon;
   b) die Schale (Wand) ein Material umfasst, ausgewählt aus der Gruppe bestehend aus einem Polyethylen; einem Polyamid; einem Polystyrol; einem Polyisopren; einem Polycarbonat; einem Polyester; einem Polyacrylat; einem Aminoplast, wobei der Aminoplast unter einem Gesichtspunkt einen Polyharnstoff, ein Polyurethan und/oder ein Polyureaurethan umfasst, wobei der Polyharnstoff unter einem Gesichtspunkt Polyoxymethylenharnstoff und/oder Melaminformaldehyd umfasst; einem Polyolefin; einem Polysaccharid, unter einem Gesichtspunkt Alginat und/oder Chitosan; Gelatine; Schellack; einem Epoxidharz; einem Vinylpolymer; einem wasserunlöslichen anorganischen Material; einem Silikon; und Mischungen davon; und
   c) das kationische Abscheidungspolymer ausgewählt ist aus der Gruppe bestehend aus einem kationischen Polysaccharid, einer kationisch modifizierten Stärke, einem kationisch modifizierten Guargummi, einem kationischen Polysiloxan, einem Polydiallyldimethylammoniumhalogenid, einem Copolymer aus Polydiallyldimethylammoniumchlorid und Vinylpyrrolidon, einem kationischen Acrylamid, einem kationischen Imidazol, einem Imidazolinium, einem Halogeniden, einem Imidazoliumhalogenid, einem kationischen Polyvinylamin, einem kationischen Copolymer aus Polyvinylamin und N-Vinylformamid, einem quaternisierten Methacrylat-Homopolymer und Mischungen davon.

8. Verfahren nach einem der vorstehenden Ansprüche, wobei die Mikrokapseln einen Kern und eine Schale umfassen, und wobei der Kern Duftstoff umfasst und die Schale (Wand) Melaminformaldehyd und/oder quervernetztes Melaminformaldehyd umfasst.

9. Verfahren nach einem der vorstehenden Ansprüche, wobei die Mikrokapseln einen Kern und eine Schale umfassen, und wobei der Kern Duftstoff umfasst und die Schale (Wand) Melaminformaldehyd und/oder quervernetztes Melaminformaldehyd, Poly(acrylsäure) und Poly(acrylicsäure-co-butylacrylat) umfasst.

10. Verfahren nach einem der vorstehenden Ansprüche, umfassend einen Zusatzbestandteil, ausgewählt aus der Gruppe bestehend aus zusätzlichen Duftstoff- und/oder Duftstoffabgabesystemen.

11. Verfahren zum Reinigen oder Behandeln einer Stelle, umfassend wahlweise Waschen und/oder Spülen der Stelle, Inkontaktbringen der Stelle mit einer nach einem der vorstehenden Ansprüche hergestellten Zusammensetzung und wahlweise Waschen und/oder Spülen der Stelle und/oder Trocknen der Stelle durch passives oder aktives Trocknen in einer Maschine.

Revendications

1. Procédé de fabrication d’une composition ayant une viscosité d’environ 10 cps à 5 000 cps, préférablement de 10

cps à 2 000 cps, plus préférablement de 50 cps à 1 500 cps, le plus préférablement de 100 à 1 000 cps telle que mesurée dans un viscosimètre à l'aide de plaques parallèles en acier de 40 mm de diamètre et un écartement de 500 μm à un taux de cisaillement de 20 s^{-1} à 21 °C comprenant sur la base du poids total de la composition :

a) de 0,01 % à 10 % en poids, préférablement de 0,1 % à 5 % en poids, plus préférablement de 0,1 % à 2 % en poids, le plus préférablement de 0,1 % à 1 % en poids de microcapsules, lesdites microcapsules comprenant un polymère de dépôt cationique disposé sur la surface externe desdites microcapsules, lesdites microcapsules étant des microcapsules de parfum ;
b) de 0,0001 % à 5 % en poids, préférablement de 0,001 % à 5 % en poids, de 0,01 % à 4 % en poids, plus préférablement de 0,3 % à 2 % en poids d'un ion choisi dans le groupe constitué par Na^+, K^+, Mg^{2+}, Ca^{2+}, Cl^-, Br^-, HSO_4^- et SO_4^{2-} et leurs mélanges ;
c) facultativement, un matériau choisi dans le groupe constitué par un polymère en plus dudit polymère de dépôt, un conservateur, un piégeur de formaldéhyde et leurs mélanges ; et
d) 0,0001 % à 70 % en poids, préférablement de 0,1 % à 50 % en poids, plus préférablement de 15 % à 40 % en poids d'un matériau choisi dans le groupe constitué par un agent d'amélioration des tissus, une enzyme, un agent tensioactif, un adjuvant, un colorant, un agent teintant, un solvant non aqueux, un suppresseur de mousse, un agent de blanchiment, des agents chélatants, des azurants optiques, des agents inhibant la décoloration, des dispersants, des agents d'élimination des salissures à base d'argile/anti-redéposition, des structurants, des parfums, des agents de dépôt, des silicones, des agents modifiant la rhéologie, des conservateurs, des agents stabilisants et leurs mélanges ; ladite composition ayant un indice d'agrégation déterminé tel que décrit ici dans la rubrique « Indice d'Agrégation », inférieur à 30, préférablement de 0,01 à 29, plus préférablement de 0,05 à 20, plus préférablement de 0,1 à 10, le plus préférablement de 0,1 à 5 particules agrégées de microcapsules de parfum par gramme de composition, ladite composition étant un produit de consommation ; ledit procédé comprenant la production d'une suspension produite par le procédé consistant à :

i) ajuster le pH d'une suspension de microcapsules de parfum ayant une charge anionique, préférablement une charge de -1 mV à -100 mV, jusqu'à une valeur en dessous du pKa de la microcapsule de parfum et du polymère cationique ;
ii) combiner la suspension et ledit polymère cationique et disperser ladite suspension et ledit polymère cationique combinés avec de l'énergie mécanique
iii) ajuster le pH de ladite suspension et dudit polymère cationique combinés jusqu'à une valeur au-dessus du pKa de ladite suspension de particules, mais en dessous du pKa du polymère cationique ;
iv) combiner ladite suspension et ledit polymère cationique combinés avec un matériau choisi dans le groupe constitué par un agent d'amélioration des tissus, une enzyme, un agent tensioactif, un adjuvant, un colorant, un agent teintant, un solvant non aqueux, un suppresseur de mousse, un agent de blanchiment, des agents chélatants, des azurants optiques, des agents inhibant la décoloration, des dispersants, des agents d'élimination des salissures à base d'argile/anti-redéposition, des structurants, des parfums, des agents de dépôt, des silicones, des agents modifiant la rhéologie, des conservateurs, des agents stabilisants et leurs mélanges.

2. Procédé selon la revendication 1 comprenant un agent tensioactif, ledit agent tensioactif étant choisi dans le groupe constitué par un agent tensioactif anionique, un agent tensioactif cationique, un agent tensioactif non ionique, un agent tensioactif zwittérionique, un agent tensioactif amphotère et leurs mélanges, préférablement ladite composition comprend un agent tensioactif anionique, plus préférablement ladite composition comprend un agent tensioactif anionique qui est choisi dans le groupe constitué par un agent tensioactif sulfonate d'(alkyle en C_9 à C_{18})benzène ; un agent tensioactif sulfate d'alkyle en C_{10} à C_{20} ; un agent tensioactif sulfate d'(alkyl en C_{10} à C_{18})-alcoxy, ledit agent tensioactif sulfate d'(alkyl en C_{10}-C_{18})-alcoxy ayant un degré moyen d'alcoxylation allant de 1 à 30 et l'alcoxy comprend une chaîne en C_1 à C_4, et des mélanges de ceux-ci.

3. Procédé selon une quelconque revendication précédente dans lequel :

a) ledit agent d'amélioration des tissus comprend un matériau choisi dans le groupe constitué par des esters de polyglycérol, des dérivés de sucre huileux, des émulsions de cire, des acides gras, le chlorure de N,N-bis(stéaroyloxyéthyl)-N,N-diméthylammonium, le chlorure de N,N-bis(tallowoyloxyéthyl)-N,N diméthylammonium, le méthylsulfate de N,N-bis(stéaroyloxyéthyl)-N-(2 hydroxyéthyl)-N-méthylammonium et leurs mélanges, préférablement ledit agent d'amélioration des tissus comprend un matériau choisi dans le groupe constitué par un ester d'acide gras de méthylsulfate de bis-(2-hydroxypropyl)diméthylammonium, le chlorure de 1,2-di(acyloxy)-3-triméthylammoniopropane, le chlorure de N,N-bis(stéaroyloxyéthyl)-N,N-diméthylammonium, le chlorure de N,N-bis(tallowoyloxyéthyl)-N,N-diméthylammonium, le méthylsulfate de N,N-bis(stéaroyloxyéthyl)-N-(2 hydroxyéthyl)-N-méthylammonium, le méthylsulfate de N,N-bis-(stéaroyl-2-hydroxypropyl)-N,N-diméthylammonium, le méthylsulfate de N,N-bis-(tallowoyl-2-hydroxypropyl)-N,N-diméthylammonium, le méthylsulfate de N,N-bis-(palmitoyl-2-hydroxypropyl)-N,N-diméthylammonium, le chlorure de N,N-bis-(stéaroyl-2-hydroxypropyl)-N,N-diméthylammonium, le chlorure de 1, 2 di (stéaroyl-oxy)-3-triméthylammoniumpropane, le chlorure de dicanoladiméthylammonium, le chlorure de di(suif durci)diméthylammonium, le méthylsulfate de dicanoladiméthylammonium, le méthylsulfate de 1-méthyl-1-stéaroylamidoéthyl-2-stéaroylimidazolinium, la 1-tallowylamidoéthyl-2-tallowylimidazoline, le méthosulfate de dipalméthylhydroxyéthylammonium et leurs mélanges ;

b) ledit polymère de dépôt, préférablement ledit polymère de dépôt comprend un polymère cationique ayant une charge cationique de 0,005 méq/g à 23 méq/g, préférablement de 0,01 méq/g à 12 méq/g, le plus préférablement de 0,1 méq/g à 7 méq/g au pH de ladite composition ;

c) ladite enzyme est choisie dans le groupe constitué par une protéase, une amylase, une lipase, une mannanase, une cellulase, une xyloglucanase, une pectate lyase et leurs mélanges ;

d) ledit structurant comprend un matériau choisi dans le groupe constitué par huile de ricin hydrogénée ; dérivés d'huile de ricin hydrogénée ; cellulose microfibrillaire ; matériaux cristallins à fonction hydroxy, alcools gras à longue chaîne, acide 12-hydroxystéarique ; argiles ; et leurs mélanges ;

e) ledit dispersant comprend un agent dispersant polymère choisi dans le groupe constitué par des polycarboxylates, des polymères antisalissures, des carboxyméthylcelluloses, de la poly(vinylpyrrolidone), du poly(éthylèneglycol), du poly(alcool vinylique), du poly(vinylpyrridine-N-oxyde), du poly(vinylimidazole), une diamine d'hexaméthylène sulfatée quaternaire éthoxylée zwittérionique, un polyalkylèneimine alcoxylé, une polyamine éthoxylée, du polyéthylèneglycolpoly(acétate de vinyle) ;

f) ledit agent teintant comprend un matériau choisi dans le groupe constitué par des colorants à petites molécules, des colorants polymères, des conjugués d'argile colorante et des pigments ; et/ou

g) une oligoamine qui comprend une polyétheramine.

4. Procédé selon l'une quelconque des revendications précédentes dans lequel lesdites microcapsules comprennent un noyau et une enveloppe, ladite enveloppe encapsulant ledit noyau, lesdites microcapsules ayant une dimension de particules de 0,01 micron à 300 microns, préférablement de 0,1 micron à 100 microns, plus préférablement de 0,5 micron à 50 microns.

5. Procédé selon la revendication 4 dans lequel lesdites microcapsules ont un rapport du revêtement de polymère de dépôt à l'enveloppe (paroi) de 1:200 à 5:1, préférablement de 1:40 à 1:1, préférablement lorsque ledit polymère de dépôt comprend un copolymère comprenant du formamide polyvinylique et de la polyvinylamine ledit rapport du revêtement de polymère de dépôt à l'enveloppe (paroi) peut aller de 1:40 à 1:5, plus préférablement lorsque ledit polymère de dépôt comprend un homopolymère quaternaire de méthacrylate ledit rapport du revêtement de polymère de dépôt à l'enveloppe (paroi) peut aller de 1:10 à 5:1.

6. Procédé selon la revendication 4 ou la revendication 5 dans lequel lesdites microcapsules ont une fuite d'agent bénéfique de 0 % à 30 %, préférablement de 0,001 % à 20 %, plus préférablement de 0,1 % à 10 %, le plus préférablement de 0,1 % à 5 %.

7. Procédé selon l'une quelconque des revendications 4, 5 ou 6 dans lequel :

a) ledit noyau comprend en outre un matériau choisi dans le groupe constitué par un azurant ; une teinture ; un répulsif pour insectes ; une silicone ; une cire ; un arôme ; une vitamine ; un agent d'adoucissement des tissus ; un agent de soin de la peau sous un aspect, une paraffine ; une enzyme ; un agent antibactérien ; un agent de blanchiment ; un agent sensoriel ; et leurs mélanges ;

b) ladite enveloppe (paroi) comprend un matériau choisi dans le groupe constitué par un polyéthylène ; un polyamide ; un polystyrène ; un polyisoprène ; un polycarbonate ; un polyester ; un polyacrylate ; un aminoplaste, sous un aspect ledit aminoplaste comprend une polyurée, un polyuréthane, et/ou un polyuréeuréthane, sous un aspect ladite polyurée comprend de la polyoxyméthylèneurée et/ou du mélamine-formaldéhyde ; une polyoléfine ; un polysaccharide, sous un aspect de l'alginate et/ou du chitosane ; gélatine ; la gomme laque ; une résine époxy ; un polymère vinylique ; une matière inorganique insoluble dans l'eau ; une silicone ; et leurs mélanges ; et

c) ledit polymère de dépôt cationique est choisi dans le groupe constitué par un polysaccharide cationique, un amidon à modification cationique, une gomme à modification cationique, un polysiloxane cationique, un halogénure de poly(diallyldiméthylammonium), un copolymère de chlorure de poly(diallyldiméthylammonium) et de vinylpyrrolidone, un acrylamide cationique, un imidazole cationique, un imidazolinium un halogénures, un halogénure d'imidazolium, une amine polyvinylique cationique, un copolymère cationique de poly(vinylamine) et de N-vinylformamide, un homopolymère quaternaire de méthacrylate et leurs mélanges.

8. Procédé selon l'une quelconque des revendications précédentes, dans lequel lesdites microcapsules comprennent un noyau et une enveloppe et dans lequel ledit noyau comprend du parfum et ladite enveloppe (paroi) comprend du mélamine-formaldéhyde et/ou du mélamine-formaldéhyde réticulé.

9. Procédé selon l'une quelconque des revendications précédentes, dans lequel lesdites microcapsules comprennent un noyau et une enveloppe et dans lequel ledit noyau comprend du parfum et ladite enveloppe (paroi) comprend du mélamine-formaldéhyde et/ou du mélamine-formaldéhyde réticulé, du poly(acide acrylique) et du poly(acide acrylique-co-acrylate de butyle).

10. Procédé selon l'une quelconque des revendications précédentes comprenant un ingrédient additif choisi dans le groupe constitué par un parfum supplémentaire et/ou des systèmes de libération de parfum supplémentaires.

11. Procédé de nettoyage ou de traitement d'un site comprenant facultativement le lavage et/ou le rinçage dudit site, la mise en contact dudit site avec une composition préparée selon une quelconque revendication précédente, et facultativement le lavage et/ou le rinçage dudit site et/ou le séchage dudit site par séchage passif ou actif dans une machine.

REFERENCES CITED IN THE DESCRIPTION

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