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(54) Title: FABRIC TREATMENT COMPOSITION PROVIDING STAIN REPELLANT COATING

(57) Abstract: This invention relates to textile benefit compositions that can maintain or rejuvenate article's stain repellency and processes for making and using such compositions. Such article may be a textile product. The composition comprises: a) a chelating agent selected from the group consisting of aminocarboxylates, phosphonates, polyfunctionally-substituted aromatic chelating agents, and mixuteres thereof ; b) a stripping agent selected from the group consisting of protonatable aminies, alkyl quaternary ammonium compounds, cationic silicones, cationic polymers and mixtures thereof ; c) a suspending agent selected from the group consisting of anionic ploymers, modified polyamine polymers and mixtures thereof ; and d) a pH buffer selected from the group consisting of organic acids, inorganic acids and mixtures thereof.

FABRIC TREATMENT COMPOSITION PROVIDING STAIN REPELLANT COATING

FIELD OF INVENTION

This invention relates to benefit compositions that can maintain or rejuvenate an article's stain repellency and processes for making and using such compositions.

BACKGROUND OF THE INVENTION

Due to use and cleaning, articles, for example, articles that comprise fibers such as garments and linens are generally treated with compositions that provide such articles with a degree of stain repellency. Unfortunately the effectiveness of such treatment compositions is fleeting and/or limited. Will not being bound by theory, Applicants believe that such loss in effectiveness is do to the adherence of materials that attract stains to the article's stain repellant coating.

Accordingly, there is a need for textile benefit compositions that can maintain or rejuvenate a textile product's stain repellency and processes for making and using such compositions.

SUMMARY OF THE INVENTION

This invention relates to textile benefit compositions that can maintain or rejuvenate article's stain repellency and processes for making and using such compositions. Such article may be a textile product.

DETAILED DESCRIPTION OF THE INVENTION

Definitions

As used herein, the term "textile products" includes, unless otherwise indicated, fibers, yarns, fabrics and/or garments or articles comprising same.

As used herein, the articles a and an when used in a claim, are understood to mean one or more of what is claimed or described.

Unless otherwise noted, all component or composition levels are in reference to the active level 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.

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.

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.

All documents cited are, in relevant part, incorporated herein by reference; the citation of any document is not to be construed as an admission that it is prior art with respect to the present invention.

Benefit Compositions

Applicants' benefit compositions may take any form, for example, a general treatment composition, a detergent, a wash additive or a rinse additive. When such benefit composition takes the form of a general treatment composition, such composition may comprise from about 0.1% to about 60%, from about 0.5% to about 50%, or even from about 1% to about 40% of a chelating agent, from about 0.1% to about 50%, from about 0.5% to about 40%, or even from about 1% to about 30% of a stripping agent and a from about 0.01% to about 40%, from about 0.1% to about 35%, or even from about 0.5% to about 30% of a suspending agent and optionally a pH buffer and optionally one or more cleaning adjuncts.

When such benefit composition is a detergent composition, such composition may comprise from about 0.001% to about 30%, from about 0.05% to about 25%, or even from about 0.01% to about 20% of a chelating agent, from about 0.001% to about 25%, from about 0.05% to about 20%, or even from about 0.01% to about 15% of a stripping agent and a from about 0.01% to about 40%, from about 0.1% to about 35%, or even from about 0.5% to about 30% of a suspending agent and at least one detergent adjunct.

When such benefit composition is in the form of a wash additive or rinse additive, such composition may comprise from about 0.1% to about 60%, from about 0.5% to about 50%, or even from about 1% to about 40% of a chelating agent, from about 0.1% to about 50%, from

about 0.5% to about 40%, or even from about 1% to about 30% of a stripping agent and a from about 0.01% to about 40%, from about 0.1% to about 35%, or even from about 0.5% to about 30% of a suspending agent and a sufficient amount of pH buffer to provide a neat product pH of from about 1 to about 9, from about 1.5 to about 8, or even form about 2 to about 7.

Any balance of any of the aforementioned compositions may be a carrier.

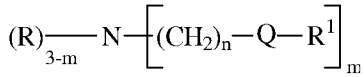
In one aspect of the invention, the pH buffer comprises citric acid.

In one aspect of Applicants' invention, such benefit compositions are capable of maintaining or rejuvenating a textile product's stain repellency when said textile product is contacted with such textile benefit composition.

In one aspect of Applicants' invention, such textile benefit compositions do not contain one or more adjuncts materials, for example, bleach activators, surfactants, builders, 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, perfumes, structure elasticizing agents, fabric softeners, carriers, hydrotropes, processing aids and/or pigments.

Useful chelating agents include chelating agents selected from the group consisting of aminocarboxylates, phosphonates, polyfunctionally-substituted aromatic chelating agents, and mixtures thereof. Useful aminocarboxylates include ethylenediaminetetracetates, N-hydroxyethylethylenediaminetriacetates, nitrilotriacetates, ethylenediamine tetraproprionates, triethylenetetraaminehexacetates, diethylenetriaminepentaacetates, and ethanoldiglycines, alkali metal, ammonium and substituted ammonium salts of such aminocarboxylates. Useful phosphonates include aminophosphonates. Useful polyfunctionally-substituted aromatic chelating agents include 1-hydroxy-2,4-disulfo-6-carboxybenzene, 1,3,5-trihydroxy-2-carboxybenzene, 1,3,5-tris[carboxyethylether]-2-carboxybenzene, 2,4-disulfo-1,5-dihydrobenzene, 1,4-bis[carboxymethylether]-2,5-dicarboxybenzene and mixtures thereof. Additional examples of polyfunctionally-substituted aromatic chelating agents can be found in U.S. Pat No. 3,812,044.

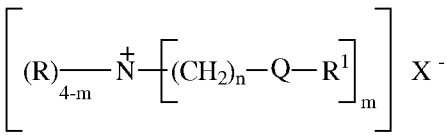
Useful stripping agents include cationic materials selected from the group consisting of protonatable amines, alkyl quaternary ammonium compounds, cationic silicones, cationic polymers and mixtures thereof. Suitable protonatable amines include, protonatable amines having Formula I below:



Formula I

wherein the index m = 0, 1, 2 or 3; the index n=1, 2, 3 or 4, preferably n is 2 or 3, more preferably n is 2, each R is independently selected from C_1-C_{22} alkyl, C_1-C_{22} hydroxyalkyl or a benzyl group; each R^1 is independently selected from C_{11}-C_{22} linear alkyl, C_{11}-C_{22} branched alkyl, C_{11}-C_{22} linear alkenyl, or C_{11}-C_{22} branched alkenyl; and each Q may comprise a carbonyl, carboxyl, or amide moiety.

Suitable alkylated quaternary ammonium compounds (quats), include mono-alkyl quats, di-alkyl, tri-alkyl quats and tetra-alkyl quats and certain cationic surfactants. Suitable mono-alkyl quats, di-alkyl, tri-alkyl quats and tetra-alkyl quats typically have Formula II below:



Formula II

wherein the index m = 0, 1, 2, 3 or 4; the index n=1, 2, 3 or 4, preferably n is 2 or 3, more preferably n is 2, each R is independently selected from C_1-C_{22} alkyl, C_1-C_{22} hydroxyalkyl, or a benzyl group; each R^1 is independently selected from C_{11}-C_{22} linear alkyl, C_{11}-C_{22} branched alkyl, C_{11}-C_{22} linear alkenyl, or C_{11}-C_{22} branched alkenyl; X^- is a water soluble anionic species such as chloride, bromide or methyl sulfate, and Q may comprise a carbonyl, carboxyl, or amide moiety.

Suitable cationic silicones include silicones functionalized by amine derived compounds and cationic silicone polymers. Suitable silicones functionalized by amine derived compounds include amino silicones having Formula III below:

$$(R^1R^2R^3SiO_{1/2})_p\ (R^4R^4SiO_{2/2})_m\ [R^4Si(L\text{-}NR^5R^6)O_{2/2}]_a\ [Si(K\text{-}NR^7R^8)O_{3/2}]_b\ [R^4SiO_{3/2}]_c$$

Formula III

wherein m, a, b, and c can be independently selected from integers between 0 and 6000; p=2+b+c; R^1, R^2, R^3, R^4, R^5, R^6, R^7 R^8, L, K may be various side chains attached to the silicone

or nitrogen atoms within the molecule. In Formula IV above, R^1, R^2, R^3, R^4 can be independently selected from:

1.) C_1-C_{22} linear or branched, substituted or unsubstituted hydrocarbyl moiety; or

2.) –O-R^{11}, –O-R^{12}, –O-R^{13}, and –O-R^{14}, wherein R^{11}, R^{12}, R^{13}, and R^{14} can be independently selected from H, or C_1-C_{22} linear or branched, substituted or unsubstituted hydrocarbyl moiety.

In Formula III above, L and K can be independently selected from C_1-C_{22} linear or branched, substituted or unsubstituted hydrocarbyl moieties. In one aspect L and K can be independently selected from C_1-C_{12} linear or branched, substituted or unsubstituted hydrocarbyl moieties. In another aspect, L and K can be independently selected from C_1-C_4 linear or branched, substituted or unsubstituted hydrocarbyl moieties. In another aspect L and K can be independently selected from methylene, ethylene, propylene, 2-methylpropylene, butylene, octadecylene or 3-(2,2',6,6'-tetramethyl-4-oxy-piperidyl)propyl. In Formula III above, R^5, R^6, R^7 and R^8 can be independently selected from H, or C_1-C_{22} linear or branched, substituted or unsubstituted hydrocarbyl moieties.

As used in Formula III above, "$SiO_{n/2}$" means the ratio of oxygen atoms to silicon atoms, i.e., $SiO_{1/2}$ means one oxygen atom is shared between two silicon atoms.

Suitable cationic silicone polymers include cationic silicone polymers having Formula IV below:

$$[CAP]—Z_m—[CAP]$$

Formula IV

wherein [CAP] can be a backbone termination or truncation unit; m can be an integer from 1 to 50 and each Z unit may have Formula V below:

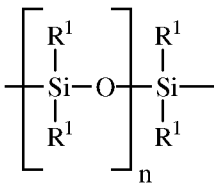
$$—(R)_x—W—(R)_x—$$

Formula V

wherein for Formula V:

x can be 0 or 1;

W can be a siloxane unit having Formula VI below:



Formula VI

wherein for Formula VI each R^1 unit can be a C_1-C_{22} linear or branched, substituted or unsubstituted hydrocarbyl moiety;

wherein for Formula V above R can have Formula VII below:

$$— [(L)_y — (R^2)_y — (L)_y] — B — [(L)_y — (R^2)_y — (L)_y] —$$

Formula VII

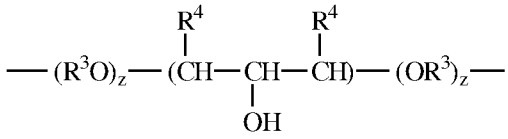
wherein for Formula VII above:

y can be 0 or 1;

L can be a suitable carbon containing linking unit, suitable linking units include, but are not limited to, alkylene moieties, acrylate moieties, and amide containing moieties;

each B can be a unit comprising at least one secondary, tertiary, or quaternary amino moiety;

R^2 can be a coupling unit having the Formula VIII below:



Formula VIII

wherein for Formula VIII:

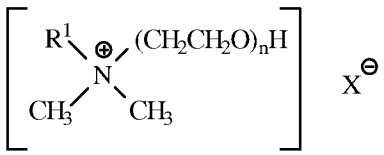
each R^3 can be independently selected from a C_2-C_{12} linear or branched alkylene moiety, in one aspect each R^3 can be independently ethylene, 1,3-propylene, or 1,2-propylene;

each R^4 can be independently selected from hydrogen, or a C_1-C_{22} linear or branched, substituted or unsubstituted hydrocarbyl moiety, in one aspect each R^4 can be independently selected from hydrogen, a C_1-C_{22} linear or branched alkyl moiety; a C_1-C_{22} cycloalkyl moiety; a C_1-C_{22} linear or branched fluoroalkyl moiety;

a C_2-C_{22} linear or branched alkenyl moiety; a C_6-C_{22} aryl moiety; or a C_7-C_{22} alkylenearyl moiety; in another aspect each R^4 can be hydrogen, or a C_1-C_{10} linear or branched alkyl moiety; and

z can be an integer from 0 to 50;

Suitable cationic surfactants include quaternary ammonium surfactants selected from the group consisting of mono C_6-C_{16}, C_6-C_{10} N-alkyl or alkenyl ammonium surfactants, wherein the remaining N positions are substituted by methyl, hydroxyehthyl or hydroxypropyl groups. In one aspect the cationic surfactant may be C_6-C_{18} alkyl or an alkenyl ester of an quaternary ammonium alcohol, such as quaternary choline esters. In one aspect cationic surfactants have Formula IX below:



Formula IX

wherein R^1 is a C_8-C_{18} hydrocarbyl, $C_{8\text{-}14}$ alkyl, or even C_8, C_{10} or C_{12} alkyl, and X^- is a water soluble anionic species such as chloride, bromide or methyl sulfate.

Useful suspending agents include anionic polymers, modified polyamine polymers and mixtures thereof. Suitable anionic polymers include random polymers, block polymers and mixtures thereof. Such polymers typically comprise first and second moieties in a ratio of from about 100:1 to about 1:5. Suitable first moieties include moieties derived from monoethylenically unsaturated C_3-C_8 monomers comprising at least one carboxylic acid group, salts of such monomers, and mixtures thereof. Non-limiting examples of suitable monomers include monoethylenically unsaturated C_3-C_8 monocarboxylic acids and C_4-C_8 dicarboxylic acids selected from the group consisting of acrylic acid, methacrylic acid, beta-acryloxypropionic acid, vinyl acetic acid, vinyl propionic acid, crotonic acid, ethacrylic acid, alpha-chloro acrylic acid, alpha-cyano acrylic acid, maleic acid, maleic anhydride, fumaric acid, itaconic acid, citraconic acid, mesaconic acid, methylenemalonic acid, their salts, and mixtures thereof. In one aspect of Applicants' invention, suitable first moieties comprise monomers that are entirely selected from the group consisting of: acrylic acid, methacrylic acid, maleic acid and mixtures thereof.

Suitable second moieties include:

1.) Moieties derived from modified unsaturated monomers having the formulae R – Y – L and R – Z wherein:

a.) R can be selected from the group consisting of C(X)H=C(R^1)- where

(i) R^1 can be H, or C_1-C_4 alkyl; and

(ii) X can be H, CO_2H, or CO_2R_2 wherein R_2 can be hydrogen, alkali metals, alkaline earth metals, ammonium and amine bases, saturated C_1-C_{20} alkyl, C_6-C_{12} aryl, and C_7-C_{20} alkylaryl;

b.) Y can be selected from the group consisting of $-CH_2$-, $-CO_2$-, -OCO-, and -CON(R^a)-, $-CH_2OCO$-; wherein R^a can be H or C_1-C_4 alkyl;

c.) L can be selected from the group consisting of hydrogen, alkali metals, alkaline earth metals, ammonium and amine bases, saturated C_1-C_{20} alkyl, C_6-C_{12} aryl, and C_7-C_{20} alkylaryl; and

d.) Z can be selected from the group consisting of C_6-C_{12} aryl and C_7-C_{12} arylalkyl.

In another aspect of Applicants' invention:

a.) R can be selected from the group consisting of C(X)H=C(R^1)- where

(i) R^1 can be H and

(ii) X can be H, or CO_2H;

b.) Y can be $-CO_2$-;

c.) L can be selected from the group consisting of hydrogen, alkali metals, C_6-C_{12} aryl, and C_7-C_{20} alkylaryl; and

d.) Z can be selected from the group consisting of C_6-C_{12} aryl and C_7-C_{12} arylalkyl.

In still another aspect of Applicants' invention the variables R, R^1, Y, L and Z can be as described immediately above and the variable X can be H.

Suitable anionic polymers comprising such first and second moieties typically have weight-average molecular weights of from about 1000 Da to about 100,000 Da..

Another class of suitable second moiety includes moieties derived from ethylenically unsaturated monomers containing from 1 to 100 repeat units selected from the group consisting of C_1-C_4 carbon alkoxides and mixtures thereof. An example of such an unsaturated monomer is represented by the formula J–G–D wherein:

1.) J can be selected from the group consisting of C(X)H=C(R_1)- wherein

a.) R_1 can be H, or C_1-C_4 alkyl;

b.) X can be H, CO_2H, or CO_2R_2 wherein R_2 can be hydrogen, alkali metals, alkaline earth metals, ammonium and amine bases, saturated C_2-C_{20} alkyl, C_6-C_{12} aryl, C_7-C_{20} alkylaryl;

2.) G can be selected from the group consisting of C_1-C_4 alkyl, -O-, $-CH_2O$-, $-CO_2$-.

3.) D can be selected from the group consisting of

a.) $-CH_2CH(OH)CH_2O(R^3O)_dR_4$;

b.) $-CH_2CH[O(R^3O)_dR^4]CH_2OH$;

c.) $-CH_2CH(OH)CH_2NR^5(R^3O)_dR^4$;

d.) $-CH_2CH[NR^5(R^3O)_dR^4]CH_2OH$, and mixtures thereof; wherein

R^3 can be selected from the group consisting of ethylene, 1,2-propylene, 1,3-propylene, 1,2-butylene, 1,4-butylene, and mixtures thereof;

R^4 can be a capping unit selected from the group consisting of H, C_1-C_4 alkyl, C_6-C_{12} aryl and C_7-C_{20} alkylaryl;

R^5 can be selected from the group consisting of H, C_1-C_4 alkyl C_6-C_{12} aryl and C_7-C_{20} alkylaryl; and

subscript index d can be an integer from 1 to 100.

In another aspect of Applicants' invention:

1.) J can be selected from the group consisting of $C(X)H=C(R_1)$- wherein

a.) R_1 can be H, or C_1-C_4 alkyl;

b.) X can be H or CO_2H;

2.) G can be selected from the group consisting of -O-, $-CH_2O$-, $-CO_2$-.

3.) D can be selected from the group consisting of

a.) $-CH_2CH(OH)CH_2O(R^3O)_dR_4$;

b.) $-CH_2CH[O(R^3O)_dR^4]CH_2OH$, and mixtures thereof; wherein

R^3 can be ethylene;

R^4 can be a capping unit selected from the group consisting of H, and C_1-C_4 alkyl; and

d can be an integer from 1 to 100.

In still another aspect of Applicants' invention the variables J, D, R^3 and d can be as described immediately above and the variables R_1 and X can be H, G can be $-CO_2$-.and R^4 can be C_1-C_4 alkyl.

Suitable anionic polymers comprising such first and second moieties typically have weight-average molecular weights of from about 2000 Da to about 100,000 Da.

Other suitable anionic polymers include graft co-polymers that comprise the first moieties previously described herein, and typically have weight-average molecular weights of from about 1000 Da to about 50,000 Da. In such polymers, the aforementioned first moieties are typically grafted onto a C_1-C_4 carbon polyalkylene oxide.

Suitable modified polyamine polymers include modified polyamines having the formulae:

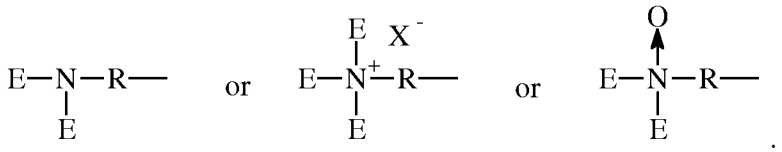
$$V_{(n+1)}W_mY_nZ$$

or

$$V_{(n-k+1)}W_mY_nY'_kZ$$

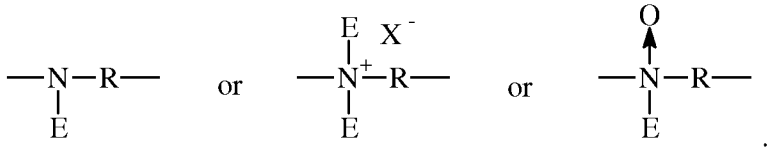
wherein m can be an integer from 0 to about 400; n can be an integer from 0 to about 400; k can be less than or equal to n wherein

i) V units can be terminal units having the formula:



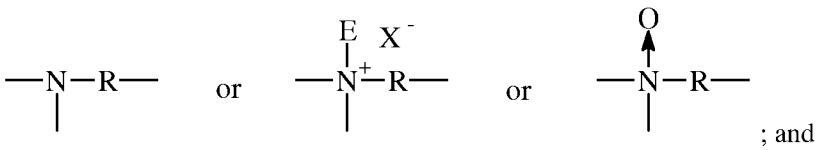
;

ii) W units can be backbone units having the formula:



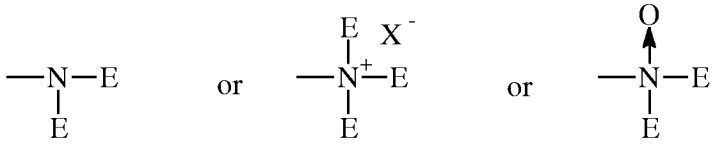
;

iii) Y and Y' units can be branching units having the formula:



; and

iv) Z units can be terminal units having the formula:



;

wherein:

R units can be selected from the group consisting of C_2-C_{12} alkylene, C_4-C_{12} alkenylene, C_3-C_{12} hydroxyalkylene, C_4-C_{12} dihydroxy-alkylene, C_8-C_{12} dialkylarylene, $-(R^1O)_xR^1-$, $-(R^1O)_xR^5(OR^1)_x-$, $-(CH_2CH(OR^2)CH_2O)_z-(R^1O)_yR^1(OCH_2CH(OR^2)CH_2)_w-$, $-C(O)(R^4)_rC(O)-$, $-CH_2CH(OR^2)CH_2-$, and mixtures thereof; wherein

R^1 can be C_2-C_3 alkylene and mixtures thereof;

R^2 can be hydrogen, $-(R^1O)_xB$, and mixtures thereof;

wherein at least one B can be selected from the group consisting of $-(CH_2)_q-SO_3M$, $-(CH_2)_pCO_2M$, $-(CH_2)_q(CHSO_3M)CH_2SO_3M$, $-(CH_2)_q-(CHSO_2M)CH_2SO_3M$, $-(CH_2)_pPO_3M$, $-PO_3M$, and mixtures thereof, and any remaining B moieties can be selected from the group consisting of hydrogen, C_1-C_6 alkyl, $-(CH_2)_q-SO_3M$, $-(CH_2)_pCO_2M$, $-(CH_2)_q(CHSO_3M)CH_2SO_3M$, $-(CH_2)_q-(CHSO_2M)CH_2SO_3M$, $-(CH_2)_pPO_3M$, $-PO_3M$, and mixtures thereof;

R^4 can be C_1-C_{12} alkylene, C_4-C_{12} alkenylene, C_8-C_{12} arylalkylene, C_6-C_{10} arylene, and mixtures thereof;

R^5 can be C_1-C_{12} alkylene, C_3-C_{12} hydroxy-alkylene, C_4-C_{12} dihydroxyalkylene, C_8-C_{12} dialkylarylene, -C(O)-, $-C(O)NHR^6NHC(O)-$, $-R^1(OR^1)-$, $-C(O)(R^4)_rC(O)-$, $-CH_2CH(OH)CH_2-$, $-CH_2CH(OH)CH_2O(R^1O)_yR^1-OCH_2CH(OH)CH_2-$, and mixtures thereof;

R^6 is C_2-C_{12} alkylene or C_6-C_{12} arylene;

X can be a water soluble anion; provided at least one backbone nitrogen is quaternized or oxidized

E units can be selected from the group consisting of hydrogen, C_1-C_{22} alkyl, C_3-C_{22} alkenyl, C_7-C_{22} arylalkyl, C_2-C_{22} hydroxyalkyl, $-(CH_2)_pCO_2M$, $-(CH_2)_qSO_3M$, $-CH(CH_2CO_2M)-CO_2M$, $-(CH_2)_pPO_3M$, $-(R^1O)_xB$, $-C(O)R^3$, and mixtures thereof; provided that when any E unit of a nitrogen is a hydrogen, said nitrogen is not also an N-oxide;

R^1 can be C_2-C_3 alkylene and mixtures thereof;

R^3 can be C_1-C_{18} alkyl, C_7-C_{12} arylalkyl, C_7-C_{12} alkyl substituted aryl, C_6-C_{12} aryl, and mixtures thereof;

at least one B can be selected from the group consisting of $-(CH_2)_q-SO_3M$, $-(CH_2)_pCO_2M$, $-(CH_2)_q(CHSO_3M)CH_2SO_3M$, $-(CH_2)_q-(CHSO_2M)CH_2SO_3M$, $-(CH_2)_pPO_3M$, $-PO_3M$, and mixtures thereof, and any remaining B moieties can be selected from the group consisting of hydrogen, C_1-C_6 alkyl, $-(CH_2)_q-SO_3M$, $-(CH_2)_pCO_2M$, $-(CH_2)_q(CHSO_3M)CH_2SO_3M$, $-(CH_2)_q-(CHSO_2M)CH_2SO_3M$, $-(CH_2)_pPO_3M$, $-PO_3M$, and mixtures thereof;

M can be hydrogen or a water soluble cation in sufficient amount to satisfy charge balance; and

wherein the values for the following indices are as follows: subscript index p can be an integer from 1 to 6; subscript index q can be an integer from 0 to 6; subscript index r can

have the value of 0 or 1; subscript index w can have the value 0 or 1; subscript index x can be an integer from 1 to 100; subscript index y can be an integer from 0 to 100; and subscript index z can have the value 0 or 1.

In another embodiment of Applicants' invention the aforementioned variables can be as follows:

R units can be selected from the group consisting of C_2-C_{12} alkylene, -$(R^1O)_xR^1$-, and mixtures thereof; wherein R^1 can be C_2-C_3 alkylene and mixtures thereof;

X can be a water soluble anion; provided at least one backbone nitrogen is quaternized or oxidized

E units can be -$(R^1O)_xB$ wherein

R^1 can be C_2-C_3 alkylene and mixtures thereof; and

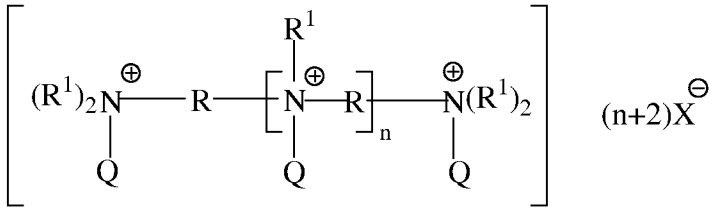
B can be hydrogen, -$(CH_2)_q$-SO_3M, -$(CH_2)_pCO_2M$, and mixtures thereof;

M can be hydrogen or a water soluble cation in sufficient amount to satisfy charge balance; and

subscript p can be an integer from 1 to 6; subscript q can be 0 ; subscript r can have the value of 0 or 1; subscript w can have the value 0 or 1; subscript x can be an integer from 1 to 100; subscript y can be an integer from 0 to 100; and subscript z can have the value 0 or 1.

In still another aspect of Applicants' invention all variables can be as described immediately above except B can be hydrogen, -$(CH_2)_q$-SO_3M, and mixtures thereof.

Additional suitable modified polyamines include modified polyamines having Formula (X):



(X)

wherein R can be C_6-C_{20} linear or branched alkylene, and mixtures thereof; X in Formula (X) can be an anion present in sufficient amount to provide electronic neutrality; n and subscript index n in Formula (X) can have equal values and can be integers from 0 to 4; R^1 in Formula (X) can be a capped polyalkyleneoxy unit having Formula (IX):

$$-(R^2O)_x-R^3$$

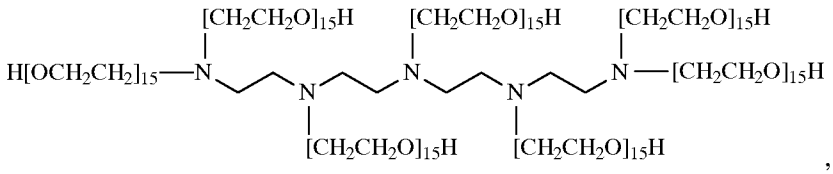
(IX)

wherein R^2 in Formula (IX) can be C_2-C_4 linear or branched alkylene, and mixtures thereof; subscript index x in Formula (IX) describes the average number of alkyleneoxy units attached to the backbone

nitrogen, such index can have a value from about 1 to about 50, in another aspect of Applicants' invention such index can have a value from about 15 to about 25; at least one R^3 moiety in Formula (IX) can be an anionic capping unit, with the remaining R^3 moieties in Formula (IX) selected from the group comprising hydrogen, C_1-C_{22} alkylenearyl, an anionic capping unit, a neutral capping unit, and mixtures thereof; at least one Q moiety, in Formula (X) can be a hydrophobic quaternizing unit selected from the group comprising C_7-C_{30} substituted or unsubstituted alkylenearyl, and mixtures thereof, any remaining Q moieties in Formula (X) can be selected from the group comprising lone pairs of electrons on the unreacted nitrogens, hydrogen, C_1-C_{30} substituted or unsubstituted linear or branched alkyl, or C_3-C_{30} substituted or unsubstituted cycloalkyl, and mixtures thereof.

In still another aspect of Applicants' invention all variables for Formula X and XI are the same except R in Formula X can be C_6-C_{20} linear alkylene, and mixtures thereof; and R^2 in Formula (IX) can be C_2-C_4 linear alkylene, and mixtures thereof;

Examples of suitable modified polyamines include modified polyamines having the following structures. As with all polymers containing alkyleneoxy units it is understood that only an average number or statistical distribution of alkyleneoxy units will be known. Therefore, depending upon how "tightly" or how "exactly" a polyamine is alkoxylated, the average value may vary from embodiment to embodiment.



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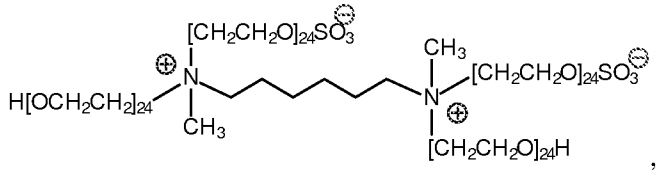

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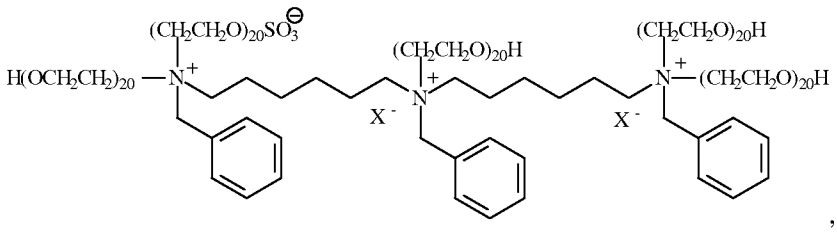

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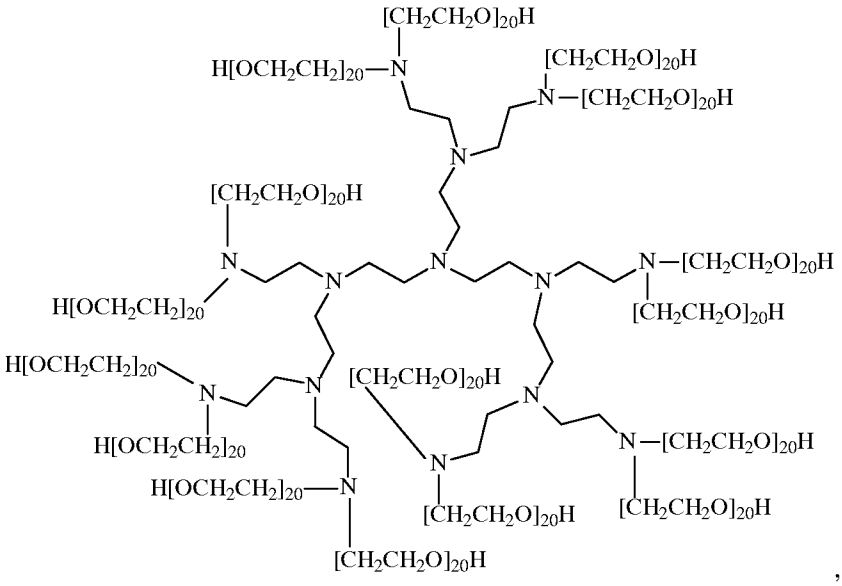

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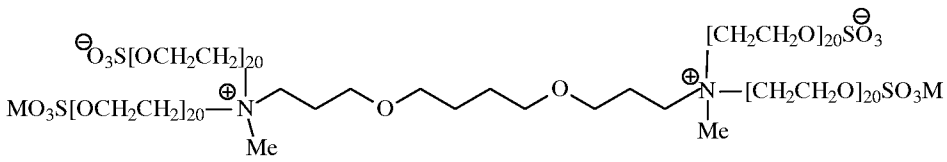

Suitable modified polyamines, as disclosed herein, may be produced in accordance with the processes and methods disclosed in Applicants examples.

Useful pH buffers include a material selected from the group consisting of organic acids, inorganic acids and mixtures there of. Useful organic acids include organic acids selected from the group consisting of an organic carboxylic acid, a polycarboxylic acid and mixtures thereof. Typically, the organic acids preferably have equivalent weights that are less than or equal to about 80 Daltons. Examples of suitable organic acids include: adipic, aspartic, carboxymethyloxymalonic, carboxymethyloxysuccinic, citric, glutaric, hydroxyethyliminodiacetic, iminodiacetic, maleic, malic, malonic, oxydiacetic, oxydisuccinic, succinic, sulfamic, tartaric, tartaric-disuccinic, tartaric-monosuccinic and mixtures thereof. Useful inorganic acids include inorganic acids selected from the group consisting of hydrochloric acid, sulfuric acid, phosphoric acid and mixtures hereof. Typically the inorganic is used in conjunction with an organic acid.

Useful carriers may comprise water. For, example, a useful carrier is water.

The aforementioned useful materials may be obtained as follows: useful chelating agents Aldrich, P.O. Box 2060, Milwaukee, WI 53201, USA; useful stripping agents may be obtained from Akzo Nobel, Velperweg 76, 6824 BM Arnhem
P.O. Box 9300, 6800 SB Arnhem; useful suspending agents include, Alcosperse® 725 and Alcosperse® 747 available from Alco Chemical of Chattanooga, Tennessee U.S.A. and Acusol® 480N from Rohm & Haas Co. of Spring House, Pennsylvania U.S.A., IMS and PLS polymers supplied by Nippon Shokubai Co., Ltd of Osaka, Japan and Sokalan® ES 8305, Sokalan® HP 25, and Densotan® A supplied by BASF Corporation of New Jersey, U.S.A.; and useful pH buffers may be obtained from Aldrich, P.O. Box 2060, Milwaukee, WI 53201, USA.

Adjunct Materials

While certain embodiments of Applicants textile benefit compositions do not contain one or more of the adjunct materials listed herein as such adjuncts are not essential for the purposes of the present invention, other embodiments may contain one or more adjuncts illustrated hereinafter. Such adjuncts may be incorporated in the textile benefit compositions disclosed herein, for example to assist or enhance cleaning performance, or to modify the aesthetics of such compositions as is the case with perfumes, colorants, dyes or the like. The precise nature of these additional components, and levels of incorporation thereof, will depend on the physical form of the textile benefit composition and the nature of the operation for which it is to be used and applied. Useful adjunct materials may include, but are not limited to, bleach activators, surfactants, builders, 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, perfumes, structure elasticizing agents, fabric softeners, carriers, hydrotropes, processing aids and/or pigments.

Processes of Making Textile Benefit Compositions

The skilled artisan can produce the textile benefit compositions of the present invention by following the teaching contained herein and in the examples as such compositions may be made by combining the requisite materials.

Commercial quantities of such textile benefit compositions can be made using a variety of reaction vessels and processes including batch, semi-batch and continuous processes. Such equipment may be obtained from a variety of sources such as Lodige GmbH (Paderborn,

Germany), Littleford Day, Inc. (Florence, Kentucky, U.S.A.), Forberg AS (Larvik, Norway), Glatt Ingenieurtechnik GmbH (Weimar, Germany), Niro (Soeborg, Denmark), Hosokawa Bepex (Minneapolis, Minnesota, USA).

Method of Use

An article may be treated with any of Applicants' benefit compositions or mixtures thereof:

Typically, an article comprising a stain repellant treatment is contacted with the benefit composition in neat form or during a cleaning or washing process. Contact methods include padding wiping, spraying and washing.

Useful equipment for practicing the method disclosed herein includes sponges, cloths, spray bottles and washing units and containers such as washing machines. Treatment methods may comprise contacting the article before during or after a washing step that may optionally include rinsing and/or a drying step.

Treated Articles

Textile products having enhanced and/or durable stain repellency properties may be made by treating said textile products with Applicants' benefit compositions. Treatment methods include the methods disclosed in the present specification.

EXAMPLES

Example 1: Special Detergent:

Ingredient	**wt %**
AES	9.77
DTPA[1]	1.20
citric acid	5.70
Ethoxylated Polyamine (Suspension agent)	3.2
ethanolamine	1.39
Propanediol	2.41
Other laundry adjuncts (perfume, enzyme, dye, brightener, polymers, water, etc.)	Balance

[1] diethylenetriaminepentaacetic acid, sodium salt

Example 2 Wash additive:

Ingredient	wt %
DTPA[1]	18.50
citric acid	14.82
Ethoxylated Polyamine (Suspension agent)	3.2
Barol 561[2]	1.5
Other laundry adjuncts (surfactant, perfume, enzyme, dye, brightener, polymers, water, etc.)	Balance

[1] diethylenetriaminepentaacetic acid, sodium salt

2 Marketed by Akzonobel

Example 3 Rinse additive:

Ingredient	wt %
DTPA[1]	16.10
citric acid	12.90
Ethoxylated Polyamine (Suspension agent)	8.05
Barol 561[2]	12.90
Other laundry adjuncts (surfactant, perfume, enzyme, dye, brightener, polymers, water, etc.)	Balance

[1] diethylenetriaminepentaacetic acid, sodium salt

[2] Marketed by Akzonobel

For each of Examples I-III the requisite components are pre-dissolved and then combined in a standard batch mixing vessel.

Fabric Treatment

The compositions of Examples 1-3 are used to treat a situs in the following manner in accordance with the methods described in the present specification.

While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to

cover in the appended claims all such changes and modifications that are within the scope of this invention.

CLAIMS

WHAT IS CLAIMED IS:

1. A composition comprising:
   a) from 0.001% to 60%, preferably from 0.1% to 60% , more preferably from 0.5% to 50%, most preferably from 1% to 40% of chelating agent;
   b) from 0.001% to 50%, preferably from 1% to 40% , more preferably from 0.5% to 40%, most preferably from 1% to 30% of a stripping agent;
   c) from 0.01% to 40%, preferably from 0.01% to 40%, more preferably from 0.1% to 35%, most preferably from 0.5% to 30% of a suspending agent; and
   d) an optional pH buffer
   the balance of said composition being a carrier and/or an adjunct ingredient.

2. A composition according to Claim 1, said composition comprising.
   a.) from 0.001% to 30% of chelating agent preferably from 0.5% to 25%, more preferably from 0.01% to 20%;
   b.) from 0.001% to 25% of a stripping agent preferably from 0.05% to 20%, more preferably from 0.01% to 15%;
   c.) from 0.01% to 40% of a suspending agent preferably from 0.1% to 35%, more preferably from 0.5% to 30%; and
   d.) an optional pH buffer;
   the balance of said composition comprising at least one detergent adjunct.

3. A composition according to any preceding claim wherein said pH buffer is present in a sufficient amount to provide a neat product pH of from 1 to 9, preferably from 1.5 to 8, more preferably from 2 to 7.

4. A composition according to any preceding claims wherein said optional pH buffer is selected from the group consisting of organic acids, inorganic acids and mixtures thereof.

5. A composition according to any preceding claim wherein:

a.) said chelating agent is selected from the group consisting of aminocarboxylates, phosphonates, polyfunctionally-substituted aromatic chelating agents, and mixtures thereof;

b.) said stripping agent is selected from the group consisting of protonatable amines, alkyl quaternary ammonium compounds, cationic silicones, cationic polymers and mixtures thereof;

c.) said suspending agent is selected from the group consisting of anionic polymers, modified polyamine polymers and mixtures thereof; and

d.) said pH buffer is selected from the group consisting of organic acids, inorganic acids and mixtures thereof.

6. A method of treating a surface or article comprising the step of:

a.) optionally washing and/or rinsing said surface or article;

b.) contacting at least a portion of a textile product with the composition of any preceding claim; and

c.) optionally washing and/or rinsing said surface or article.

7. The method of Claim 6 wherein said surface or article is a textile product.

8. The method of Claim 6 wherein said contacting step comprises an operation selected from saturating, spraying, padding, exhaustion and combinations thereof.

9. A treated article or surface made by the method of Claim 6.

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2007/050132

A. CLASSIFICATION OF SUBJECT MATTER
INV. C11D1/62 C11D3/00 C11D3/36 C11D3/37

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C11D

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 96/11248 A (PROCTER & GAMBLE [US]) 18 April 1996 (1996-04-18) example VII	1-9
X	US 2003/224964 A1 (GOSSELINK EUGENE PAUL [US] ET AL) 4 December 2003 (2003-12-04) claims; examples 2-5,8,12	1-9
X	EP 0 971 027 A (PROCTER & GAMBLE [US]) 12 January 2000 (2000-01-12) examples 3P,Q,T,U	1-9
X	GB 2 355 015 A (PROCTER & GAMBLE [US]) 11 April 2001 (2001-04-11) examples	1-9

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 May 2007	23/05/2007

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Hillebrecht, Dieter

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2007/050132

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 100 27 634 A1 (BASF AG [DE]) 13 December 2001 (2001-12-13) paragraphs [0005], [0006], [0083], [0090]; claims	1-9
X	DE 200 10 121 U1 (PROCTER & GAMBLE [US]) 28 December 2000 (2000-12-28) page 26, line 25 - page 28, line 10; claims; examples	1-9

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2007/050132

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