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(71) Applicant: **The Procter & Gamble Company
Cincinnati, Ohio 45202 (US)**

(72) Inventors:

- **Pace, Luigi
80067 Sorrento (IT)**
- **Sacrinelli, Luca
90142 Palermo (IT)**
- **Tromeur, Melanie
92310 Sevres (FR)**

(74) Representative: **Engisch, Gautier et al
NV Procter & Gamble Services Company SA, 100
Temselaan
1853 Strombeek-Bever (BE)**

(54) **Process of treating a carpet with a composition comprising a zeolite**

(57) The present invention relates to a process of

treating a fabric with a composition comprising an activated zeolite.

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DescriptionTechnical Field

5 **[0001]** The present invention relates to a process of treating a fabric, in particular a carpet, with a composition comprising a zeolite. More particularly, the present invention relates to a process of treating a fabric with a composition comprising an activated zeolite.

Background of the Invention

10 **[0002]** Carpets produced from synthetic or natural fibers and mixtures thereof are commonly used in residential and commercial applications as a floor covering. Various types of fibers can be used in making carpets such as polyamide fibers, polyester fibers as well as wool, cotton or even silk in the case of rugs.

15 **[0003]** However, carpets irrespective of whether they are made from natural or synthetic fibers are all prone to soiling and staining. Foods, grease, oils, beverages in particular such as coffee, tea and soft drinks especially those containing acidic dyes can cause unsightly, often dark stains on carpets ("spot stains"). Also fibers may become soiled as a result of dirt particles, clay, dust, i.e., particulate soils in general, which may come into contact with and adhere to the fibers of the carpet. These latter soils often appear in the form of a diffuse layer of soils rather than in the form of spots and tend to accumulate particularly in the so-called "high traffic areas" such as near doors as a result of intensive use of the carpets in such areas.

20 **[0004]** Compositions for treating and/or cleaning carpets are already known in the art. Indeed, such carpet treatment compositions can be formulated either as solid or liquid compositions. Solid carpet cleaning compositions to be scattered over a soiled carpet are, for example, disclosed in US 4,659,494 or DE-OS-4411047. Liquid carpet cleaning compositions may be provided either in the form of a sprayable composition, as for example described in WO 96/15308, or in the form of shampoos to be used in spray extraction devices, as for example, described in WO 92/15662. Furthermore, water can be used to clean carpets.

25 **[0005]** The currently known carpet treaters and/or cleaners as described above, usually show an acceptable performance on removing particulate soils appearing in the form of a diffuse layer of soils as well as on removing light spot stains.

30 **[0006]** However, it is well-known from consumer research that the carpet cleaning performance of compositions used to treat carpets may still be further improved. In particular, the spot stain removal performance of compositions used to treat carpets on any kind of stubborn spot stains, as for example proteinic spot stains, greasy spot stains, bleachable spot stains as well as particulate spot stains, and the soil removal performance of said compositions on soiling of so-called "high traffic areas", may still be further improved.

35 **[0007]** It is therefore an objective of the present invention to provide a process of treating a carpet with a carpet treatment composition that delivers good overall carpet cleaning performance. In particular, it is an objective of the present invention to provide a process of treating a carpet with a carpet treatment composition that delivers good spot stain removal performance on various types of stains including proteinic, greasy, bleachable and/or particulate spot stains as well as good soil removal performance, especially for soiling of so-called "high traffic areas".

40 **[0008]** It has now been found that the above objectives can be met by a process of treating a fabric, and in particular a carpet, with a composition comprising an activated zeolite.

[0009] An advantage of the process as described herein is that said process provides an effective way of treating a carpet.

45 **[0010]** A further advantage of the process as described herein is that the activated zeolite as used in the process according to the present invention is capable of absorbing malodorous that are present on a fabric, preferably a carpet, and/or liquids spilled on and/or staining a fabric, preferably a carpet.

[0011] Another advantage of the process as described herein, is that said process provides the means to selectively apply a high performance spot stain and soil removal method on heavily stained and/or soiled parts of a fabric, preferably carpet.

50 **[0012]** Still a further advantage of the present invention is that the process of treating a carpet herein is applicable to all carpet types, especially delicate natural fibers, and are also safe to most of the carpet dye types, even those particularly sensitive natural dyes used therein. The present invention is also suitable to be used to treat upholstery and car seats covering.

Summary of the Invention

55 **[0013]** The present invention encompasses a process of treating a fabric with a composition comprising an activated zeolite.

[0014] In a preferred embodiment the process according to the present invention is a process of treating a carpet.

[0015] In another preferred embodiment the process herein comprises the step of applying said composition onto said fabric, preferably carpet.

[0016] In yet another preferred embodiment said composition is a solid composition.

[0017] In still another preferred embodiment according to the present invention the composition comprising an activated zeolite is applied onto said fabric in combination with a second composition.

Detailed Description of the Invention

[0018] The present invention encompasses a process of treating a fabric with a composition comprising an activated zeolite.

[0019] According to the present invention the process herein may be used for the treatment of any kind of fabrics. Preferably, the process according to the present invention is used to treat carpets or hard wearing textiles and fabrics, e.g., upholstery, rugs, curtains. More preferably, the process according to the present invention is used to treat carpets.

The process according to the present invention may be used for the removal of stains and soils as well as of odors and spilled liquids from fabrics, preferably carpets. In addition the process according to the present invention may be used to hygienise, disinfect and/or exterminate micro-insects from fabrics, preferably carpets.

The composition

[0020] The composition used in the process according to the present invention may be in its liquid or solid form. Preferably, said composition is a solid composition. More preferably, said composition is a solid composition in the form of : a powder composition, preferably a scatterable powder composition; a granular composition; or even in the form of a tablet, preferably of compressed powder and/or granular solid composition. In a highly preferred embodiment according to the present invention, the composition herein is a scatterable powder composition.

[0021] In a preferred embodiment according to the present invention, the solid composition herein is substantially anhydrous, preferably anhydrous. Preferably, the further ingredients besides the activated zeolites present in said composition, when present, are substantially anhydrous, preferably anhydrous. By "substantially anhydrous" it is meant herein, that the water content in said composition is less than 20%, preferably less than 15%, more preferably less than 10% by weight. Indeed, by ensuring that said further ingredients, when present, are substantially anhydrous the hydration, preferably premature hydration, of the activated zeolite herein is prevented. By "premature hydration" it is meant herein the hydration of the activated zeolite before the treatment of the fabric in a process as described herein.

[0022] In yet another preferred embodiment according to the present invention, the solid composition herein is stored under conditions that substantially prevent or even completely prevent the contact of the composition with any kind of moisture, preferably water. Indeed, a substantially anhydrous composition, when used, will therefore remain substantially anhydrous upon storage, this means between the time of manufacture and usage in a process according to the present invention. Indeed, by ensuring that said composition remains substantially anhydrous the hydration, preferably premature hydration, of the activated zeolite herein, and further ingredients, when present, is prevented.

[0023] Accordingly, the composition herein may be packaged in a container designed to prevent the hydration of the composition, preferably the activated zeolite and the further ingredients, when present.

[0024] Suitable containers designed to prevent the hydration of the composition herein may have a low moisture-vapor permeability rate, preferably a moisture-vapor permeability rate of less than 20 g/m²/day, preferably less than 10 g/m²/day, more preferably less than 1 g/m²/day, even more preferably less than 0.5 g/m²/day, and most preferably less than 0.1 g/m²/day, measured at 23 °C and a relative equilibrium moisture of 85%. Suitable test methods to determine the moisture-vapor permeability rate of a packaging system are, for example, described in WO 00/23557 or WO 98/40464.

[0025] Preferably, the composition is packaged in a re-sealable container or a container that provides a unit dose which is used up at once, as for example a sachet or bag, and the like. Suitable containers are produced from glass, plastics, such as high density polyethylene (HDPE), polypropylene (PP), polyethylene (PE), polyethylene terephthalate (PET) and/or metals. Suitable containers for the composition herein are selected from the group consisting of bottles, bags, pouches sachets, boxes and the like.

[0026] In a preferred embodiment, wherein the compositions herein are solid, the compositions may comprise additional materials, which may be used for the contribution to the cleaning process, as flow aids or simply as filler to increase the volume of the composition herein. This additional material may be an "inert material" meaning a material that substantially will not be part of a chemical reaction during storage of the compositions herein and/or during the process as described herein. Any inert material known to those skilled in the art may be used herein. Suitable additional materials herein may be selected from the group consisting of : cellulose, anhydrous inorganic salts, silicates, charcoal, anhydrous organic salts, and the like. The compositions herein may comprise up 95%, preferably from 80% to 5%,

more preferably from 70% to 20%, by weight of the total composition of an additional material.

Activated Zeolite

[0027] As an essential ingredient the composition herein comprises an activated zeolite.

[0028] By "zeolite" it is meant herein, a naturally occurring aluminosilicate mineral with three-dimensional structure based on $[\text{SiO}_4]^{4-}$ and $[\text{AlO}_4]^{4-}$ polyhedra. The polyhedra are linked by their corners to produce an open structural form providing internal cavities. Without being bound by theory, the Applicant found that in these internal cavities molecules of various sizes can be trapped. The molecular trapping depends on the size and polar properties of the zeolite and the molecules to be trapped. Zeolites generally act as adsorbent of molecules, which are small enough to pass into their internal cavities by physical ("physisorption") and/or chemical ("chemisorption") bonding. One type of molecules to be absorbed by the zeolites herein may be water or polar solvents such as ethanol.

[0029] By "activated zeolite" it is meant herein, a substantially anhydrous zeolite, preferably an anhydrous zeolite. By "substantially anhydrous zeolite" it is meant herein, that the water content in the zeolite is less than 12%, preferably less than 8%, more preferably less than 5% by weight.

[0030] The activated zeolite herein is rendered anhydrous by any means known to those skilled in the art to render material, preferably zeolites, anhydrous. A suitable means of rendering zeolite anhydrous is to heat zeolite in a furnace at high temperature for a suitable amount of time, preferably followed by cooling in the presence of a desiccant or by other processes such as freeze drying etc. For example, the zeolite may be heated at a temperature of from 200°C to 500°C, preferably 400°C or above for a period of at least 24 hours, preferably 48 hours. A suitable desiccant may be phosphorous pentoxide. Furthermore, suitable activated zeolites can be produced by calcination.

[0031] Suitable activated zeolites are commercially available from UOP under the tradename Molecular Sieve UOP®.

[0032] The composition herein preferably comprises up to 50%, preferably from 5% to 50%, more preferably from 10% to 40%, even more preferably from 15% to 40%, and most preferably from 20% to 40%, by weight of the total composition of an activated zeolite.

Process steps

[0033] As an essential element, the process according to the present invention comprises the step of applying the composition herein onto a fabric, preferably a carpet. Depending on its solid or liquid state, said composition may be applied onto the fabric in any way known to those skilled in the art, preferably by spraying, pouring, scattering and the like said composition onto the fabric. In a preferred embodiment wherein said composition is a solid composition, said solid composition is scattered onto the fabric, preferably carpet.

[0034] In a preferred embodiment according to the present invention, said process comprises the steps of applying said composition to parts, preferably heavily soiled parts of the fabric, preferably the carpet, e.g., high traffic areas, or spot stains, and optionally mechanically agitating the composition, preferably with an implement, into the soiled parts of the fabric, preferably carpet layer. Any number of implements may be used to provide said mechanical agitation, including brushes, sponges, paper towels, a piece of fabric, a cleaning glove, a human finger and the like. Said mechanical agitation allows the compositions to better penetrate into the fabric, preferably carpet, fibers. In addition, said contact loosens the dirt particles forming the stain.

[0035] In another preferred embodiment according to the present invention, said process of treating a fabric, preferably carpet, further comprises the step of at least partially removing said composition, even more preferably, said process of treating a fabric, preferably carpet, further comprises the step of at least partially removing said composition in combination with soil, dirt particles, malodors and/or spilled liquids. Most preferably, the process herein comprises the additional step of leaving the composition to act on the fabric, preferably for 1 to 60 minutes, before the step of at least partially removing said composition, preferably at least partially removing said composition in combination with soil, dirt particles, malodors and/or spilled liquids. The composition and the soil particles, if any, from a carpet may be carried out with the help of any commercially available vacuum cleaner like for instance a standard Hoover® 1300W vacuuming machine.

[0036] In a highly preferred embodiment according to the present invention, the composition comprising an activated zeolite is used in a process of treating a fabric comprising the steps of applying, in any order, to said fabric said composition comprising an activated zeolite and a second composition.

[0037] The second composition used in the process according to the highly preferred embodiment of the present invention as described above may be in its liquid or solid form. Indeed, when said second composition is in its liquid form, it may be an aqueous or non-aqueous liquid composition; a thickened or non-thickened liquid composition; a sprayable liquid composition; a foaming or non-foaming liquid composition and/or a pasteous composition. In the case, that said second composition is in its solid form, it may be in the form of: a powder composition, preferably a scatterable powder composition; a granular composition; or even in the form of a tablet, preferably of compressed powder and/or

granular solid composition.

[0038] Preferably, said second composition is in its liquid form, more preferably it is : an aqueous or non-aqueous liquid composition; a thickened or non-thickened liquid composition; a sprayable liquid composition; a foaming or non-foaming liquid composition and/or a pasteous composition. Most preferably, said second composition is an aqueous or non-aqueous liquid sprayable composition.

[0039] Depending on its solid or liquid state, the second composition may be applied onto the fabric in any way known to those skilled in the art, preferably by spraying, pouring, scattering and the like said first and/or second compositions onto the fabric.

[0040] In a preferred embodiment according to the present invention, said second composition is a liquid or solid carpet treatment composition or comprises ingredients selected from the group consisting of : water; and polar solvents (like ethanol, methanol, acetone, etc.); and mixtures thereof. More preferably, said second composition is a conventional liquid carpet treatment composition or water. Suitable liquid carpet treatment compositions may be sprayable, foaming or non-foaming liquid carpet treatment compositions dispensed using a manually- or electrically-operated spraying device or a pressurized spraying device (aerosol can, pressurizer or carbonators). It is in this preferred embodiment wherein the additional advantage of providing the means to selectively apply a high performance spot stain and soil removal method on heavily stained and/or soiled parts of a fabric, preferably carpet, and apply a normal performing spot stain and soil removal method on normally stained and/or soiled parts of a fabric, preferably carpet is especially noteworthy.

[0041] By "conventional liquid or solid carpet treatment or cleaning composition" it is meant herein, any carpet treatment/cleaning composition suitable for the treatment/cleaning of carpets. Preferably, said carpet treatment/cleaning composition may comprise at least one ingredient selected from the group consisting of surfactants, builders, enzymes, solvents and bleaches. Suitable conventional liquid or solid carpet treatment composition are, for instance, commercially available as Resolve liquid®, 1001 liquid®, Resolve powder® and Capture powder®.

[0042] In another embodiment according to the present invention, further compositions, liquid or solid, may be applied onto said fabric before, during or after the step of applying said composition comprising an activated zeolite and a second composition onto the fabric.

[0043] In a highly preferred embodiment according to the present invention, said composition comprising an activated zeolite is a scatterable solid powder composition and said second composition is a conventional liquid carpet treatment composition or water.

[0044] In a highly preferred embodiment herein, wherein said composition comprising an activated zeolite is a solid composition and is combined with a second composition which is in its liquid form, the combination of the two compositions generates heat upon contact of said two compositions, preferably generates heat on the fabric to be treated upon contact of the two compositions.

[0045] In a preferred embodiment herein, the activated zeolite is present in said composition in an amount suitable to generate a temperature increase on a fabric treated therewith of at least 5°C, preferably above 15°C, more preferably 30°C.

[0046] Without being bound by theory, the heat generation is achieved by an exothermic process of physical nature, indeed, the heat generation is achieved by the hydration of substantially anhydrous compound, the activated zeolite herein, by the combination of said substantially anhydrous compound with a suitable hydrant.

[0047] By "exothermic process" it is meant herein a process involving two or more compounds wherein energy is released at least partially in the form of heat, this means that the temperature of said compounds and/or the area or space in close vicinity of the process is increased.

[0048] In a preferred embodiment according to the present invention, the heat generation takes place upon the fabric, preferably the carpet ("in-situ heat generation").

[0049] The generation of heat is known to significantly increase the cleaning performance of compositions used to treat fabrics and carpets in particular. This finding is based on the fact that the kinetics of chemical reactions involved in the removal of stains and/or soils are significantly accelerated when the temperature of the environment of such a chemical reaction is increased. It is general common knowledge that an increase of approximately 10° C leads to about a two-fold increase in the kinetics of a chemical reaction. Furthermore, the physical interaction between compositions and stains and/or soils is improved at elevated temperatures. Indeed, it is a generally known concept to improve the cleaning and/or soil removal performance of water by increasing its temperature.

[0050] The Applicant has now found an efficient way of generating heat directly upon a fabric, preferably a carpet. Indeed, it has surprisingly been found that the generation of heat upon contact of the two compositions, as described herein, is capable of significantly increasing the cleaning performance provided by the two compositions ("fabric, preferably carpet, cleaning performance benefit"). The generation of heat using two separate compositions provides a means to significantly increase the soil and/or stain removal performance on heavily soiled (soiled high traffic areas) and/or stained (stubborn spot stains, preferably on stubborn proteinic, greasy, bleachable and/or particulate spot stains) areas of the carpet. Furthermore, the heat generation can be locally limited to areas that need a special treatment due

to heavy soiling or presence of spot stains. However, it is also possible to generate the heat over a large area of the fabric to be treated or over the whole fabric to be treated.

[0051] By "high traffic areas" it is meant herein, areas with an intensive use of the carpets in such areas as for example near doors.

[0052] By "particulate stains" it is meant herein, any soils or stains of particulate nature that can be found on any carpet, e.g. clay, dirt, dust, mud, concrete and the like.

[0053] By "greasy/oily stains" it is meant herein, any soils or stains of greasy/oily nature that can be found on any carpet, e.g., make-up, lipstick, dirty motor oil and mineral oil, greasy food like mayonnaise, spaghetti sauce and shoe polish.

[0054] By "proteinic stains" it is meant herein, any soils or stains of proteinic nature that can be found on any carpet, e.g., grass, urine and blood stains.

[0055] Moreover, the Applicant has found that the preferred process herein provides an easy to use way of in-situ generating heat directly on a fabric, preferably a carpet. Indeed, as long as the two compositions herein are stored separately from each other, for example in separate containers or at least compartments of the same container separated from each other by any means suitable, the heat generation can easily be achieved by combining the two compositions on the area to be treated.

[0056] In a preferred embodiment according to the present invention, the heat generated (ΔT) upon contact of the two compositions is at least, with increasing preference in the order given, 1° C, 2° C, 3° C, 4° C, 5° C, 10° C, 15° C, 20° C, 30° C or 40° C when measured upon the fabric, preferably carpet, expressed as the local increase in temperature.

[0057] In another preferred embodiment according to the present invention, the heat generated (ΔT) upon contact of the two compositions is at least, with increasing preference in the order given, 1° C, 2° C, 3° C, 4° C, 5° C, 10° C, 15° C, 20° C, 30° C or 40° C when measured in a glass container.

[0058] In the above described assessments of ΔT , the thermal energy, which is used for phase, changes, if any, and for endothermic reactions (i.e., the heat of formation), if any, is being neglected.

[0059] The heat generation of the two compositions used in the preferred process according to the present invention can be assessed by the following test method : Using an infra-red camera, for instance the AGEMA 570® commercially available from FSI Flir System, the initial temperature of a portion, preferably a 5 cm times 5 cm sized portion, of a carpet is measured. Following this initial measurement, the two compositions according to the present invention are applied onto said portion of the carpet and the temperature measurement using the same infra-red camera is performed again, preferably every 5 seconds for at least 10 minutes, more preferably 5 minutes, ("set of temperature measurements"). The difference between the initial temperature and the temperature, preferably the highest temperature measured in the set of temperature measurements, on the carpet after the application of said two compositions is the heat generated upon the carpet (ΔT). Typically, the measurement is performed at room temperature (24° C) with the two compositions, prior to their combination, being stored at room temperature for one day and therefore having a temperature of approximately 24° C.

[0060] Alternatively, the heat generation can be assessed by combining the two compositions herein in a glass container and measure the temperature change between the two compositions prior to their combination and after their combination using a thermometer. The heat generated (ΔT) of the two compositions may be evaluated as being proportional to the difference between the initial temperature of the two compositions prior to their combination and the highest temperature measured after their combination. Preferably, the temperature measurement is performed for at least 10 minutes, more preferably 5 minutes. Typically, the measurement is performed at room temperature (24° C) with the two compositions, prior to their combination, the glass container and the thermometer being stored at room temperature for one day and therefore having a temperature of approximately 24° C.

[0061] The cleaning performance of a given set of compositions on a soiled carpet may be evaluated by the following test method : the two compositions according to the present invention are applied onto the stained portion of a carpet, left to act thereon from 1 to 60 minutes, preferably 20 minutes, after which the carpet is vacuum cleaned using any commercially available vacuum cleaners like for instance a standard Hoover® 1300W vacuuming machine. The soils used in this test may be particulate stains, greasy/oily stains or enzymatic stain as described herein. The cleaning performance may be evaluated by visual using panel score units to rate the cleaning performance. The visual grading may be performed by a group of expert panelists using panel score units (PSU). To assess the carpet cleaning benefits of a given set of first and second compositions a PSU-scale ranging from 0, meaning no noticeable difference in cleanliness of a treated, initially soiled, carpet versus an untreated, similarly soiled, carpet, to 4, meaning a clearly noticeable difference in cleanliness of a treated, initially soiled, carpet versus an untreated, similarly soiled, carpet, can be applied.

[0062] Alternatively, the cleaning performance of a given set of compositions on a soiled carpet may be evaluated by the measurement of the delta L with a miniscan, for example a colorimeter CR310® commercially available from Minolta. Delta L represents the difference of gray intensity between a reference (soiled carpet tile) and a carpet tile treated with the compositions to be assessed, this means with the compositions as described herein. The difference

in cleaning performance between different sets of compositions may be assessed by comparing the delta Ls that have been measured for said sets of compositions. In practice, the miniscan takes a photo of the carpet tile and quantitatively analysis its gray intensity (L is the quantitative value, ranging from 100% for a pure white to 0% for a pure black). The higher the delta L, wherein $\Delta L = L(\text{sample}) - L(\text{reference})$, the better is the cleaning performance of a sample (set of compositions).

[0063] Additionally, it has been found that when a composition comprising an activated zeolite is combined with a second composition, preferably a second composition being either a conventional liquid carpet treatment composition or water, the pH of the resulting mixture is adjusted to a pH value having a favorable effect on the cleaning performance of the mixture. The activated zeolite provides a pH shifting benefit to said mixture, indeed, due to the presence of the activated zeolite the pH of the mixture of a composition comprising an activated zeolite combined with a second composition, that has either a mildly non-buffered acidic pH or a mildly alkaline non-buffered pH, is shifted towards a higher degree of alkalinity. Thus, it is possible to formulate the second composition at an acidic to mildly alkaline pH and after the combination of said second composition with the composition comprising an activated zeolite clean the fabric, preferably the carpet, with a mildly to strongly alkaline composition. This represents an advantage since it is well-known in the art that grease removal from fabrics is hugely promoted in alkaline conditions. Also, this may be advantageous if the second composition is more stable under acidic to mildly alkaline, preferably acidic to neutral, more preferably acidic, pH conditions but shows a better cleaning performance under alkaline pH conditions.

[0064] The pH shift provided by the composition comprising an activated zeolite is naturally dependent on the second composition. Without being bound by theory, the resulting pH after the combination of the two compositions, when present, herein is 7.5 to 10.5 for systems wherein the second composition is water, 7.5 to 9 for systems wherein the second composition is acidic, and 8 to 10.5 for systems wherein the second composition is mildly alkaline.

[0065] By "mildly alkaline" it is meant herein a pH range from 7.01 to 8.5, preferably 7.01 to 8.

[0066] The present invention further encompasses a kit comprising (a) a composition comprising an activated zeolite as described herein and (b) a cleaning composition or water, preferably a carpet cleaning composition or water, more preferably a conventional carpet cleaning composition or water. Preferably, the composition comprising an activated zeolite and/or said conventional carpet cleaning composition may comprise optional ingredients as described in the present application.

[0067] Furthermore, the present invention encompasses a kit comprising (a) a composition comprising an activated zeolite as described herein and (b) a set of instructions to use said composition in a process wherein the composition is applied onto a fabric, preferably a carpet. Preferably, said set of instructions specifies that the composition is applied in combination with a second composition, preferably a carpet cleaning composition more preferably a conventional carpet cleaning composition, or water. More preferably, said set of instructions specifies that the process comprises the steps of applying, in any order given, to said fabric, preferably carpet, said composition comprising an activated zeolite and a second composition, preferably a carpet cleaning composition more preferably a conventional carpet cleaning composition, or water. Most preferably, said set of instructions specifies that the process comprises steps as described in the section titled "Process steps" of the present application.

[0068] Furthermore, the present invention encompasses the use of an activated zeolite for the manufacture of a composition for use in the process according to the present invention.

Solvent

[0069] As a highly preferred although optional ingredient, the composition comprising an activated zeolite may further comprise a solvent. The solvent is preferably loaded onto the activated zeolite, this means, sprayed onto the activated zeolite described herein and adsorbed onto the outer surface of the activated zeolite itself.

[0070] Typically, the compositions herein may comprise up to 90%, preferably from 0.1% to 20%, more preferably from 0.5% to 10% and most preferably from 3% to 10% by weight of the total composition of a solvent or a mixture thereof.

[0071] Suitable solvents for use herein include aliphatic and/or aromatic alcohol, glycol ethers and/or derivatives thereof, polyol and mixtures thereof.

[0072] Suitable aromatic alcohols to be used herein are according to the formula $R_1\text{-OH}$ wherein R_1 is an alkyl substituted or non-alkyl substituted aryl group of from 1 to 20 carbon atoms, preferably from 2 to 15 and more preferably from 2 to 10. A suitable aromatic alcohol to be used herein is benzyl alcohol.

[0073] Suitable aliphatic alcohols to be used herein are according to the formula $R_2\text{-OH}$ wherein R_2 is a linear or branched saturated or unsaturated hydrocarbon chain of from 1 to 20 carbon atoms, preferably from 1 to 10 and more preferably from 2 to 6. Highly preferred herein are aliphatic alcohols with 2 to 4 carbon atoms and most preferably 4 carbon atoms, or mixtures thereof. Suitable aliphatic alcohols to be used herein include linear alcohol like 2-octanol, decanol, isopropyl alcohol, propyl alcohol, ethanol and/or methanol. Highly preferred herein are ethanol, isopropyl alcohol or a mixture thereof.

[0074] Ethanol may be commercially available from Eridania Italia under its chemical name.

[0075] Isopropanol may be commercially available from Merck/BDH Italia under its chemical name.

[0076] Suitable glycol ethers and/or derivatives thereof to be used herein include monoglycol ethers and/or derivatives thereof, polyglycol ethers and/or derivatives thereof and mixtures thereof.

[0077] Suitable monoglycol ethers and derivatives thereof to be used herein include n-butoxypropanol (n-BP), CELLOSOLVE® solvents or mixtures thereof. Preferred Cellosolve® solvents include propoxy ethyl acetate salt (i.e., Propyl Cellosolve acetate salt®), ethanol-2-butoxy phosphate salt (i.e., Butyl Cellosolve phosphate salt®), 2-(Hexyloxy) ethanol (i.e., 2-hexyl Cellosolve®), 2-ethoxy ethanol (i.e., 2-ethyl Cellosolve®), 2-butoxyethanol (i.e., 2-butyl Cellosolve®) or mixtures thereof.

[0078] Suitable polyglycol ethers and derivatives thereof to be used herein include n-butoxypropoxypropanol (n-BPP), butyl triglycol ether (BTGE), butyl diglycol ether (BDGE), CARBITOL® solvents or mixtures thereof.

[0079] Preferred CARBITOL® solvents are compounds of the 2-(2-alkoxyethoxy) ethanol class, 2-(2-alkoxyethoxy) propanol class and/or 2-(2-alkoxyethoxy) butanol class wherein the alkoxy group is derived from ethyl, propyl or butyl. A preferred carbitol is 2-(2-butoxyethoxy) ethanol also known as butyl carbitol®.

[0080] Preferred glycol ethers and/or derivatives thereof are 2-ethoxyethanol, 2-butoxyethanol, n-butoxypropoxypropanol, butyl carbitol® or mixtures thereof.

[0081] Suitable polyol solvents to be used herein are the polyols having at least 2 hydroxyl groups (-OH) like diols. Suitable diols to be used herein include 2-ethyl-1,3-hexanediol, 2,2,4-trimethyl-1,3-pentanediol, methyl-2,4 pentanediol or mixture thereof.

[0082] Other suitable solvent may be selected from the group consisting of: terpenes such as pinene, limonene and geraniol; ketones such as dipropyl ketone, butyrolactone and acetophenone; aromatic solvents such as toluene and xylene; and halogenated solvents such as bromopropane and chlorobenzene; and mixtures thereof.

[0083] Preferably, the composition comprising an activated zeolite may comprise a solvent selected from the group consisting of aliphatic and/or aromatic alcohol, glycol ethers and derivatives thereof, and polyols and mixtures thereof.

[0084] In a preferred embodiment herein, wherein the composition comprising an activated zeolite is a solid composition, said composition may comprise a solvent selected from the group consisting of aliphatic and/or aromatic alcohol, glycol ethers and derivatives thereof, and polyols and mixtures thereof. More preferably, a solvent selected from the group consisting of glycol ethers.

[0085] The solvents, when present, contribute to the excellent overall cleaning performance of the present invention. Additionally, their addition in the compositions herein also enhances the sanitizing properties of the compositions.

Optional ingredients

[0086] The composition comprising an activated zeolite herein and the second composition as described herein above, when present, may comprise optional ingredients in addition to the activated zeolite or ingredients present in the second composition, when present. When including optional ingredients in said compositions the compatibility of said optional ingredients with the essential ingredients of the composition(s) have to be taken into account. Indeed, for instance optional ingredients that hydrate the activated zeolite are not suitable to be included in the composition comprising an activated zeolite.

Peroxygen bleach

[0087] As an optional but highly preferred ingredient the compositions according to the present invention may comprise a peroxygen bleach.

[0088] Suitable peroxygen bleaches to be used herein are selected from the group consisting of: hydrogen peroxide; water soluble sources of hydrogen peroxide; organic or inorganic peracids; hydroperoxides; diacyl peroxides; and mixtures thereof.

[0089] As used herein a hydrogen peroxide source refers to any compound that produces perhydroxyl ions when said compound is in contact with water. Suitable water-soluble sources of hydrogen peroxide for use herein are selected from the group consisting of percarbonates, perborates and persilicates and mixtures thereof.

[0090] Suitable diacyl peroxides for use herein are selected from the group consisting of aliphatic, aromatic and aliphatic-aromatic diacyl peroxides, and mixtures thereof.

[0091] Suitable aliphatic diacyl peroxides for use herein are dilauroyl peroxide, didecanoyl peroxide, dimyristoyl peroxide, or mixtures thereof. A suitable aromatic diacyl peroxide for use herein is for example benzoyl peroxide. A suitable aliphatic-aromatic diacyl peroxide for use herein is for example lauroyl benzoyl peroxide. Such diacyl peroxides have the advantage to be particularly safe to carpets and carpet dyes while delivering excellent bleaching performance.

[0092] Suitable organic or inorganic peracids for use herein are selected from the group consisting of: persulfates such as monopersulfate; peroxyacids such as diperoxydodecandioic acid (DPDA) and phthaloyl amino peroxyacaproic

acid (PAP); magnesium perphthalic acid; perlauric acid; perbenzoic and alkylperbenzoic acids; and mixtures thereof.

[0093] Suitable hydroperoxides for use herein are selected from the group consisting of tert-butyl hydroperoxide, cumyl hydroperoxide, 2,4,4-trimethylpentyl-2-hydroperoxide, di-isopropylbenzene-monohydroperoxide, tert-amyl hydroperoxide and 2,5-dimethyl-hexane-2,5-dihydroperoxide and mixtures thereof. Such hydroperoxides have the advantage to be particularly safe to carpets and carpet dyes while delivering excellent bleaching performance.

[0094] Preferred peroxygen bleaches herein are selected from the group consisting of hydrogen peroxide; water soluble sources of hydrogen peroxide; organic or inorganic peracids; hydroperoxides; and diacyl peroxides; and mixtures thereof.

[0095] More preferred peroxygen bleaches herein are selected from the group consisting of hydrogen peroxide, water soluble sources of hydrogen peroxide and diacyl peroxides and mixtures thereof. Even more preferred peroxygen bleaches herein are selected from the group consisting of hydrogen peroxide, water soluble sources of hydrogen peroxide, aliphatic diacyl peroxides, aromatic diacyl peroxides and aliphatic-aromatic diacyl peroxides and mixtures thereof. Most preferred peroxygen bleaches herein are hydrogen peroxide, water soluble sources of hydrogen peroxide or mixtures thereof.

[0096] Typically, the liquid compositions herein comprise from 0.01% to 20%, preferably from 0.5 % to 10%, and more preferably from 1% to 7% by weight of the total composition of a peroxygen bleach, or mixtures thereof.

[0097] The presence of a peroxygen bleach in preferred compositions employed in the process of treating a fabric according to the present invention contributes to the excellent cleaning and sanitizing performance on various types of soils including on spot stains like bleachable stains (e.g., coffee, beverage, food) of the compositions of the present invention.

[0098] By "bleachable stains" it is meant herein any soils or stains containing ingredients sensitive to bleach that can be found on any carpet, e.g., coffee or tea.

Surfactants

[0099] As an optional but highly preferred ingredient the compositions according to the present invention may comprise a surfactant or a mixture thereof.

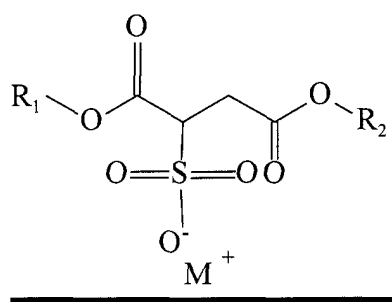
[0100] Typically, the compositions herein may comprise up to 50%, preferably from 0.1% to 20%, more preferably from 0.5% to 10% and most preferably from 1% to 5% by weight of the total composition of a surfactant.

[0101] Such surfactants may be selected from those well-known in the art including anionic, nonionic, zwitterionic, amphoteric and cationic surfactants and mixtures thereof.

[0102] Particularly suitable surfactants to be used herein are anionic surfactants. Said anionic surfactants are preferred herein as they further contribute to the outstanding stain removal performance of the compositions of the present invention on various types of stains. Moreover they do not stick on carpet, thereby reducing resoiling.

[0103] Suitable anionic surfactants include sulfosuccinate surfactants, sulfosuccinamate surfactants, sulfosuccinamide surfactants, alkyl carboxylate surfactants, sarcosinate surfactants, alkyl sulfate surfactants, alkyl sulphonate surfactants, alkyl glycerol sulfate surfactants, alkyl glycerol sulphonate surfactants and mixtures thereof.

[0104] Suitable sulfosuccinate surfactants are according to the formula



wherein : R_1 is hydrogen or a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20 carbon atoms, preferably 8 to 18 carbon atoms, more preferably 10 to 16 carbon atoms, and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group; R_2 is a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20 carbon atoms, preferably 8 to 18 carbon atoms, more preferably 10 to 16 carbon atoms, and alkyl phenyl radicals containing from 6 to 18 carbon

atoms in the alkyl group; and M is hydrogen or a cationic moiety, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

[0105] Such sulfosuccinate surfactants are commercially available under the tradenames Aerosol® from Cytec, Anionyx® from Stepan, Arylene® from Hart, Setacin® from Zschimmer & Schwarz, Mackanate® from McIntyre and Monawet® from Mona Industries.

[0106] Suitable alkyl sulphonate surfactants for use herein include water-soluble salts or acids of the formula RSO_3M wherein R is a $\text{C}_6\text{-C}_{20}$ linear or branched, saturated or unsaturated alkyl group, preferably a $\text{C}_8\text{-C}_{18}$ alkyl group and more preferably a $\text{C}_{10}\text{-C}_{16}$ alkyl group, and M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium), or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

[0107] An example of a $\text{C}_{14}\text{-C}_{16}$ alkyl sulphonate is Hostapur® SAS available from Hoechst.

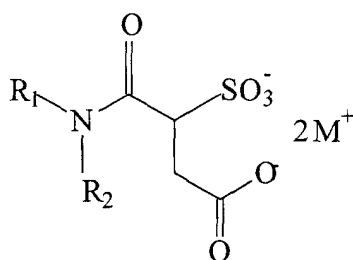
[0108] Suitable alkyl sulphate surfactants for use herein are according to the formula $\text{R}_1\text{SO}_4\text{M}$ wherein R_1 represents a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20, preferably 8 to 18, more preferably 10 to 16, carbon atoms and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group. M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

[0109] By "linear alkyl sulphate or sulphonate" it is meant herein a non-substituted alkyl sulphate or sulphonate wherein the alkyl chain comprises from 6 to 20 carbon atoms, preferably from 8 to 18 carbon atoms, and more preferably from 10 to 16 carbon atoms, and wherein this alkyl chain is sulphated or sulphonated at one terminus.

[0110] By "branched sulphonate or sulphate", it is meant herein an alkyl chain having from 6 to 20 total carbon atoms, preferably from 8 to 18 total carbon atoms, and more preferably from 10 to 16 total carbon atoms, wherein the main alkyl chain is substituted by at least another alkyl chain, and wherein the alkyl chain is sulphated or sulphonated at one terminus.

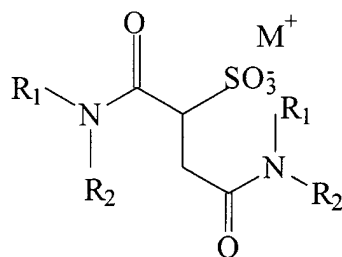
[0111] Particularly preferred branched alkyl sulphates to be used herein are those containing from 10 to 14 total carbon atoms like Isalchem 123 AS®. Isalchem 123 AS® commercially available from Enichem is a C_{12-13} surfactant which is 94% branched. This material can be described as $\text{CH}_3\text{-(CH}_2)_m\text{-CH(CH}_2\text{OSO}_3\text{Na)-(CH}_2)_n\text{-CH}_3$ where $n+m = 8-9$. Also preferred alkyl sulphates are the alkyl sulphates where the alkyl chain comprises a total of 12 carbon atoms, i.e., sodium 2-butyl octyl sulphate. Such alkyl sulphate is commercially available from Condea under the trade name Isofol® 12S. Particularly suitable linear alkyl sulphonates include $\text{C}_{12}\text{-C}_{16}$ paraffin sulphonate like Hostapur® SAS commercially available from Hoechst.

[0112] Suitable sulfosuccinamate surfactants for use herein are according to the formula



wherein R_1 and R_2 each independently represent a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20, preferably 8 to 18, more preferably 10 to 16, carbon atoms and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group. M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

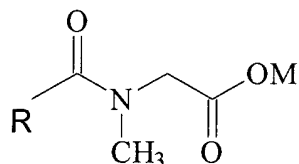
[0113] Suitable sulfosuccinamide surfactants for use herein are according to the formula



wherein R_1 and R_2 each independently represent a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20, preferably 8 to 18, more preferably 10 to 16, carbon atoms and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group. M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

[0114] Suitable alkyl carboxylate surfactants for use herein are according to the formula RCO_2M wherein : R represents a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 6 to 20, preferably 8 to 18, more preferably 10 to 16, carbon atoms and alkyl phenyl radicals containing from 6 to 18 carbon atoms in the alkyl group. M is H or a cation, e.g., an alkali metal cation (e.g., sodium, potassium, lithium, calcium, magnesium and the like) or ammonium or substituted ammonium (e.g., methyl-, dimethyl-, and trimethyl ammonium cations and quaternary ammonium cations, such as tetramethyl-ammonium and dimethyl piperdinium cations and quaternary ammonium cations derived from alkylamines such as ethylamine, diethylamine, triethylamine, and mixtures thereof, and the like).

[0115] Suitable sarcosinate surfactants to be used herein include acyl sarcosinate or mixtures thereof, in its acid and/or salt form, preferably long chain acyl sarcosinates having the following formula:



wherein M is hydrogen or a cationic moiety and wherein R is an alkyl group of from 11 to 15 carbon atoms, preferably of from 11 to 13 carbon atoms. Preferred M are hydrogen and alkali metal salts, especially sodium and potassium. Said acyl sarcosinate surfactants are derived from natural fatty acids and the amino-acid sarcosine (N-methyl glycine). They are suitable to be used as aqueous solution of their salt or in their acidic form as powder. Being derivatives of natural fatty acids, said acyl sarcosinates are rapidly and completely biodegradable and have good skin compatibility.

[0116] Accordingly, particularly preferred long chain acyl sarcosinates to be used herein include C_{12} acyl sarcosinate, i.e., an acyl sarcosinate according to the above formula wherein M is hydrogen and R is an alkyl group of 11 carbon atom, sodium N-lauroyl sarcosinate, i.e., an acyl sarcosinate according to the above formula wherein M is sodium and R is an alkyl group of 11 carbon atom, and C_{14} acyl sarcosinate (i.e., an acyl sarcosinate according to the above formula wherein M is hydrogen and R is an alkyl group of 13 carbon atoms). Sodium N-lauroyl sarcosinate is commercially available, for example, as Haposyl L-30® supplied by Hampshire or Crodasinc LS30® supplied by Croda. C_{14} acyl sarcosinate is commercially available, for example, as Haposyl M-30® supplied by Hampshire or Crodasinc MS30® supplied by Croda.

[0117] Suitable nonionic surfactants include amine oxide surfactants. Suitable amine oxide surfactants are according to the formula $\text{R}_1\text{R}_2\text{R}_3\text{NO}$, wherein each of R_1 , R_2 and R_3 is independently a saturated substituted or unsubstituted, linear or branched alkyl groups of from 1 to 30 carbon atoms, preferably of from 1 to 20 carbon atoms, and mixtures thereof.

[0118] Particularly preferred amine oxide surfactants to be used according to the present invention are amine oxide

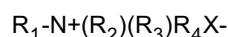
surfactants having the following formula $R_1R_2R_3NO$ wherein R_1 is a saturated linear or branched alkyl group of from 1 to 30 carbon atoms, preferably of from 6 to 20 carbon atoms, more preferably of from 6 to 16 carbon atoms, and wherein R_2 and R_3 are independently substituted or unsubstituted, linear or branched alkyl groups of from 1 to 4 carbon atoms, preferably of from 1 to 3 carbon atoms, and more preferably are methyl groups. Preferred amine oxide surfactants used herein are pure-cut amine oxide surfactants, i.e., a pure single amine oxide surfactant, e.g. C_8 N,N-dimethyl amine oxide, as opposed to mixtures of amine oxide surfactants of different chain lengths

[0119] Suitable amine oxide surfactants for use herein are for instance pure cut C_8 amine oxide, pure cut C_{10} amine oxide, pure cut C_{14} amine oxide, natural blend C_8 - C_{10} amine oxides as well as natural blend C_{12} - C_{16} amine oxides. Such amine oxide surfactants may be commercially available from Hoechst or Stephan.

[0120] Suitable nonionic surfactants for use herein also include any ethoxylated C_6 - C_{24} fatty alcohol nonionic surfactant, alkyl propoxylates and mixtures thereof, fatty acid C_6 - C_{24} alkanolamides, C_6 - C_{20} polyethylglycol ethers, polyethylene glycol with molecular weight 1000 to 80000 and glucose amides, alkyl pyrrolidones.

[0121] Suitable cationic surfactants for use herein include quaternary ammonium compounds of the formula $R_1R_2R_3R_4N^+$ where R_1, R_2 and R_3 are methyl groups, and R_4 is a C_{12-15} alkyl group, or where R_1 is an ethyl or hydroxy ethyl group, R_2 and R_3 are methyl groups and R_4 is a C_{12-15} alkyl group.

[0122] Suitable zwitterionic surfactants are zwitterionic betaine surfactants. Suitable zwitterionic betaine surfactants for use herein contain both a cationic hydrophilic group, i.e., a quaternary ammonium group, and anionic hydrophilic group on the same molecule at a relatively wide range of pHs. The typical anionic hydrophilic groups are carboxylates and sulphonates, although other groups like sulfates, phosphonates, and the like can be used. A generic formula for the zwitterionic betaine surfactant to be used herein is :



wherein R_1 is a hydrophobic group; R_2 is hydrogen, C_1 - C_6 alkyl, hydroxy alkyl or other substituted C_1 - C_6 alkyl group; R_3 is C_1 - C_6 alkyl, hydroxy alkyl or other substituted C_1 - C_6 alkyl group which can also be joined to R_2 to form ring structures with the N, or a C_1 - C_6 sulphonate group; R_4 is a moiety joining the cationic nitrogen atom to the hydrophilic group and is typically an alkylene, hydroxy alkylene, or polyalkoxy group containing from 1 to 10 carbon atoms; and X is the hydrophilic group, which is a carboxylate or sulphonate group.

[0123] Preferred hydrophobic groups R_1 are aliphatic or aromatic, saturated or unsaturated, substituted or unsubstituted hydrocarbon chains that can contain linking groups such as amido groups, ester groups. More preferred R_1 is an alkyl group containing from 1 to 24, preferably from 8 to 18, and more preferably from 10 to 16 carbon atoms. These simple alkyl groups are preferred for cost and stability reasons. However, the hydrophobic group R_1 can also be an amido radical of the formula $R_a-C(O)-NH-(C(R_b)_2)_m$, wherein R_a is an aliphatic or aromatic, saturated or unsaturated, substituted or unsubstituted hydrocarbon chain, preferably an alkyl group containing from 8 up to 20, preferably up to 18, more preferably up to 16 carbon atoms, R_b is selected from the group consisting of hydrogen and hydroxy groups, and m is from 1 to 4, preferably from 2 to 3, more preferably 3, with no more than one hydroxy group in any $(C(R_b)_2)$ moiety.

[0124] Preferred R_2 is hydrogen, or a C_1 - C_3 alkyl and more preferably methyl. Preferred R_3 is C_1 - C_4 sulphonate group, or a C_1 - C_3 alkyl and more preferably methyl. Preferred R_4 is $(CH_2)_n$ wherein n is an integer from 1 to 10, preferably from 1 to 6, more preferably is from 1 to 3.

[0125] Some common examples of betaine/sulphobetaine are described in U.S. Pat. Nos. 2,082,275, 2,702,279 and 2,255,082, incorporated herein by reference.

[0126] Examples of particularly suitable alkyldimethyl betaines include coconut-dimethyl betaine, lauryl dimethyl betaine, decyl dimethyl betaine, 2-(N-decyl-N, N-dimethyl-ammonia) acetate, 2-(N-coco N, N-dimethylammonio) acetate, myristyl dimethyl betaine, palmityl dimethyl betaine, cetyl dimethyl betaine, and stearyl dimethyl betaine. For example Coconut dimethyl betaine is commercially available from Seppic under the trade name of Amonyl 265®. Lauryl betaine is commercially available from Albright & Wilson under the trade name Empigen BB/L®.

[0127] Examples of amidobetaines include cocoamidoethylbetaine, cocoamidopropyl betaine or C_{10} - C_{14} fatty acylamidopropylene (hydropropylene) sulfobetaine. For example C_{10} - C_{14} fatty acylamidopropylene (hydropropylene) sulfobetaine is commercially available from Sherex Company under the trade name "Varion CAS® sulfobetaine".

[0128] A further example of betaine is Lauryl-immino-dipropionate commercially available from Rhone-Poulenc under the trade name Mirataine H2C-HA®.

[0129] A preferred surfactant for use herein is an anionic surfactant or a zwitterionic surfactant or a mixture thereof, a more preferred surfactant is a sulfosuccinate surfactant, sulfosuccinamate surfactant, sulfosuccinamide surfactant, carboxylate surfactant, sarcosinate surfactant, alkyl sulfate surfactant, alkyl sulphonate surfactant, alkyl glycerol sulfate surfactant, alkyl glycerol sulphonate surfactant or a zwitterionic betaine surfactant and mixtures thereof.

[0130] In a preferred embodiment a preferred surfactant for use herein is a sarcosinate surfactant, an alkyl sulphonate

surfactant, an alkyl sulphate surfactant, or a zwitterionic betaine surfactant and mixtures thereof, and the most preferred surfactant herein is an alkyl sarcosinate surfactant.

[0131] In another preferred a preferred surfactant for use herein is a mixture of a sulfosuccinate surfactant and a second anionic surfactant. More preferably, said surfactant is a mixture of a sulfosuccinate surfactant and a sulphate surfactant. Most preferably, said surfactant is a sulfosuccinate surfactant.

[0132] The presence of a surfactant in preferred compositions when employed in the process of treating a fabric according to the present invention contributes to the excellent cleaning performance on various types of soils including diffuse soils (e.g., particulate and/or greasy soils) that tend to accumulate in the so-called "high traffic areas" but also in delivering good cleaning performance on other types of stains or soils, i.e., proteinic stains like blood.

Solvents

[0133] The second composition according to the present invention, when present, may comprise a solvent or a mixture thereof.

[0134] Typically, the compositions herein may comprise up to 90%, preferably from 0.1% to 20%, more preferably from 0.5% to 10% and most preferably from 1% to 5% by weight of the total composition of a solvent or a mixture thereof.

[0135] Suitable solvents for use herein include aliphatic and/or aromatic alcohol, glycol ethers and/or derivatives thereof, polyol and mixtures thereof.

[0136] Suitable aromatic alcohols to be used herein are according to the formula R_1 -OH wherein R_1 is an alkyl substituted or non-alkyl substituted aryl group of from 1 to 20 carbon atoms, preferably from 2 to 15 and more preferably from 2 to 10. A suitable aromatic alcohol to be used herein is benzyl alcohol.

[0137] Suitable aliphatic alcohols to be used herein are according to the formula R_2 -OH wherein R_2 is a linear or branched saturated or unsaturated hydrocarbon chain of from 1 to 20 carbon atoms, preferably from 1 to 10 and more preferably from 2 to 6. Highly preferred herein are aliphatic alcohols with 2 to 4 carbon atoms and most preferably 4 carbon atoms, or mixtures thereof. Suitable aliphatic alcohols to be used herein include linear alcohol like 2-octanol, decanol, isopropyl alcohol, propyl alcohol, ethanol and/or methanol. Highly preferred herein are ethanol, isopropyl alcohol or a mixture thereof.

[0138] Ethanol may be commercially available from Eridania Italia under its chemical name.

[0139] Isopropanol may be commercially available from Merck/BDH Italia under its chemical name.

[0140] Suitable glycol ethers and/or derivatives thereof to be used herein include monoglycol ethers and/or derivatives thereof, polyglycol ethers and/or derivatives thereof and mixtures thereof.

[0141] Suitable monoglycol ethers and derivatives thereof to be used herein include n-butoxypropanol (n-BP), CELLOSOLVE® solvents or mixtures thereof. Preferred Cellosolve® solvents include propoxy ethyl acetate salt (i.e., Propyl Cellosolve acetate salt®), ethanol-2-butoxy phosphate salt (i.e., Butyl Cellosolve phosphate salt®), 2-(Hexyloxy) ethanol (i.e., 2-hexyl Cellosolve®), 2-ethoxy ethanol (i.e., 2-ethyl Cellosolve®), 2-butoxyethanol (i.e., 2-butyl Cellosolve®) or mixtures thereof.

[0142] Suitable polyglycol ethers and derivatives thereof to be used herein include n-butoxypropoxypropanol (n-BPP), butyl triglycol ether (BTGE), butyl diglycol ether (BDGE), CARBITOL® solvents or mixtures thereof.

[0143] Preferred CARBITOL® solvents are compounds of the 2-(2-alkoxyethoxy) ethanol class, 2-(2-alkoxyethoxy) propanol class and/or 2-(2-alkoxyethoxy) butanol class wherein the alkoxy group is derived from ethyl, propyl or butyl. A preferred carbitol is 2-(2-butoxyethoxy) ethanol also known as butyl carbitol®.

[0144] Preferred glycol ethers and/or derivatives thereof are 2-ethoxyethanol, 2-butoxyethanol, n-butoxypropoxypropanol, butyl carbitol® or mixtures thereof.

[0145] Suitable polyol solvents to be used herein are the polyols having at least 2 hydroxyl groups (-OH) like diols. Suitable diols to be used herein include 2-ethyl-1,3-hexanediol, 2,2,4-trimethyl-1,3-pentanediol, methyl-2,4 pentanediol or mixture thereof.

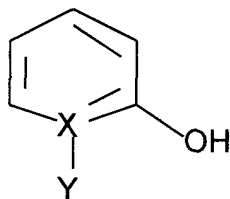
[0146] Other suitable solvent may be selected from the group consisting of: terpenes such as pinene, limonene and geraniol; ketones such as dipropyl ketone, butyrolactone and acetophenone; aromatic solvents such as toluene and xylene; and halogenated solvents such as bromopropane and chlorobenzene; and mixtures thereof.

[0147] The solvents, when present, further contribute to the excellent overall cleaning performance of the present invention. Additionally, their addition in the compositions herein also enhances the sanitising properties of the compositions.

Stabilizing agents

[0148] The compositions of the present invention may further comprise a stabilizing agent selected from the group consisting of hydroxy pyridine N-oxides or derivatives thereof and mixtures thereof.

[0149] Suitable hydroxy pyridine N-oxides or derivatives thereof are according to the following formula:



wherein X is nitrogen, Y is one of the following groups oxygen, -CHO, -OH, -(CH₂)_n-COOH, wherein n is an integer of from 0 to 20, preferably of from 0 to 10 and more preferably is 0, and wherein Y is preferably oxygen. Accordingly particularly preferred hydroxy pyridine N-oxides or derivatives thereof to be used herein is 2-hydroxy pyridine N-oxide.

[0150] Hydroxy pyridine N-oxides or derivatives thereof may be commercially available from Sigma.

[0151] Typically, the compositions herein may comprise up to 2%, preferably from 0.001% to 1% and more preferably from 0.001% to 0.5% by weight of the total composition of a hydroxy pyridine N-oxide or derivatives thereof or mixtures thereof.

Chelating agents

[0152] The compositions of the present invention may further comprise a chelating agent.

[0153] Suitable chelating agents are those known to those skilled in the art. Particularly suitable chelating agents include for examples phosphonate chelating agents, polyfunctionally-substituted aromatic chelating agents, amino carboxylate chelating agents, other chelating agents like ethylene diamine N,N'-disuccinic acid and mixtures thereof.

[0154] Typically, the compositions herein may comprise up to 4%, preferably from 0.001% to 1%, and more preferably from 0.001% to 0.5% by weight of the total composition of a chelating agent.

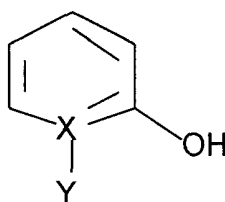
[0155] Suitable phosphonate chelating agents to be used herein may include ethydrionic acid, alkali metal ethane 1-hydroxy diphosphonates as well as amino phosphonate compounds, including amino alkylene poly (alkylene phosphonate), alkali metal ethane 1-hydroxy diphosphonates, nitrilo trimethylene phosphonates, ethylene diamine tetra methylene phosphonates, and diethylene triamine penta methylene phosphonates. The phosphonate compounds may be present either in their acid form or as salts of different cations on some or all of their acid functionalities. Preferred phosphonate chelating agents to be used herein are diethylene triamine penta methylene phosphonates (DETPMP). Such phosphonate chelating agents are commercially available from Monsanto under the trade name DEQUEST®.

[0156] Polyfunctionally-substituted aromatic chelating agents may also be useful in the compositions herein. See U. S. patent 3,812,044, issued May 21, 1974, to Connor et al. Preferred compounds of this type in acid form are dihydroxydisulfobenzenes such as 1,2-dihydroxy -3,5-disulfobenzene.

[0157] A preferred biodegradable chelating agent for use herein is ethylene diamine N,N'- disuccinic acid, or alkali metal, or alkaline earth, ammonium or substitutes ammonium salts thereof or mixtures thereof. Ethylenediamine N,N'- disuccinic acids, especially the (S,S) isomer, have been extensively described in US patent 4, 704, 233, November 3, 1987, to Hartman and Perkins. Ethylenediamine N,N'- disuccinic acid is, for instance, commercially available under the tradename ssEDDS® from Palmer Research Laboratories.

[0158] Suitable amino carboxylate chelating agents to be used herein include ethylene diamine tetra acetates, diethylene triamine pentaacetates, diethylene triamine pentaacetate (DTPA), N-hydroxyethylethylenediamine triacetates, nitrilotriacetates, ethylenediamine tetrapropionates, triethylenetetraaminehexaacetates, ethanoldiglycines, propylene diamine tetracetic acid (PDTA) and methyl glycine di-acetic acid (MGDA), both in their acid form, or in their alkali metal, ammonium, and substituted ammonium salt forms. A particularly suitable amino carboxylate to be used herein is diethylene triamine penta acetic acid (DTPA).

[0159] Other suitable chelating agents to be used herein include salicylic acid or derivatives thereof, or mixtures thereof according to the following formula:



wherein X is carbon, Y is one of the following groups -CHO, -OH, $-(CH_2)_n-COOH$, and preferably is $-(CH_2)_n-COOH$, and wherein n is an integer of from 0 to 20, preferably of from 0 to 10 and more preferably is 0. Salicylic acid and derivatives thereof may be used herein either in their acid form or in their salts form as for example sodium salts.

[0160] Salicylic acid is particularly preferred herein and may be commercially available from Rhone Poulenc.

Radical scavengers:

[0161] The compositions herein may comprise a radical scavenger as another optional ingredient. Suitable radical scavengers for use herein include the well-known substituted mono and di hydroxy benzenes and derivatives thereof, alkyl- and aryl carboxylates and mixtures thereof. Preferred radical scavengers for use herein include trimethoxy benzoic acid (TMBA), di-tert-butyl hydroxy toluene (BHT), p-hydroxy-toluene, hydroquinone (HQ), di-tert-butyl hydroquinone (DTBHQ), mono-tert-butyl hydroquinone (MTBHQ), tert-butyl-hydroxy anisole (BHA), p-hydroxy-anisol, benzoic acid, 2,5-dihydroxy benzoic acid, 2,5-dihydroxyterephthalic acid, toluic acid, catechol, t-butyl catechol, 4-allyl-catechol, 4-acetyl catechol, 2-methoxy-phenol, 2-ethoxy-phenol, 2-methoxy-4-(2-propenyl) phenol, 3,4-dihydroxy benzaldehyde, 2,3-dihydroxy benzaldehyde, benzylamine, 1,1,3-tris(2-methyl-4-hydroxy-5-t-butylphenyl) butane, tert-butyl-hydroxy-anyline, p-hydroxy anyline as well as n-propyl-gallate. Highly preferred for use herein is di-tert-butyl hydroxy toluene, which is for example commercially available from SHELL under the trade name IONOL CP® and/or tert-butyl-hydroxy anisole and/or propyl gallate. These radical scavengers further contribute to the stability of the compositions herein.

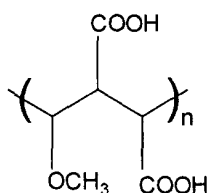
[0162] Typically, the compositions according to the present invention may comprise up to 5%, preferably from 0.002% to 1.5% by weight and more preferably from 0.002% to 0.5% by weight of the total composition of a radical scavenger.

Anti-resoiling agent

[0163] The compositions as disclosed herein may comprise as a preferred optional ingredient an anti-resoiling agent.

[0164] Suitable anti-resoiling agents include anti-resoiling polymers.

[0165] Suitable poly (vinyl methyl ether / maleic acid) copolymers are according to the general formula :



wherein n (degree of polymerisation) is an integer of from 50 to 1600, preferably from 100 to 800, and more preferably from 200 to 400.

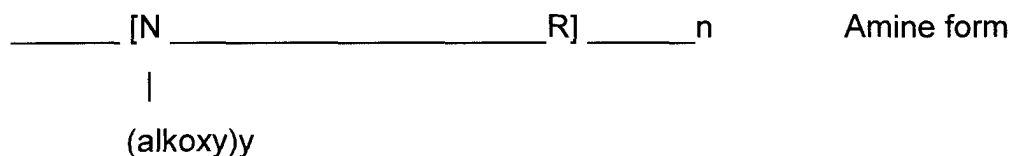
[0166] Accordingly, suitable poly (vinyl methyl ether / maleic acid) copolymers for use herein have an average molecular weight of from 1'000 to 10'000'000, preferably 10'000 to 1'000'000, more preferably from 10'000 to 500'000, and most preferably from 50'000 to 100'000.

[0167] Suitable poly (vinyl methyl ether / maleic acid) copolymers are commercially available, for instance, from ISP Corporation, New York, NY and Montreal, Canada under the product names Gantrez AN Copolymer® (AN-119 copolymer, average molecular weight of 20'000; AN-139 copolymer, average molecular weight of 41'000; AN-149 copolymer, average molecular weight of 50'000; AN-169 copolymer, average molecular weight of 67'000; AN-179 copolymer, average molecular weight of 80'000), Gantrez S® (Gantrez S97®, average molecular weight of 70'000), and Gantrez

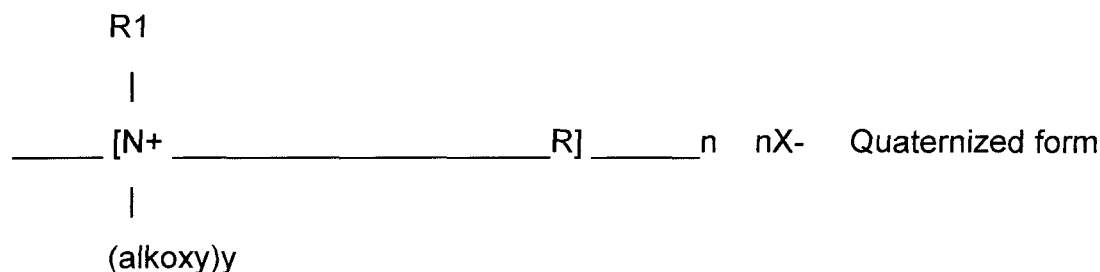
ES® (ES-225, ES-335, ES-425, ES-435), Gantrez V® (V-215, V-225, V-425).

[0168] Preferably the poly (vinyl methyl ether / maleic acid) copolymers are either crosslinked or not crosslinked, i. e., linear. More preferably the poly (vinyl methyl ether / maleic acid) copolymers are not crosslinked.

[0169] Suitable anti-resoiling polymers include soil suspending polyamine polymers. Any soil suspending polyamine polymer known to those skilled in the art may also be used herein. Particularly suitable polyamine polymers for use herein are alkoxyated polyamines. Such materials can conveniently be represented as molecules of the empirical structures with repeating units :

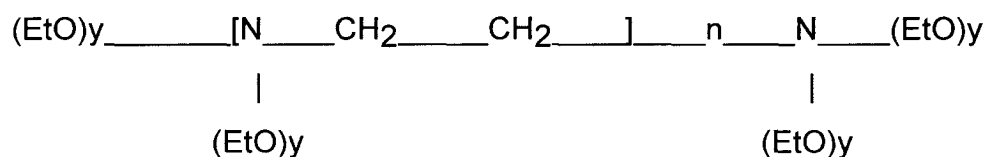


and



wherein R is a hydrocarbonyl group, usually of 2-6 carbon atoms; R₁ may be a C₁-C₂₀ hydrocarbon; the alkoxy groups are ethoxy, propoxy, and the like, and y is from 2 to 30, most preferably from 7 to 20; n is an integer of at least 2, preferably from 2 to 40, most preferably from 2 to 5; and X⁻ is an anion such as halide or methylsulfate, resulting from the quaternization reaction.

[0170] The most highly preferred polyamines for use herein are the so-called ethoxylated polyethylene amines, i.e., the polymerized reaction product of ethylene oxide with ethyleneimine, having the general formula :



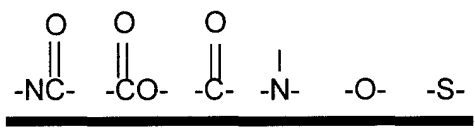
wherein y is from 2 to 50, preferably from 5 to 30, and n is from 1 to 40, preferably from 2 to 40. Particularly preferred for use herein is an ethoxylated polyethylene amine, in particular an ethoxylated polyethylene amine wherein n=2 and y=20, and an ethoxylated polyethylene amine wherein n=40 and y=7.

[0171] Suitable ethoxylated polyethylene amines are commercially available from Nippon Shokubai CO., LTD under the product names ESP-0620A® (ethoxylated polyethylene amine wherein n=2 and y=20) or from BASF under the product names ES-8165 and from BASF under the product name LUTENSIT K - 187/50® (ethoxylated polyethylene amine wherein n=40 and y=7).

[0172] Suitable anti-resoiling polymers also include polyamine N-oxide polymers.

[0173] Suitable polyamine N-oxide polymers for use herein are according to the following formula : R-A_x-P; containing at least one N-oxide group (N-O group); wherein : P is a polymerizable unit to which an N-O group can be attached and/or the N-O group can form part of the polymerizable unit;

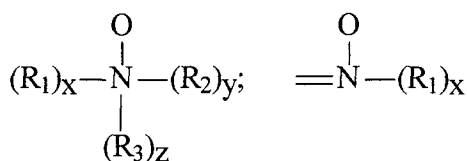
A is one of the following structures:



x is 0 or 1;

and R is an aliphatic, ethoxylated aliphatic, aromatic, heterocyclic or alicyclic group or any combination thereof to which the N-O group can be attached to R or the nitrogen of the N-O group is part of R.

[0174] By "N-O group" it is meant one of the following general structures:



wherein R_1 , R_2 , R_3 are aliphatic, aromatic, heterocyclic or alicyclic groups or combinations thereof; x, y and z are 0 or 1; and the nitrogen of the N-O group can be attached or form part of any of the aforementioned groups.

[0175] Any polymerizable unit P can be used as long as the amine oxide polymer formed is water-soluble and provides the carpet treatment composition with carpet cleaning and/or carpet anti-resoiling benefits. Preferred polymerizable unit P are vinyl, alkenes, esters, ethers, amides, imides, acrylates and mixtures thereof. A more preferred polymerizable unit P is vinyl.

[0176] Preferred polyamine N-oxide polymers are those wherein R is a heterocyclic group such as pyridine, pyrrole, imidazole, or a derivative thereof, to which the nitrogen of the N-O group can be attached or the N-O group is part of these groups. Most preferred polyamine N-oxide polymers are those wherein R is a pyridine.

[0177] The polyamine N-oxide polymer can be obtained in almost any degree of polymerization. Typically, the average molecular weight is within the range of 1,000 to 100,000; more preferred 5,000 to 100,000; most preferred 5,000 to 25,000.

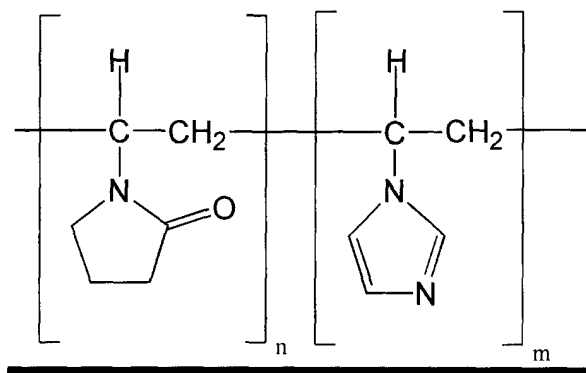
[0178] Suitable polyamine N-oxide polymer are polyvinyl pyridine-N-oxide polymers wherein the polymerizable unit P is vinyl; x=0; and R is pyridine.

[0179] Suitable polyvinyl pyridine-N-oxide polymers are commercially available from Hoechst under the trade name of Hoe S 4268®, and from Reilly Industries Inc. under the trade name of PVNO.

[0180] Furthermore, suitable anti-resoiling polymers include N-vinyl polymer.

[0181] Suitable N-vinyl polymers include polyvinyl pyrrolidone polymers, co-polymers of N-vinylpyrrolidone and N-vinylimidazole, co-polymers of N-vinylpyrrolidone and acrylic acid, and mixtures thereof.

[0182] Suitable co-polymers of N-vinylpyrrolidone and N-vinylimidazole polymers (referred to as a class as "PVPVI") are according to the formula :



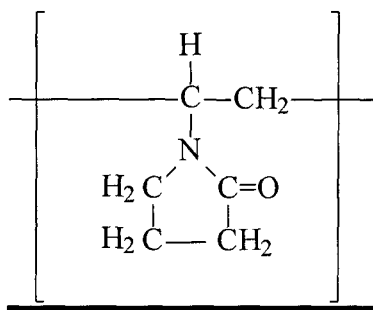
in which n is between 50 and 500 and preferably between 80 and 200 and m is between 50 and 500 and preferably between 80 and 200.

[0183] Preferably the PVPVI has an average molecular weight range from 1,000 to 100,000, more preferably from 5,000 to 100,000, and most preferably from 5,000 to 20,000. (The average molecular weight range is determined by light scattering as described in Barth, et al., Chemical Analysis, Vol 113. "Modern Methods of Polymer Characterization", the disclosures of which are incorporated herein by reference.)

[0184] The PVPVI co-polymers typically have a molar ratio of N-vinylimidazole to N-vinylpyrrolidone from 1:1 to 0.2:1, more preferably from 0.8:1 to 0.3:1, most preferably from 0.6:1 to 0.4:1. These co-polymers can be either linear or branched.

[0185] Suitable co-polymers of N-vinylpyrrolidone and N-vinylimidazole are commercially available from BASF, under the trade name of Sokalan® PG55.

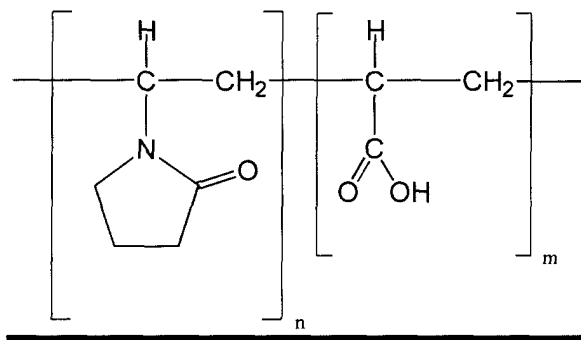
[0186] Suitable polyvinylpyrrolidone ("PVP") for use herein are homopolymers of N-vinylpyrrolidone having the following repeating monomer:



[0187] Preferred vinylpyrrolidone homopolymers for use herein have an average molecular weight of from 1,000 to 100,000, preferably from 5,000 to 100,000, and more preferably from 5,000 to 20,000.

[0188] Suitable vinylpyrrolidone homopolymers are commercially available from BASF under the trade names Luviskol® K15 (viscosity molecular weight of 10,000), Luviskol® K25 (viscosity molecular weight of 24,000), Luviskol® K30 (viscosity molecular weight of 40,000), and other vinylpyrrolidone homopolymers known to persons skilled in the detergent field (see for example EP-A-262,897 and EP-A-256,696).

[0189] Suitable co-polymers of N-vinylpyrrolidone and acrylic acid (referred to as a class as "PV/AA") are according to the formula :



in which n is between 50 and 1000 and preferably between 100 and 200 and m is between 150 and 3000 and preferably between 300 and 600.

[0190] Preferably the PV/AA have an average molecular weight range from 1,000 to 100,000, more preferably from 5,000 to 100,000, and most preferably from 5,000 to 25,000.

[0191] Suitable co-polymers of N-vinylpyrrolidone and acrylic acid are commercially available from BASF under the trade name Sokalan® PG 310.

[0192] Preferred N-vinyl polymers are polyvinyl pyrrolidone polymers, co-polymers of N-vinylpyrrolidone and N-vinylimidazole, co-polymers of N-vinylpyrrolidone and acrylic acid, and mixtures thereof, even more preferred are polyvinyl pyrrolidone polymers.

[0193] Suitable anti-resoiling polymers also include soil suspending polycarboxylate polymers.

[0194] Any soil suspending polycarboxylate polymer known to those skilled in the art can be used according to the present invention such as homo- or co-polymeric polycarboxylic acids or their salts including polyacrylates and copolymers of maleic anhydride or/and acrylic acid and the like. Indeed, such soil suspending polycarboxylate polymers can be prepared by polymerizing or copolymerizing suitable unsaturated monomers, preferably in their acid form. Unsaturated monomeric acids that can be polymerized to form suitable polymeric polycarboxylates include acrylic acid, maleic acid (or maleic anhydride), fumaric acid, itaconic acid, aconitic acid, mesaconic acid, citraconic acid and methylenemalononic acid. The presence in the polymeric polycarboxylates herein of monomeric segments, containing no carboxylate radicals such as vinylmethyl ether, styrene, ethylene, etc. is suitable provided that such segments do not constitute more than 40% by weight.

[0195] Particularly suitable polymeric polycarboxylates to be used herein can be derived from acrylic acid, including polyacrylic polymers and copolymers of acrylic acid. Most preferred anti-resoiling polymers are copolymer of acrylic acid and methacrylic acid. Such acrylic acid-based polymers, which are useful herein, are the water-soluble salts of polymerized acrylic acid. The average molecular weight of such polymers in the acid form preferably ranges from 2,000 to 10,000, more preferably from 4,000 to 7,000 and most preferably from 4,000 to 5,000. Water-soluble salts of such acrylic acid polymers can include, for example, the alkali metal, ammonium and substituted ammonium salts. Soluble polymers of this type are known materials. Use of polyacrylates of this type in detergent compositions has been disclosed, for example, in Diehl, U.S. Patent 3,308,067, issued March 7, 1967.

[0196] Acrylic/maleic-based copolymers may also be used as a preferred soil suspending polycarboxylic polymer. Such materials include the water-soluble salts of copolymers of acrylic acid and maleic acid. The average molecular weight of such copolymers in the acid form preferably ranges from 2,000 to 100,000, more preferably from 5,000 to 75,000, most preferably from 7,000 to 65,000. The ratio of acrylate to maleate segments in such copolymers will generally range from 30:1 to 1:1, more preferably from 10:1 to 2:1. Water-soluble salts of such acrylic acid/maleic acid copolymers can include, for example, the alkali metal, ammonium and substituted ammonium salts. Soluble acrylate/maleate copolymers of this type are known materials, which are described in European Patent Application No. 66915, published December 15, 1982. Particularly preferred is a copolymer of maleic / acrylic acid with an average molecular weight of 70,000. Such copolymers are commercially available from BASF under the trade name SOKALAN® CP5.

[0197] Other suitable anti-resoiling polymers include those anti-resoiling polymers having: (a) one or more nonionic hydrophilic components consisting essentially of (i) polyoxyethylene segments with a degree of polymerization of at least 2, or (ii) oxypropylene or polyoxypropylene segments with a degree of polymerization of from 2 to 10, wherein said hydrophilic segment does not encompass any oxypropylene unit unless it is bonded to adjacent moieties at each end by ether linkages, or (iii) a mixture of oxyalkylene units comprising oxyethylene and from 1 to about 30 oxypropylene units wherein said mixture contains a sufficient amount of oxyethylene units such that the hydrophilic component has hydrophilicity great enough to increase the hydrophilicity of conventional polyester synthetic fiber surfaces upon deposit of the soil release agent on such surface, said hydrophilic segments preferably comprising at least about 25% oxyeth-

ylene units and more preferably, especially for such components having about 20 to 30 oxypropylene units, at least about 50% oxyethylene units; or (b) one or more hydrophobe components comprising (i) C₃ oxyalkylene terephthalate segments, wherein, if said hydrophobe components also comprise oxyethylene terephthalate, the ratio of oxyethylene terephthalate: C₃ oxyalkylene terephthalate units is about 2:1 or lower, (ii) C₄-C₆ alkylene or oxy C₄-C₆ alkylene segments, or mixtures therein, (iii) poly (vinyl ester) segments, preferably polyvinyl acetate, having a degree of polymerization of at least 2, or (iv) C₁-C₄ alkyl ether or C₄ hydroxyalkyl ether substituents, or mixtures therein, wherein said substituents are present in the form of C₁-C₄ alkyl ether or C₄ hydroxyalkyl ether cellulose derivatives, or mixtures therein, and such cellulose derivatives are amphiphilic, whereby they have a sufficient level of C₁-C₄ alkyl ether and/or C₄ hydroxyalkyl ether units to deposit upon conventional polyester synthetic fiber surfaces and retain a sufficient level of hydroxyls, once adhered to such conventional synthetic fiber surface, to increase fiber surface hydrophilicity, or a combination of (a) and (b).

[0198] Typically, the polyoxyethylene segments of (a)(i) will have a degree of polymerization of from about 1 to about 200, although higher levels can be used, preferably from 3 to about 150, more preferably from 6 to about 100. Suitable oxy C₄-C₆ alkylene hydrophobe segments include, but are not limited to, end-caps of polymeric soil release agents such as MO₃S(CH₂)_nOCH₂CH₂O-, where M is sodium and n is an integer from 4-6, as disclosed in U.S. Patent 4,721,580, issued January 26, 1988 to Gosselink.

[0199] Anti-resoiling polymers useful in the present invention also include cellulosic derivatives such as hydroxyether cellulosic polymers, co-polymeric blocks of ethylene terephthalate or propylene terephthalate with polyethylene oxide or polypropylene oxide terephthalate, and the like. Such anti-resoiling polymers are commercially available and include hydroxyethers of cellulose such as METHOCEL® (Dow). Cellulosic anti-resoiling polymers for use herein also include those selected from the group consisting of C₁-C₄ alkyl and C₄ hydroxyalkyl cellulose; see U.S. Patent 4,000,093, issued December 28, 1976 to Nicol, et al.

[0200] Anti-resoiling polymers characterised by poly(vinyl ester) hydrophobe segments include graft co-polymers of poly(vinyl ester), e.g., C₁-C₆ vinyl esters, preferably poly(vinyl acetate) grafted onto polyalkylene oxide backbones, such as polyethylene oxide backbones. See European Patent Application 0 219 048, published April 22, 1987 by Kud, et al. Commercially available anti-resoiling polymers of this kind include the SOKALAN® type of material, e.g., SOKALAN HP-22®, available from BASF.

[0201] One type of preferred anti-resoiling polymers is a co-polymer having random blocks of ethylene terephthalate and polyethylene oxide (PEO) terephthalate. The molecular weight of these anti-resoiling polymers is in the range of from about 25,000 to about 55,000. See U.S. Patent 3,959,230 to Hays, issued May 25, 1976 and U.S. Patent 3,893,929 to Basadur issued July 8, 1975.

[0202] Another preferred anti-resoiling polymers is a polyester with repeat units of ethylene terephthalate units which contains 10-15% by weight of ethylene terephthalate units together with 90-80% by weight of polyoxyethylene terephthalate units, derived from a polyoxyethylene glycol of average molecular weight 300-5,000. Examples of this polymer include the commercially available material ZELCON 5126® (from Dupont) and MILEASE T® (from ICI). See also U.S. Patent 4,702,857, issued October 27, 1987 to Gosselink.

[0203] Another preferred anti-resoiling polymers agent is a sulfonated product of a substantially linear ester oligomer comprised of an oligomeric ester backbone of terephthaloyl and oxyalkyleneoxy repeat units and terminal moieties covalently attached to the backbone. These anti-resoiling polymers are fully described in U.S. Patent 4,968,451, issued November 6, 1990 to J.J. Scheibel and E.P. Gosselink. Other suitable anti-resoiling polymers include the terephthalate polyesters of U.S. Patent 4,711,730, issued December 8, 1987 to Gosselink et al, the anionic end-capped oligomeric esters of U.S. Patent 4,721,580, issued January 26, 1988 to Gosselink, and the block polyester oligomeric compounds of U.S. Patent 4,702,857, issued October 27, 1987 to Gosselink.

[0204] Preferred anti-resoiling polymers also include the soil release agents of U.S. Patent 4,877,896, issued October 31, 1989 to Maldonado et al, which discloses anionic, especially sulfoaroyl, end-capped terephthalate esters.

[0205] Still another preferred anti-resoiling agent is an oligomer with repeat units of terephthaloyl units, sulfoisoterephthaloyl units, oxyethyleneoxy and oxy-1,2-propylene units. The repeat units form the backbone of the oligomer and are preferably terminated with modified isethionate end-caps. A particularly preferred anti-resoiling agent of this type comprises about one sulfoisophthaloyl unit, 5 terephthaloyl units, oxyethyleneoxy and oxy-1,2-propyleneoxy units in a ratio of from about 1.7 to about 1.8, and two end-cap units of sodium 2-(2-hydroxyethoxy)-ethanesulfonate. Said anti-resoiling agent also comprises from about 0.5% to about 20%, by weight of the oligomer, of a crystalline-reducing stabilizer, preferably selected from the group consisting of xylene sulfonate, cumene sulfonate, toluene sulfonate, and mixtures thereof. See U.S. Pat. No. 5,415,807, issued May 16, 1995, to Gosselink et al.

[0206] The liquid compositions may comprise from 0.01% to 10%, preferably from 0.01% to 5%, and more preferably from 0.05% to 2% by weight of the total composition of a further anti-resoiling agent.

[0207] A preferred anti-resoiling agent is an anti-resoiling polymer. A more preferred anti-resoiling agent is a poly (vinyl methyl ether / maleic acid) copolymer, a soil suspending polyamine polymer, a poly vinyl pyridine-N-oxide polymer or a mixture thereof. An even more preferred anti-resoiling agent is a poly (vinyl methyl ether / maleic acid) copolymer,

an alkoxyated polyamine polymer, a poly vinyl pyridine-N-oxide polymer or a mixture thereof. The most preferred anti-resoiling agent useful in the compositions herein are selected from the group consisting of : a poly (vinyl methyl ether / maleic acid) copolymer; an ethoxylated polyethylene amine according to the formula as described above wherein $n=2$ and $y=20$; an ethoxylated polyethylene amine according to the formula as described herein wherein $n=40$ and $y=7$; a poly vinyl pyridine-N-oxide polymer; and mixtures thereof.

Silica

[0208] In a preferred embodiment, wherein the composition comprising an activated zeolite herein is a solid composition, said composition may further comprise silica.

[0209] Suitable, silica are commercially available from Degussa under the tradenames Ultrasil® and Sipernat®.

[0210] Preferably, the composition comprising an activated zeolite herein may comprise up to 50%, more preferably from 0.1% to 40%, even more preferably from 0.5% to 10%, by weight of the total composition of a silica.

Cellulose

[0211] In a preferred embodiment, wherein the composition comprising an activated zeolite herein is a solid composition, said composition may further comprise a microcrystalline cellulose and/or a cellulose or a derivative thereof.

[0212] Suitable celluloses are commercially available under the trade name Arbocel®, commercially available from Rettenmaier and Nymcel® available from Metsa-serla. Suitable microcrystalline celluloses are available under the trade name Vivapur® from Rettenmaier.

[0213] Preferably, the composition comprising an activated zeolite herein may comprise up to 90%, more preferably from 1% to 60%, even more preferably from 3% to 50%, by weight of the total composition of a microcrystalline cellulose and/or a cellulose or a derivative thereof.

Other optional ingredients

[0214] The compositions herein may further comprise conventional carpet treating ingredients. Preferably, the compositions herein may further comprise a number of additional compounds such as stabilising agents, builder systems, radical scavengers, perfumes, dyes, suds suppressing agents, photobleaching agents, and other minors.

Examples

[0215] The following examples will further illustrate the present invention. The compositions are made by combining the listed ingredients in the listed proportions (weight % unless otherwise specified). The following Examples are meant to exemplify compositions used in a process according to the present invention but are not necessarily used to limit or otherwise define the scope of the present invention.

Examples:

[0216]

Compositions (weight %)	I	II
	Molecular Sieve UOP 13X® (45%)	Molecular Sieve UOP 4A® (35%)

Compositions (weight %)	I	II
	NaHCO ₃ (45%) n-BP (8%) Perfume (2%)	Na ₂ CO ₃ (20%) Arbocel B800® (35%) Hexyl Cellosolve (10%)

Compositions (weight %)	III	IV
	Molecular Sieve UOP 3A® (35%) Arbocel B800® (35%) Hexyl Cellosolve (10%) Ultrasil UN3SP® (10%)	Molecular Sieve UOP 13X® (30%) Arbocel B800® (35%) Ultrasil UN3SP® (10%) Hexyl Cellosolve (10%)

Molecular Sieve UOP 13X®, 4A and 3A are activated zeolites supplied by UOP.

NaHCO₃ and Na₂CO₃ are supplied by Solvay.

n-BP is n-butoxy propanol supplied by Union Carbide.

Hexyl Cellosolve is a solvent supplied by Union Carbide.

Ultrasil UN3SP® is 20 micron silica supplied by Degussa.

Arbocel B800® is a cellulose supplied by Rettenmaier.

Claims

1. A process of treating a fabric with a composition comprising an activated zeolite.
2. A process according to claim 1, wherein said fabric is a carpet or a hard wearing textile and fabric, e.g., upholstery, rugs, curtains.
3. A process according to any of the preceding claims, wherein said composition comprising an activated zeolite is a solid composition.
4. A process according to any of the preceding claims, wherein said composition comprising an activated zeolite comprises up to 50% by weight of the total composition of an activated zeolite.
5. A process according to any of the preceding claims, wherein said composition comprising an activated zeolite is applied onto said fabric and optionally left to act onto said fabric and/or removed from said fabric.
6. A process according to any of the preceding claims, wherein said composition comprising an activated zeolite additionally comprises a solvent.
7. A process according to claim 6, wherein said solvent is selected from the group consisting of aliphatic and/or aromatic alcohol, glycol ethers and derivatives thereof, and polyols and mixtures thereof.
8. A process according to any of claims 6 or 7, wherein said composition comprising an activated zeolite additionally comprises up to 90% by weight of the total composition of a solvent.
9. A process according to claim 3, wherein said composition comprising an activated zeolite additionally comprises a silica and/or a microcrystalline cellulose and/or a cellulose or a derivative thereof.
10. A process according to any of the preceding claims, wherein said composition comprising an activated zeolite is applied onto said fabric in combination with a second composition.
11. A process according to claim 10, wherein said second composition is a liquid or solid carpet treatment composition or comprises ingredients selected from the group consisting of : water; and polar solvents, such as ethanol, methanol, acetone; and mixtures thereof.
12. A process according to any of claims 10 or 11, wherein heat is generated upon contact of said composition comprising an activated zeolite and said second composition.

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13. A process according to claim 12, wherein said heat generation takes place upon the fabric to be treated.

14. A kit comprising (a) a composition comprising an activated zeolite and (b) a cleaning composition or water.

5 15. A kit comprising (a) a composition comprising an activated zeolite and (b) a set of instructions to use said composition in a process according to any of the claims 1 to 13.

16. The use of an activated zeolite for the manufacture of a composition for use in the process according to any of claims 1 to 13.

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