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(54) Carpet cleaning compositions and method for cleaning carpets

(57) The present invention relates to a method of cleaning a carpet with a liquid composition having a residuality index of less than 40% after vacuum cleaning, said method comprising the steps of:

- applying the composition onto the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, the amount of composition applied onto the carpet being from 1 ml to 120 ml per square meter of carpet,
- leaving said composition to dry onto the carpet and finally removing it by vacuum cleaning said carpet. The present invention further relates to a composition for the cleaning of a carpet having a residuality index of less than 40% after vacuum cleaning, packaged in a container adapted to deliver the composition onto the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns. The present invention provides excellent cleaning performance on the carpet in a faster and easier way. Indeed, no rinsing is required and no manual action (other than application of the composition) by the user while the composition is in a wet state.

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Description

Technical Field

[0001] The present invention relates to an easy and fast method of cleaning carpets which requires limited wetting, no need to rinse and no manual action (except for application) by the user while the composition is in a wet state, to provide excellent cleaning performance. More particularly, the present invention provides liquid carpet cleaning compositions packaged in a container adapted to apply the composition on the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, said composition having the ability to remove various types of stains/soils from carpets and to dry to non-tacky residues.

Background of the Invention

[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.

[0003] However, carpets irrespective of whether they are made from natural or synthetic fibers are all prone to soiling and staining when contacted with many household items. 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. Also fibers may become soiled as a result of dirt particles, clay, dust, i.e., particulate soils in general, coming into contact with and adhering 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.

[0004] There are a number of carpet cleaning compositions described in the art for removing stains and soils from carpet fibers. These carpet cleaning compositions can be divided in two main groups: shampoos and spotters. Shampoos are usually applied by means of a typical extraction machine on the whole carpet. A problem with such shampoos is that while they may, at times, loosen and/or disperse the soil, they fail to pick up or retain the soil, which results in it being redeposited on the carpet fibers. Furthermore, they are not very effective against difficult stains, such as acid and/or coffee stains. Still further, since acid and coffee stains are not water soluble, aqueous shampoos are not particularly effective and many times it is difficult to remove all of the shampoos from the fiber surfaces, even when rinsed with large amounts of water or steam. As a result the carpet fibers become tacky due to a film of shampoo/detergent. The film attracts and retains soils, which results in a cleaned carpet that will soil more easily after a cleaning than prior thereto. Also such shampoos require large amounts of water to be rinsed off. This amount of water causes the fibers in the carpet and, many times, the pad under the fibers, to become saturated with water, which can result in degradation of the pad and/or carpet. In addition, the moisture trapped in the padding promotes microbial growth which can present health and/or odor problems. Finally a problem associated to the use of such shampoos which require large amounts of water or steam for the cleaning of carpets is the long drying time usually several hours if not an entire day.

[0005] The spotters are usually applied on the stains to clean on the carpet. However, one of the problems with such a cleaning composition is that it requires brushing, mopping, scouring, scrubbing or any other manual action by the user while the composition is in a wet state to achieve effective results. Indeed, the use of such a cleaning implement such as a cloth, mop or sponge and the like to remove the soils/stains limits its use to localised carpet areas. Also the use of such a cleaning implement will imply to rinse it with water as needed, until no soil appears on it. In fact, spotters disperse the soil up to the carpet surface, but they often fail to prevent redeposition of the dispersed soil onto the cleaned carpet fibers, if the soil is not picked up by the cleaning implement. For example, it has been found that if residual coffee stains, which are dispersible or soluble in water, remain after cleaning, the stains can be concentrated at the surface of the cleaned carpet as they dry, resulting in an appearance of inadequate cleaning. An additional problem with the spotter compositions is that they leave tacky films on carpets like the shampoos do, if not perfectly rinsed.

[0006] It is an object of the present invention to provide a method of cleaning a carpet which can be both used to clean localised areas of the carpet or the whole carpet, and which overcomes the drawbacks of the methods mentioned herein before. Indeed, it is an object of the present invention to provide a method of cleaning a carpet which provides excellent overall cleaning performance on various types of stains including particulate stains, greasy stains, bleachable stains and/or enzymatic stains in an easier and faster way. It is an additional object of the present invention to provide a method of cleaning a carpet which requires no manual action (except for application) by the user while the composition is in a wet state. It is a further object of the present invention to provide a method of cleaning a carpet which requires no rinsing of the carpet cleaning composition used. It is yet an object of the present invention to provide a method of cleaning a carpet which requires limited drying time of the composition once applied onto the carpet.

[0007] It has now been found that the above objects can be met by a method of cleaning a carpet with a liquid composition having a residuality index of less than 40% after vacuum cleaning, said method comprising the steps of:

- applying the composition onto the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, the amount of the composition applied onto the carpet being from 1 ml to 120 ml per square meter of carpet,
- leaving said composition to dry onto the carpet and finally removing it by vacuum cleaning the carpet.

[0008] The present invention also provide a liquid composition for the cleaning of carpets, packaged in a container adapted to deliver the composition onto the surface of the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, said composition having a residuality index of less than 40% after vacuum cleaning.

[0009] An advantage of the method of cleaning carpets according to the present invention is that of being easy and fast while providing excellent overall cleaning performance. More advantageously, the method of cleaning carpets according to the present invention provides excellent cleaning performance, when both used to clean the whole carpet or localised carpet stains, with a reduced amount of composition distributed on the carpet to clean. This reflects in particularly short drying time. In addition to this, this method does not leave tacky residue on carpets.

[0010] Advantageously, excellent cleaning performance is obtained on different types of stains and soils, including bleachable stains, enzymatic stains as well as particulate stains and/or greasy stains, especially in the so called "high traffic areas".

[0011] A further advantage of the present invention is that the method of cleaning carpets herein and the liquid compositions herein, packaged in a container adapted to apply the composition on the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, are applicable to all carpet types, especially delicate natural fibers, and are also safe to all carpet dye types, particularly sensitive natural dyes used therein. The present invention is also suitable to be used to clean upholstery and car seats covering.

[0012] Yet another advantage of the method of cleaning carpets and of the compositions of the present invention is that they may be applied directly on the carpet without causing damage to the carpet. In addition the cleaning action of the invention commences as soon as the carpet cleaning composition has been applied to the surface in the form of a spray of droplets as defined herein.

Background art

[0013] The following documents are representative of the prior art available on carpet cleaning compositions.

[0014] EP-A- 629 694 discloses the use of stable aqueous compositions comprising a source of active oxygen, having a pH of from 1 to 6, for the cleaning of carpets. EP-A-751 213 discloses a carpet cleaning composition comprising salicylic acid, and a compound selected from the group consisting of amine oxides, soil suspending polycarboxylate or polyamine polymers, hydroxy-pyridine N-oxides, chelating agents and mixtures thereof.

Summary of the Invention

[0015] The present invention encompasses a method of cleaning a carpet with a liquid composition having a residuality index of less than 40% after vacuum cleaning, said method comprising the steps of:

- applying the composition onto the surface of the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, the amount of composition applied onto the carpet being from 1 ml to 120 ml per square meter of carpet,
- leaving said composition to dry onto the carpet and finally removing it by vacuum cleaning said carpet.

[0016] The present invention further encompasses a composition for the cleaning of a carpet having a residuality index of less than 40% after vacuum cleaning, packaged in a container adapted to deliver the composition onto the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns. Preferred compositions herein for the cleaning of a carpet comprise at least a polymer which dries to non-tacky residues. Highly preferred compositions herein further comprise a surfactant and/or a volatile organic compound.

[0017] All amounts, percentages and ratios are given by weight of the total composition in its neat form unless otherwise stated.

Detailed Description of the Invention

The method of cleaning a carpet:

[0018] An essential feature of the method of cleaning a carpet according to the present invention is to apply the liquid composition onto the surface of the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, the amount of composition applied onto the carpet being from 1 ml to 120 ml per square meter of carpet.

[0019] It has now been found that by applying the liquid composition on the surface of the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, preferably less than 1000 microns, more preferably less than 750 microns, even more preferably less than 500 microns and most preferably from 350 to 10 microns, an homogeneous layer of the composition is provided on the surface of the carpet which translates in excellent cleaning performance while requiring less amount of composition. Indeed, by applying the composition onto the carpet in the form of a spray of small droplets as defined herein, a higher coverage can be achieved with the same amount of composition, as compared to applying the same composition but in the form of a spray of droplets with larger droplets. Furthermore applying the composition on the carpet as mentioned herein, further translates in limited wetting of the surface, and thus in faster drying of the composition. In other words, the housewife has to wait less time between the step of applying the composition on the carpet and those of removing it by vacuum cleaning the carpet.

[0020] By "mean diameter D(v,0.9) of less than 1500 microns" for a droplet size distribution it is meant that 90% of the spray of droplets dispensed (expressed in volume unit) has a droplet diameter of less than 1500 microns. For instance, a D(v,0.9) of less than 1500 microns indicates that 90% of the total sprayed volume is dispensed with droplets whose diameter is less than 1500 microns.

[0021] The particle size distribution of a spray of droplets can be determined by following the procedure detailed herebelow:
A suitable test equipment is the Malvern Mastersizer S LongBed® with 1000mm lens and a maximum particle size range of 3475 microns. The Malvern Mastersizer S LongBed® provides 21 cm opening (between lenses) to accommodate spray flow. In all readings at the Malvern®, the lens surface must remain free of spray contamination. In the present setup procedure, the distance from nozzle to laser was fixed at 8 cm, this to minimise lens contamination. At 8 cm distance, the spray was directed to the laser beam to place the laser center to the spray cone. At least three readings have to be made for each composition sprayed to determine the particle size distribution of the spray of droplets. The sprayer used in the test according to the present invention was an electrically operated sprayer. With the battery driven system a "Full charge" test was held consistent by holding the spray head to 3.9 voltage direct current (vdc) from an external power supply, this to insure a consistent spray force. A reference sprayer used herein is a hand trigger operated sprayer. Hand trigger systems have to be tested against repeatability with three different persons. These persons chosen for their varied ability to actuate the trigger against force: Small female, female with strong finger strength, and medium male.

[0022] Any container adapted to deliver a spray of droplets as defined herein are suitable for use herein. Several modifications can be made to the conventional, single aperture, spray head to ensure that a spray of such droplets as required herein is formed. Suitable containers to be used herein (also called spray dispensers) share the common feature of having at least one aperture or a plurality of apertures also called "dispensing openings" through which the composition is dispensed, said apertures being configurated so as to deliver the spray of droplets having the characteristics mentioned herein.

[0023] Typically the composition output from the container herein is from 5 ml/minute to 750 ml/minute, preferably from 20ml/minute to 400ml/minute, more preferably from 150ml/minute to 250 ml/minute.

[0024] These spray dispensers may be manually or electrically operated. Typical manually operated spray dispensers include pump operated ones or trigger operated ones. Indeed, in such a container with a spray dispenser head the composition contained in the container is directed through the spray dispenser head via energy communicated to a pumping mechanism by the user as said user activates said pumping mechanism or to an electrically driven pump. Preferred herein is to use a container wherein the means for delivering the composition comprises an electrically driven pump and a spray arm being either extended or extendible and having at least one dispensing opening so that in operation, the composition is pumped by electrically driven pump from the container, through the spray arm to the dispensing opening from which it is dispensed. It is preferred that the spray arm communicates with the container by means of a flexible connector. The spray arm may have one nozzle or multiple nozzles located along its length. The spray arm makes it easier to control where the composition is sprayed. The electrically driven pump may be, for example, a gear pump, an impeller pump, a piston pump, a screw pump, a peristaltic pump, a diaphragm pump, or any other miniature pump. In a highly preferred embodiment of the electrically driven pump for use herein the pump is a gear pump with a typical speed between 6000 rpm and 12000rpm. The electrically driven pump is driven by a means such as an electric motor which typically produce a torque between 1 and 20 mN.m. The electric motor must in turn be provided with a power source. The power source may be either mains electricity (optionally via transformer), or it may be a throw-away battery or rechargeable battery. The spray arm may be rigidly extended. However such a spray arm can be difficult to store, and the spray arm is preferably extensible either by means of telescopic or foldable configuration.

[0025] An essential feature of the method of cleaning a carpet of the present invention is to apply the composition in amount of from 1 ml to 120 ml by square meter of carpet, preferably from 10 ml to 80, more preferably from 20 ml to 60 ml and most preferably from 30 ml to 50 ml. Indeed, it is by combining this feature with the particle size distribution of the composition herein when sprayed as defined herein on the carpet that optimum coverage of the carpet surface is obtained resulting in faster drying time while delivering excellent cleaning performance.

[0026] Prior-used spray dispensers typically used for cleaning localised carpets stains typically deliver a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of 1800 microns or even more, typically upwards of 400 ml of the composition per square meter. (e.g., S.C. Johnson Shout), i.e. deliver a spray of droplets with bigger droplets and in significantly larger amount of composition per square meter of carpet, than the spray dispensers used according to the present invention. An important advantage of the method of cleaning carpets is the composition reduced dosage for delivering excellent overall cleaning performance. In a preferred embodiment of the present invention typical cone angles of the spray dispensers are of 15 to 90 degrees so as to deliver the composition over a 50-200 cm^2 surface. This feature further contributes to deliver an increased coverage of a given amount of composition onto the carpet. Prior-used spray dispensers for the cleaning of carpets often deliver the composition in a relatively narrow cone or jet.

[0027] An essential feature of the method of cleaning carpet herein is that the compositions once applied is left to dry onto the carpet before vacuum cleaning it from said carpet.

[0028] By "dry" it is meant herein the stage where at least 40%, preferably at least 60% of the initial amount of composition dispensed onto the carpet is lost due to evaporation.

[0029] Typically, the composition once sprayed onto the carpet is left to dry for less than 2 hours, preferably less than 70 minutes, more preferably less than 50 minutes and most preferably between 15 and 25 minutes.

[0030] An advantage of the present invention is that the cleaning action of the compositions herein commences as soon as said compositions are applied onto said carpet. Thus the cleaning method of the present invention does not require any manual action (other than it application) when it its wet state. Then after drying the composition is removed from the carpet by vacuum cleaning. This may be carried out with the help of any commercially available vacuum cleaners like for instance a standard Hoover 1300W vacuuming machine.

[0031] The area to be cleaned by spraying the compositions according to the present invention may be of any size. Indeed, a complete section or more preferably the whole carpet may be sprayed with the composition for the cleaning of carpets according to the present invention.

[0032] Another essential feature of the method of cleaning carpets of the present invention is that the composition used has a residuality index of less than 40% after vacuum cleaning.

[0033] Typically, the compositions according to the present invention have a residuality index of less than 30% after vacuum cleaning, preferably less than 25%, more preferably less than 15% and most preferably less than 10%.

[0034] The residuality index after vacuum cleaning (TVRi) is defined as follow:

$$TVRi(\%) = \frac{Wfv\text{-}Ws}{Wt\text{-}Ws} \times 100$$

wherein:

Ws represents the initial weight of a carpet sample (prior to any treatment);

Wt represents the weight of the same carpet sample immediately after the composition for the cleaning of the carpet has been applied thereto; *Wt* may be influenced by the composition application rate (gr m^{-2} s^{-1}) and/or the application time (seconds);

Wfv represents the final weight of the same carpet sample after having been vacuumed with an Hoover 1300W standard implement for carpet.

Ws, *Wt* and *Wfv* can be expressed in any weight unit provided that the same unit is used for the three parameters.

[0035] A suitable test method to determine the residuality index is the one mentioned as follows:
A square 10x10 cm carpet sample is weighted before and after submitting it to a vacuum cleaning with a Hoover 1300W for 10 seconds. In order to avoid interference of the weight lost of the carpet itself (e.g. fibers) when submitted to vacuum cleaning in the determination of the residuality index it is important to repeat the vacuum cleaning several times as required and weight the carpet sample thereafter, unless the weight loss due to the vacuuming is less than 5% of composition dosage (i.e., for a sample of 100 cm^2 and a dosage of 50 gr/m^2, the loss due to vacuuming has to be less than 0.025 gr). The latest weight for the carpet sample following the hereinbefore procedure is Ws.
Then the composition is sprayed onto the carpet in amount of 50 gr/m^2 and the sample is weighted thereafter to determine Wt. Then the composition is left to dry 60 minutes and vacuum cleaned with a Hoover 1300 W for 10 seconds. Finally the sample is weighted again to determine Wfv.

[0036] It has now been found that compositions having the residuality index as defined herein provide excellent overall cleaning performance while reducing or even preventing the formation of tacky residues on the surface of the carpet.

[0037] In a preferred embodiment of the present invention the compositions able to deliver a residuality index of less than 40% after vacuum cleaning typically comprise at least a polymer which dries to non-tacky residues.

Polymers

[0038] Preferred compositions according to the present invention typically comprise a polymer or a mixture thereof.

[0039] Typically, the compositions herein comprise from 0.01% to 50% by weight of the total composition of a polymer or a mixture thereof, preferably from 0.1% to 20%, more preferably from 0.3% to 10% and most preferably 0.5% to 3%.

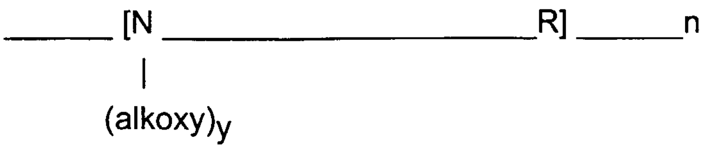
[0040] Suitable polymers for use herein have the ability to dry as non-tacky residues. Such polymers include any soil suspending polycarboxylate polymer as well as soil suspending polyamine polymer and mixtures thereof.

[0041] Any soil suspending polycarboxylate polymer known to those skilled in the art can be use 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 methylenemalonic 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 about 40% by weight.

[0042] Particularly suitable polymeric polycarboxylates to be used herein can be derived from acrylic 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 about 2,000 to 10,000, more preferably from about 4,000 to 7,000 and most preferably from about 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.

[0043] 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 about 2,000 to 100,000, more preferably from about 5,000 to 75,000, most preferably from about 7,000 to 65,000. The ratio of acrylate to maleate segments in such copolymers will generally range from about 30:1 to about 1:1, more preferably from about 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 about 70,000. Such copolymers are commercially available from BASF under the trade name SOKALAN CP5.

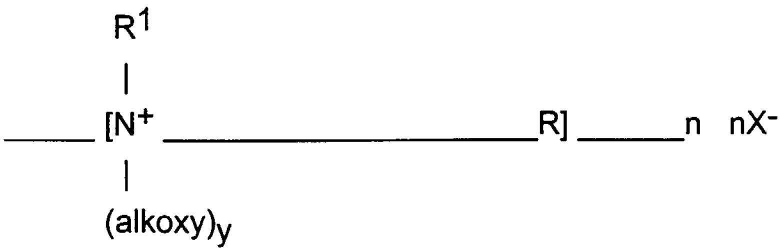
[0044] Any soil suspending polyamine polymer known to those skilled in the art may also be used herein. Particularly suitable polyamine polymers for use herein are alkoxylated polyamines. Such materials can conveniently be represented as molecules of the empirical structures with repeating units :



$$-[\underset{(\text{alkoxy})_y}{\underset{|}{N}}-R]-_n$$

Amine form

and

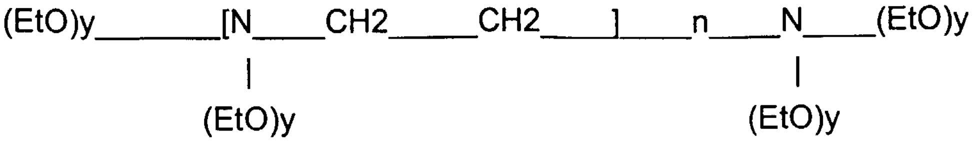


$$-[\overset{R^1}{\overset{|}{\underset{(\text{alkoxy})_y}{\underset{|}{N^+}}}}-R]-_n \; nX^-$$

Quaternized form

wherein R is a hydrocarbyl group, usually of 2-6 carbon atoms; R^1 may be a C_1-C_{20} hydrocarbon; the alkoxy groups are ethoxy, propoxy, and the like, and y is 2-30, most preferably from 10-20; n is an integer of at least 2, preferably from 2-20, most preferably 3-5; and X^- is an anion such as halide or methylsulfate, resulting from the quaternization reaction.

[0045] 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 :



$$(\text{EtO})_y-[\underset{(\text{EtO})_y}{\underset{|}{N}}-CH2-CH2-]-_n-\underset{(\text{EtO})_y}{\underset{|}{N}}-(\text{EtO})_y$$

when y = 2-30, preferably 15 and n is 1-30 preferably 4. Particularly preferred for use herein is an ethoxylated polyethylene amine, in particular ethoxylated tetraethylenepentamine, and quaternized ethoxylated hexamethylene diamine.

[0046] The presence of such a polymer in the composition for the cleaning of carpets allows said composition to form non-tacky residues. Indeed upon drying, the polymer forms non-tacky residues which entrap the soil, preventing its re-deposition on the carpet cleaned fibers.

[0047] In other words, the presence of the polymer in the compositions herein contributes to the overall cleaning performance, while reducing or even preventing the formation of tacky residues on the surface of the carpet upon drying. Indeed, it has been observed that with the compositions of the present invention which comprise such a polymer, more than 90%, preferably more than 95% of the residues left onto the carpet fibres are solid and non tacky. This results in a method of cleaning carpets whereby the residues left onto the carpets are removed more easily as opposed to residues being sticky and thus difficult to remove by vacuum cleaning said carpets. Also by almost completely removing the residues the present invention reduces or even prevents soil re-deposition on the carpet.

[0048] The compositions for the cleaning of carpets according to the present invention provide excellent overall 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., on spot stains like bleachable stains (e.g., coffee, beverage, food) and/or enzymatic stains like blood.

[0049] 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.

[0050] 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 and spaghetti sauce.

[0051] 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.

[0052] By "enzymatic stains" it is meant herein any soils or stains of enzymatic nature that can be found on any carpet, e.g., grass.

[0053] The cleaning performance of a given composition on a soiled carpet may be evaluated by the following test method. A liquid composition according to the present invention is first sprayed onto the stained portion of a carpet, left to act thereon from about 1 to about 10 minutes, preferably 5 minutes, after which the carpet is vacuum cleaned. Typical soiled carpets used in this test may be real carpet from 'high traffic areas". The cleaning performance may be evaluated by visual grading.

[0054] Also in the embodiment wherein peroxygen bleach like hydrogen peroxide is present in the compositions herein, the presence of the polymer further enhances the sanitizing properties of such a composition.

Surfactants

[0055] Highly preferred compositions according to the present invention further comprise a surfactant or a mixture thereof.

[0056] Typically the compositions herein comprise up to 50% by weight of the total composition of a surfactant or a mixture thereof, preferably from 0.5% to 25% and more preferably from 1% to 10% and most preferably from 1.5% to 5%.

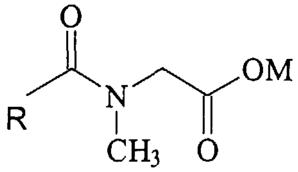
[0057] Suitable surfactants for use herein have the ability to dry as non-tacky residues. Such surfactants may be selected from those well known in the art including anionic, nonionic, zwitterionic, amphoteric and cationic surfactants and mixtures thereof.

[0058] Particularly suitable surfactants to be used herein are anionic surfactants. Said anionic surfactants are preferred herein as they further contribute to the outstanding cleaning performance of the compositions of the present invention on various type of stains. Moreover they do not stick on carpet, thereby reducing resoiling.

[0059] Suitable anionic surfactants for use herein include sulfonate and sulfate surfactants. The like anionic surfactants are well-known in the art and have found wide application in commercial detergents. These anionic surfactants include the C8-C22 alkyl benzene sulfonates (LAS), the C4-C22 alkyl sulfates (AS), unsaturated sulfates such as oleyl sulfate, the C10-C18 alkyl alkoxy sulfates (AES) and the C10-C18 alkyl alkoxy carboxylates. The neutralising cation for the anionic synthetic sulfonates and/or sulfates is represented by conventional cations which are widely used in detergent technology such as sodium, potassium or alkanolammonium. Preferred herein are the alkyl sulphate, especially coconut alkyl sulphate having from 6 to 18 carbon atoms in the alkyl chain, preferably from 8 to 15, or mixtures thereof.

[0060] Other anionic surfactants useful for detersive purposes can also be used herein. These can include salts (including, for example, sodium, potassium, ammonium, and substituted ammonium salts such as mono-, di- and triethanolamine salts) of soap, C_8-C_{22} primary or secondary alkanesulfonates, C_8-C_{24} olefinsulfonates, sulfonated polycarboxylic acids prepared by sulfonation of the pyrolyzed product of alkaline earth metal citrates, e.g., as described in British patent specification No. 1,082,179, C_8-C_{24} alkylpolyglycolethersulfates (containing up to 10 moles of ethylene oxide); alkyl ester sulfonates such as C_{14-16} methyl ester sulfonates; acyl glycerol sulfonates, fatty oleyl glycerol sulfates, alkyl phenol ethylene oxide ether sulfates, paraffin sulfonates, alkyl phosphates, isethionates such as the acyl isethionates, N-acyl taurates, alkyl succinamates and sulfosuccinates, monoesters of sulfosuccinate (especially saturated and unsaturated C_{12}-C_{18} monoesters) diesters of sulfosuccinate (especially saturated and unsaturated C_6-C_{14} diesters), sulfates of alkylpolysaccharides such as the sulfates of alkylpolyglucoside (the nonionic nonsulfated compounds being described below). Resin acids and hydrogenated resin acids are also suitable, such as rosin, hydrogenated rosin, and resin acids and hydrogenated resin acids present in or derived from tall oil. Further examples are given in "Surface Active Agents and Detergents" (Vol. I and II by Schwartz, Perry and Berch). A variety of such surfactants are also generally disclosed in U.S. Patent 3,929,678, issued December 30, 1975 to Laughlin, et al. at Column 23, line 58 through Column 29, line 23 (herein incorporated by reference).

[0061] Other suitable anionic surfactants to be used herein also 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.

[0062] 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 atoms) 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). C_{12} acyl sarcosinate is commercially available, for example, as Hamposyl L-30® supplied by Hampshire. C_{14} acyl sarcosinate is commercially available, for example, as Hamposyl M-30® supplied by Hampshire.

[0063] Particularly preferred anionic surfactants for use are the alkyl sulphate surfactants according to the formula R_1SO_4M wherein R_1 represents a hydrocarbon group selected from the group consisting of straight or branched alkyl radicals containing from 4 to 22 carbon atoms and alkyl phenyl radicals containing from 6 to 15 carbon atoms in the alkyl group. Preferably R1 is a straight or branched alkyl radical containing from 6 to 18 carbon atoms, more preferably from 6 to 12 and most preferably from 6 to 10. 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).

[0064] Other particularly suitable surfactants to be used herein include amine oxide surfactants according to the formula R1R2R3NO, wherein each of R1, R2 and R3 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.

[0065] 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 R1 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 R2 and R3 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. Preferably, the 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

[0066] Suitable amine oxide surfactants for use herein are for instance pure cut C8 amine oxide, pure cut C10 amine oxide, pure cut C14 amine oxide, natural blend C8-C10 amine oxides as well as natural blend C12-C16 amine oxides. Such amine oxide surfactants may be commercially available from Hoechst or Stephan.

[0067] Suitable nonionic surfactant for use herein 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, betaines.

[0068] 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.

[0069] Zwitterionic surfactants are also suitable optional ingredients for use herein. Suitable zwitterionic surfactants include derivatives of aliphatic quaternary ammonium, phosphonium, and sulphonium compounds in which the aliphatic moiety can be straight or branched chain and wherein one of the aliphatic substituents contains from about 8 to about 24 carbon atoms and another substituent contains, at least, an anionic water-solubilizing group. Particularly preferred zwitterionic materials are the ethoxylated ammonium sulphonates and sulfates disclosed in U.S. Patents 3,925,262, Laughlin et al., issued December 9, 1975 and 3,929,678, Laughlin et al., issued December 30, 1975.

[0070] In a preferred embodiment the compositions of the present invention further comprise a surfactant on top of the polymer. Indeed the surfactant helps the polymer to form non tacky residues which entrap the soils.

[0071] In a preferred embodiment herein the polymer and the surfactant are present in the compositions according to the present invention at a weight ratio of said polymer to said surfactant of 1:40 to 20:1, preferably of 1:20 to 10:1, more preferably of 1:10 to 5:1 and most preferably of 1:6 to 1:1. Also the total level of surfactant together with polymer is from 1% to 20%, preferably from 2% to 10% and more preferably from 3% to 6% by weight of the total composition. Indeed an advantage of the present invention is that excellent cleaning performance is provided with reduced total amount of cleaning agent, i.e. surfactant and/or polymer.

[0072] The pH of the liquid compositions according to the present invention can be from 1 to 14. In a preferred embodiment, the recommended pH range is from 1 to 8, preferably between pH 1 and 7, more preferably between pH 2 and 6.5 and most preferably between 4 and 6.5. Indeed, it has been surprisingly found that cleaning performance is further improved at these preferred pH ranges. Accordingly, the compositions herein may further comprise an acid or base to adjust the pH as appropriate. The acids that may be used for these purposes can be organic or inorganic acids, preferably inorganic acids such as sulphuric acid. The bases to be used herein can be organic or inorganic bases, preferably inorganic bases such as sodium hydroxide.

Optional ingredients :

[0073] The compositions herein may further comprise a number of additional compounds such as volatile organic compounds, peroxygen bleaches, stabilising agents, chelating agents, builder system, perfumes, dyes, suds suppressing agents, enzymes, photobleaching agents, bleach activators and other minors.

Volatile organic compounds

[0074] Preferred compositions according to the present invention typically comprise a volatile organic compound (VOC) or a mixture thereof. Typically the compositions herein comprise up to 90% by weight of the total composition of a volatile organic compound or a mixture thereof, preferably from 1% to 50% and more preferably from 1.5% to 20% and most preferably 2% to 8%.

[0075] Suitable volatile organic compounds for use herein include aliphatic and/or aromatic alcohol, glycol ethers and/or derivatives thereof, polyol and mixtures thereof.

[0076] 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.

[0077] 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 is isopropyl alcohol.

[0078] Isopropanol may be commercially available from Merck/BDH Italia under its chemical name.

[0079] 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.

[0080] Suitable monoglycol ethers and derivatives thereof to be used herein include n-buthoxypropanol (n-BP), water-soluble 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-buthyl Cellosolve®) or mixtures thereof.

[0081] Suitable polyglycol ethers and derivatives thereof to be used herein include n-butoxypropoxypropanol (n-BPP), butyl triglycol ether (BTGE), butyl diglycol ether (BDGE), water-soluble CARBITOL® solvents or mixtures thereof.

[0082] Preferred water-soluble 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 water-soluble carbitol is 2-(2-butoxyethoxy)ethanol also known as butyl carbitol®.

[0083] Preferred glycol ethers and/or derivatives thereof are 2-ethoxyethanol, 2-butoxyethanol, n-butoxypropoxypropanol, butyl carbitol® or mixtures thereof.

[0084] 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.

[0085] In a preferred embodiment herein the volatile organic compounds are present as they further contribute to the excellent cleaning performance of the present invention. Also in the embodiment wherein peroxygen bleach like hydrogen peroxide is present in the compositions herein, the addition of a volatile organic compound further enhances the sanitizing properties of such a composition.

Peroxygen bleaches

[0086] The compositions of the present invention may comprise a peroxygen bleach or mixtures thereof, as highly preferred optional ingredient.

[0087] A preferred peroxygen bleach for use herein is hydrogen peroxide or sources thereof. As used herein a hydrogen peroxide source refers to any compound which produces perhydroxyl ions when said compound is in contact with water. Indeed, the presence of a peroxygen bleach, preferably hydrogen peroxide contributes to the excellent cleaning of the compositions of the present invention. Furthermore they deliver good bleaching and sanitizing properties to the compositions herein.

[0088] Suitable water-soluble sources of hydrogen peroxide for use herein include percarbonates, persilicate, persulphate such as monopersulfate, perborates, preformed peroxyacids, alkyl hydroperoxides, peroxides, aliphatic diacyl peroxides and mixtures thereof. Hydrogen peroxide is preferred to be used in the compositions according to the present invention.

[0089] Suitable preformed peroxyacids for use in the compositions for the cleaning of carpets according to the present invention include diperoxydodecandioic acid DPDA, magnesium perphthalatic acid, perlauric acid, perbenzoic acid, diperoxyazelaic acid and mixtures thereof.

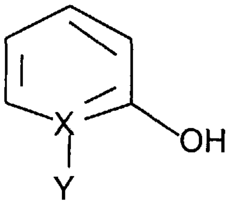
[0090] Suitable hydroperoxides for use herein are tert-butyl hydroperoxide, cumyl hydroperoxide, 2,4,4-trimethylpentyl-2-hydroperoxide, di-isopropylbenzene-monohydroperoxide, tert-amyl hydroperoxide, 2,5-dimethyl-hexane-2,5-dihydroperoxide or mixtures thereof.

[0091] Suitable aliphatic diacyl peroxides for use herein are dilauroyl peroxide, didecanoyl peroxide, dimyristoyl peroxide or mixtures thereof.

[0092] Typically, the compositions herein may comprise from 0.01% to 20% by weight of the total composition of a peroxygen bleach, or mixtures thereof, preferably from 0.5% to 10%, and more preferably from 1% to 7%.

Stabilizing agents

[0093] The compositions herein may also comprise a hydroxy pyridine N-oxides or derivatives thereof 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.

[0094] Hydroxy pyridine N-oxides or derivatives thereof may be commercially available from Sigma.

[0095] Typically, the compositions herein comprise up to 2% by weight of the total composition of a hydroxy pyridine N-oxide or derivatives thereof or mixtures thereof, preferably from 0.001% to 1% and more preferably from 0.001% to 0.5%.

[0096] The compositions herein may also comprise a chelating agent or mixtures thereof. Suitable chelating agents are those known to those skilled in the art. 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. Typically, the compositions herein comprise up to 4% by weight of the total composition of a chelating agent or mixtures thereof, preferably from 0.001% to 1%, and more preferably from 0.001% to 0.5%.

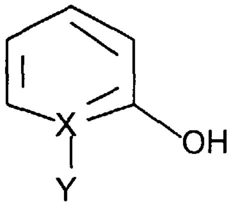
[0097] Suitable phosphonate chelating agents to be used herein may include ethydronic acid, alkali metal ethane 1-hydroxy diphosphonates as well as amino phosphonate compounds, including amino alkylene poly (alkylene phosphonate), alkali metal ethane 1-hydroxy diphosphonates, nitrilo trimethylene phosphonates, 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®.

[0098] 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.

[0099] 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 acids is, for instance, commercially available under the tradename ssEDDS® from Palmer Research Laboratories.

[0100] 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. Particularly suitable amino carboxylates to be used herein is diethylene triamine penta acetic acid (DTPA).

[0101] 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, -(CH2)n-COOH, and preferably is -(CH2)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.

[0102] Salicylic acid is particularly preferred herein and may be commercially available from Rhone Poulenc.

[0103] The compositions according to the present invention may further comprise propyl gallate up to a level of 1% by weight of the total composition, preferably from 0.01% to 0.1%, and more preferably from 0.01% to 0.06%. It has now been found that the addition of propyl gallate in the liquid preferred compositions herein comprising a peroxygen bleach contributes to deliver excellent chemical stability to said compositions.

Bleach activators

[0104] The compositions according to the present invention may further comprise a bleach activator or mixtures thereof, as another optional ingredient. By "bleach activator", it is meant herein a compound which reacts with hydrogen peroxide to form a peracid. The peracid thus formed constitutes the activated bleach. Suitable bleach activators to be used herein include those belonging to the class of esters, amides, imides, or anhydrides. Examples of suitable compounds of this type are disclosed in British Patent GB 1 586 769 and GB 2 143 231 and a method for their formation into a prilled form is described in European Published Patent Application EP-A-62 523. Suitable examples of such compounds to be used herein are tetracetyl ethylene diamine (TAED), sodium 3,5,5 trimethyl hexanoyloxybenzene sulphonate, diperoxy dodecanoic acid as described for instance in US 4 818 425 and nonylamide of peroxyadipic acid as described for instance in US 4 259 201 and n-nonanoyloxybenzenesulphonate (NOBS). Also suitable are N-acyl caprolactam selected from the group consisting of substituted or unsubstituted benzoyl caprolactam, octanoyl caprolactam, nonanoyl caprolactam, hexanoyl caprolactam, decanoyl caprolactam, undecenoyl caprolactam, formyl caprolactam, acetyl caprolactam, propanoyl caprolactam, butanoyl caprolactam pentanoyl caprolactam or mixtures thereof. A particular family of bleach activators of interest was disclosed in EP 624 154, and particularly preferred in that family is acetyl triethyl citrate (ATC). Acetyl triethyl citrate has the advantage that it is environmentally friendly as it eventually degrades into citric acid and alcohol. Furthermore, acetyl triethyl citrate has a good hydrolytical stability in the composition upon storage and it is an efficient bleach activator.

[0105] The compositions according to the present invention may comprise up to 30% by weight of the total composition of said bleach activator, or mixtures thereof, preferably from 1% to 20%, and more preferably from 2% to 10%.

Builders

[0106] The compositions according to the present invention may further comprise a builder system. Any conventional builder system known in the art is suitable for use herein. Suitable builders for use herein include derivatives of succinic acid of the formula R_CH(COOH)CH_2(COOH) wherein R is C_{10-20} alkyl or alkenyl, preferably C_{12-16}, or wherein R can be substituted with hydroxyl, sulpho sulphoxyl or sulphone substituents. Specific examples include lauryl succinate, myristyl succinate, palmityl succinate, 2-dodecenylsuccinate, 2-tetradecenyl succinate. Succinate builders are preferably used in the form of their water-soluble salts, including sodium, potassium, ammonium and alkanolammonium salts.

[0107] Other suitable builders are oxodisuccinates and mixtures of tartrate monosuccinic and tartrate disuccinic acid such as described in US 4,663,071.

[0108] Further suitable builders for use herein are fatty acid builders including saturated or unsaturated C_{10-18} fatty acids, as well as the corresponding soaps. Preferred saturated species have from 12 to 16 carbon atoms in the alkyl chain. The preferred unsaturated fatty acid is oleic acid.

[0109] The compositions herein may comprise from 0% to 10%, preferably from 1% to 7% by weight of the total composition of a builder system.

The compositions

[0110] The present invention also provides a liquid composition having a residuality index after vacuum cleaning of less than 40% as defined herein before and being packaged in a container adapted to deliver the composition on the surface of the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns.

[0111] Preferred compositions herein which are able to deliver a residuality index of less than 40% after vacuum cleaning (as defined herein before in the method of cleaning carpets), typically comprise at a polymer which dries to non-tacky residues. Highly preferred compositions herein further comprise a volatile organic compound and/or a surfactant. Suitable surfactants and/or polymers and volatile organic compounds as well as levels thereof are those mentioned herein before in the method of cleaning a carpet. Other optional ingredients may be present in these compositions herein as described herein before for the method of cleaning a carpet. In another embodiment the preferred compositions herein further comprise a peroxygen bleach or a mixture thereof. Such preferred compositions being particularly suitable for hygienising or disinfecting carpets and exterminate microinsects from the carpet or upholstery. Indeed the presence of a polymer which has the ability to dry as non-tacky residues allows to boost the sanitizing performance of the peroxygen bleach.

[0112] Suitable spray dispensers adapted to deliver the composition onto the surface of the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns are as described herein before. Preferred one is an electrically operated spray dispenser.

[0113] Typically the amount of composition applied onto the surfaces to clean is from 1 ml to 120 ml by square meter of carpet, preferably from 10 ml to 80, more preferably from 20 ml to 60 ml and most preferably from 30 ml to 50 ml.

[0114] According to the present invention easier and faster carpet cleaning is achieved by spraying a composition having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, preferably less than 1000 microns, more preferably less than 750 microns, even more preferably less than 500 microns and most preferably from 350 to 10 microns, while delivering excellent cleaning performance.

[0115] According to the present invention the compositions herein may be used for the removal of stains and soils from carpets or upholstery as well as of odors.

Examples

[0116] The following examples will illustrate the present invention. The compositions are made by combining the listed ingredients in the listed proportions (weight % unless otherwise specified).

Compositions (weight %)	**I**	**II**	**III**	**IV**	**V**	**VI**
Hydrogen peroxide	*5.0*	*6.0*	*6.0*	*3.0*	--	*4.0*
Na CnAS	*3.0*	--	*1.0*	*2.0*	--	*2.0*
PA	*1.0*	*0.5*	*0.2*	*1.5*	*1.0*	--
AMCP	--	*1.0*	*2.0*	--	--	*2.0*
Salicylic Acid	*0.1*	*0.01*	--	*0.03*	--	--
*Chelant**	*0.1*	*0.01*	--	*0.03*	--	--
Benzyl alcohol	--	*1.0*	*3.0*	--	--	--
Isopropylalcohol	*1.0*	*1.0*	*1.0*	*1.0*	*1.5*	*1.0*
Propyl Gallate	*0.01*	*0.03*	*0.1*	--	--	--
Butylhydroxy toluene	--	--	--	*0.03*		--
Water	*Balance*	*Balance*	*Balance*	*Balance*	*Balance*	*Balance*
up to pH	*5*	*4*	*5*	*6*	*6*	*5*
Compositions (weight %)	***VII***	***VIII***	***IX***	***X***	***XI***	***XII***
Hydrogen peroxide	*7.0*	*7.0*	*7.0*	*4.0*	*7.0*	*1.0*
Na CnAS	*1.0*		*3.0*	*3.0*	*2.0*	*3.0*
PA	*0.8*	*1.0*	*1.0*	*1.0*	--	*0.9*
AMCP	--	--	--	--	*2.0*	*1.0*
Salicylic Acid	*0.03*	--	--	--	--	*0.03*
*Chelant**	*0.03*	--	--	*0.2*	--	--
Benzyl alcohol	*3.0*	*4.0*	*5.0*	--	*1.0*	*3.0*
Isopropylalcohol	*0.5*	*1.5*	*1.0*	*3.0*	*1.0*	*1.0*
Propyl Gallate	*0.01*	--	--	*0.03*	--	*0.02*
Water	*Balance*	*Balance*	*Balance*	*Balance*	*Balance*	*Balance*
up to pH	*4*	*7*	*6*	*6*	*6*	*8*

AMCP is acrylic/malic based copolymers (Sokalan CP5®)
Chelant* is a phosphonate chelating agent available under the trade name DEQUEST®
Na CnAS is either C8 sodium alkyl sulphate or C7-C9 sodium alkyl sulphate.
PA is an ethoxylated tetraethylenepentamine, average molecular weight about 70,000.

[0117] The compositions exemplified above are packaged in a container adapted to deliver a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of 200 to 400 microns, when measured with Malvern Mastersizer S longBed® referenced herein before.

[0118] The compositions in the examples above have a residuality index of less than 40% after vacuum cleaning and deliver excellent overall cleaning performance on carpets according to the present invention, i.e., they exhibit excellent particulate soil, greasy/oily soil, and/or enzymatic as well as on other types of soils such as bleachable stains like coffee, tea and the like, both when used to clean whole carpet or localised carpet stains

[0119] In a suitable method of cleaning the whole carpet with any of the compositions exemplified above the composition is sprayed onto the carpet from a container as mentioned above in the form of a spray of droplets having a particle size distribution with a mean diameter D(V,0.9) of 200 to 400 microns. The amount of the composition sprayed onto the carpet is about 40 ml per square meter of carpet. The composition is left to dry onto the carpet. Typical drying times for the compositions of the examples I - XII are between 15 and 25 minutes. Upon drying, the composition forms non-tacky residues, which entrap the carpet soils. These residues are removed by vacuum cleaning the carpet with for example a Hoover 1300W, without any additional effort by the user.

Claims

1. A method of cleaning a carpet with a liquid composition, said method comprising the steps of:
   - applying the composition onto the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns, the amount of composition applied onto the carpet being from 1 ml to 120 ml per square meter of carpet,
   - leaving said composition to dry onto the carpet and finally removing it by vacuum cleaning said carpet, said composition having a residuality index of less than 40% after vacuum cleaning.

2. A composition for the cleaning of a carpet having a residuality index of less than 40% after vacuum cleaning, packaged in a container adapted to deliver the composition on the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1500 microns.

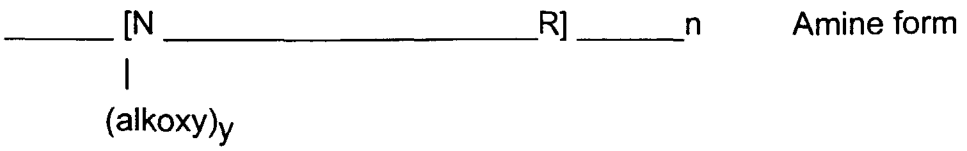
3. A method or a composition for the cleaning of a carpet, said composition being applied on the carpet in the form of a spray of droplets having a particle size distribution with a mean diameter D(v,0.9) of less than 1000 microns, preferably less than 750 microns, more preferably less than 500 microns, and most preferably from 350 to 10 microns.

4. A method or a composition for the cleaning of a carpet, said composition being applied on the carpet in amount of from 10 ml to 80 ml per square meter of carpet, preferably from 20 ml to 60 ml and more preferably from 30 ml to 50 ml.

5. A method or a composition according to any of the preceding claims wherein said composition has a residuality index of less than 30% after vacuum cleaning, preferably less than 15% and more preferably less than 10%.

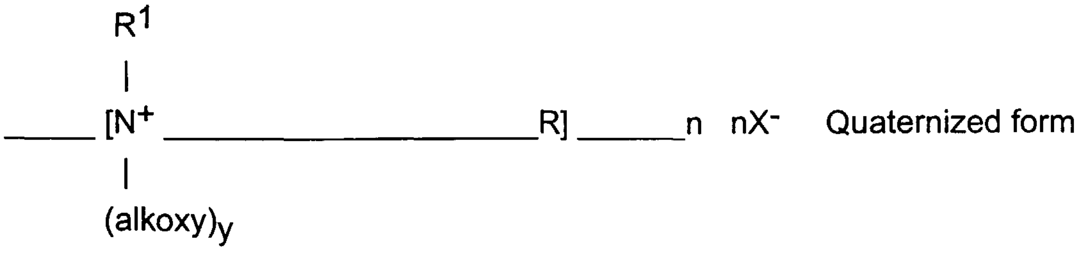
6. A method or a composition according to any of the preceding claims wherein said composition comprise at least a polymer or a mixture thereof, preferably at a level of from 0.01% to 50% by weight of the total composition, more preferably from 0.1% to 20%, even more preferably from 0.3% to 10% and most preferably from 0.5% to 3%

7. A method or a composition according to claim 6 wherein said polymer is a soil suspending polycarboxylate polymer and/or a polyamine polymer, preferably an alkoxylated polyamine or mixture thereof represented as molecules of the empirical structures with repeating units :



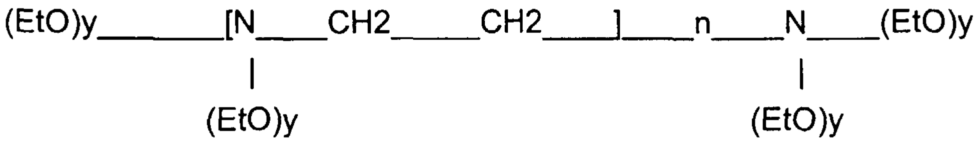
$$\text{———}[\underset{\substack{|\\(\text{alkoxy})_y}}{N}\text{—————————}R]\text{———}_n \qquad \text{Amine form}$$

and



$$\text{———}[\overset{\substack{R^1\\|}}{\underset{\substack{|\\(\text{alkoxy})_y}}{N^+}}\text{—————————}R]\text{———}_n \quad nX^- \qquad \text{Quaternized form}$$

wherein R is a hydrocarbyl group, usually of 2-6 carbon atoms; R^1 is a C_1-C_{20} hydrocarbon; the alkoxy groups are ethoxy and/or propoxy, and y is 2-30, most preferably from 10-20; n is an integer of at least 2, preferably from 2-20, most preferably 3-5; and X^- is an anion such as halide or methylsulfate, resulting from the quaternization reaction, and most preferably is an ethoxylated polyethylene amine or mixture thereof, according to the general formula :



$$(\mathrm{EtO})_y - [\underset{\underset{(\mathrm{EtO})_y}{|}}{\mathrm{N}} - \mathrm{CH2} - \mathrm{CH2}] - n - \underset{\underset{(\mathrm{EtO})_y}{|}}{\mathrm{N}} - (\mathrm{EtO})_y$$

when y = 2-30, preferably 15 and n is 1-30 preferably 4.

8. A method or composition according to any of the preceding claims wherein said composition comprises a surfactant or a mixture thereof preferably at a level up to 50% by weight of the total composition, more preferably from 1% to 10% and most preferably from 1.5% to 5%.

9. A method or a composition according to claim 8 wherein said surfactant is an anionic, nonionic, cationic, zwitterionic and/or amphoteric surfactant, preferably an anionic surfactant, more preferably a C4-C22 alkyl sulphate and most preferably a C6-C10 alkyl sulphate.

10. A method or a composition according to any of the claims 8 or 9, wherein the composition comprises said polymer and surfactant at a weight ratio of said polymer to said surfactant of 1:40 to 20:1, preferably of 1:20 to 10:1, more preferably of 1:10 to 5:1 and most preferably of 1:6 to 1:1.

11. A method or a composition according to any of the preceding claims, wherein the composition comprises a volatile organic compound preferably glycol ethers and/or a derivative thereof, more preferably buthoxypropanol, propoxy ethyl acetate, ethanol-2-butoxy phosphate, 2-(hexyloxy)ethanol, 2-ethoxy ethanol, 2-butoxyethanol, n-butoxypropoxypropanol, butyl triglycol ether, butyl diglycol ether, 2-(2-alkoxyethoxy)ethanol, 2-(2-alkoxyethoxy)propanol, 2-(2-alkoxyethoxy)butanol or mixtures thereof, and/or a polyol, more preferably a diol, even more preferably 2-ethyl-1,3-hexanediol, 2,2,4-trimethyl-1,3-pentanediol, methyl-2,4 pentanediol or mixture thereof, and/or an aromatic alcohol 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, and/or an aliphatic alcohol 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 2 to 10 and more preferably from 2 to 4 or mixtures thereof, and most preferably the volatile organic compound is isopropanol.

12. A method or a composition according to claim 11 wherein the volatile organic compound is present at a level up to 90% by weight of the total composition, preferably 1.5% to 20% and more preferably from 2% to 8%.

13. A method or a composition according to any of the preceding claims wherein said composition comprises a peroxygen bleach or a mixture thereof.

14. A method or a composition according to claim 13 wherein said peroxygen bleach is selected from the group consisting of percarbonate, persilicate, persulphate, perborate, preformed peroxyacid, alkyl hydroperoxide, peroxide, aliphatic diacyl peroxide and mixtures thereof, and preferably is hydrogen peroxide.

15. A method or a composition according to any of the preceding claims 13 or 14 wherein said composition comprises from 0.01% to 20% by weight of the total composition of peroxygen bleach or mixtures thereof, preferably from 0.5% to 10% and more preferably from 1% to 7%.

16. A method or a composition according to any of the preceding claims wherein said composition is an aqueous liquid composition having a pH of from 1 to 14, preferably between pH 1 and 7, more preferably between pH 2 and 6.5 and most preferably between pH 5 and 6.5

17. A method or a composition according to any of the preceding claims wherein said composition is packaged in a container wherein the means for delivering the composition comprises an electrically driven pump and a spray arm being either extended or extendible and having at least one dispensing opening so that in operation, the composition is pumped by electrically driven pump from the container, through the spray arm to the dispensing opening from which it is dispensed.

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 87 0075

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
D,Y	EP 0 751 213 A (PROCTER & GAMBLE) 2 January 1997 * page 4, line 1 - page 10, line 18; examples I-VIII *	1-17	C11D3/00 C11D3/39 C11D1/14 C11D3/20 C11D3/36 C11D3/37 C11D17/00
Y	US 5 364 551 A (LENTSCH STEVEN E ET AL) 15 November 1994 * examples 1-4 *	1-17	
Y	US 5 338 475 A (COREY GARLAND P ET AL) 16 August 1994 * column 4, line 22 - line 37 *	1-17	
A	WO 97 00934 A (R & C PRODUCTS PTY LTD) 9 January 1997		
A	GB 1 430 204 A (JOHNSON & SON INC S C) 31 March 1976		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			C11D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	9 September 1998	Ainscow, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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