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(54) **Bleaching compositions**

(57) Bleaching compositions are disclosed which comprise a hypohalite bleach, a polycarboxylate and optionally a catalyst. A method of treating fabrics with such a composition is also disclosed.

EP 0 896 997 A1

DescriptionTechnical field

5 [0001] The present invention relates to a bleaching composition, in particular to hypochlorite bleaching compositions, suitable for use in laundry applications such as hand washing as well as washing with automatic laundry washing machines.

Background of the invention

10 [0002] Bleaching compositions are well-known in the art. Amongst the different bleaching compositions available, those relying on bleaching by hypohalite bleaches such as hypochlorite are often preferred, mainly for performance reasons, especially at lower temperature.

[0003] However, a problem encountered with the use of hypohalite bleach-containing compositions like hypochlorite-based compositions is the resulting damage and/or yellowing of the fabrics being bleached.

[0004] It is therefore an object of the invention to provide a hypohalite bleach-containing composition, suitable for use in laundry applications, which provides improved fabric whiteness to fabrics treated therewith.

[0005] It is another object of the invention to provide a hypohalite bleach-containing composition, suitable for use in laundry applications, which provides improved fabric safety to fabrics treated therewith.

20 [0006] Fabrics made of cotton and/or synthetic materials have free hydroxyl groups. It is believed that the fabric damage and/or yellowing that may occur when bleaching a fabric may be due to the oxidation of the hydroxyl groups of the fabric by the bleach. For example, where a liquid hypochlorite-containing composition is applied on the fabric to bleach, either in its neat form or in its diluted form, the hypochlorite bleach is present in various forms, including hypochlorous acid, and in the form of free radicals, i.e., molecule fragments having one or more unpaired electrons, such as $\cdot\text{Cl}$, $\cdot\text{OH}$, and/or $\cdot\text{ClO}$. Hypochlorous acid and these free radicals which result essentially from the hypochlorite decomposition pathways are reactive with components having hydroxyl groups such as cotton fabrics or synthetic fabrics, oxidise them and thus contribute to damaging and/or yellowing these fabrics. This phenomenon is emphasised at lower pHs. Indeed, low pHs shift the chemical equilibrium between hypochlorite and hypochlorous acid to the latter, which has been found to contribute to fabric yellowing and fabric damage. Also, it is further believed that at lower pHs these hydroxyl groups are more easily oxidised to form, for example, aldehyde groups which are responsible for the yellowing of the fabric.

[0007] Therefore we have now found that it is essential to protect the hydroxyl groups of a fabric from the oxidation they may undergo in the presence of a hypohalite bleach-containing composition, especially a hypochlorite-containing bleaching composition, in order to improve fabric safety and/or whiteness.

35 [0008] It has been found that the previous objects can be met by formulating a composition comprising a hypohalite bleach and a particular polycarboxylate as described herein after. The compositions of the present invention provide improved fabric whiteness and/or improved fabric safety on fabrics bleached therewith, as compared to the same compositions without such a polycarboxylate as described herein after. Indeed, it has been found that such a polycarboxylate, preferably 1,2,3,4, butanetetracarboxylate, in a hypohalite bleach-containing composition acts as a fabric protective agent capable of binding the hydroxyl groups of a fabric treated with such a composition. In a preferred embodiment the compositions according to the present invention further comprise a catalyst, to deliver further improved fabric whiteness and/or improved fabric safety on fabrics bleached with these compositions.

[0009] An advantage of the compositions of the present invention is that they are suitable for the bleaching of different types of fabrics including natural fabrics, (e.g., fabrics made of cotton, and linen), synthetic fabrics such as those made of polymeric fibres of synthetic origin (e.g., polyamide-elasthane), as well as those made of both natural and synthetic fibres. For example, the bleaching compositions of the present invention based on hypohalite bleaches such as hypochlorite may be used on synthetic fabrics despite a standing prejudice against using such bleaches on synthetic fabrics, as evidenced by warnings on labels of commercially available hypochlorite-containing compositions and clothes.

50 [0010] A further advantage of the liquid bleaching compositions of the present invention is that said bleaching compositions are suitable for various laundry bleaching applications both when used in diluted conditions, e.g. as a detergent additive or a fully formulated laundry detergent composition, and when used in neat condition, e.g. as a liquid pretreater (spotter).

55 Background art

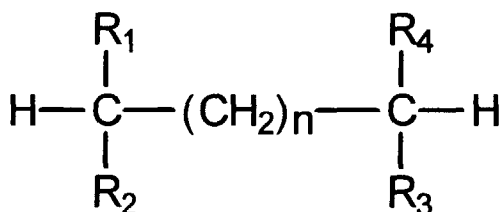
[0011] Hypohalite bleach-containing compositions like hypochlorite-containing compositions suitable for bleaching fabrics have been described in the art.

[0012] EP-A-622 451 discloses compositions comprising hypochlorite, sodium hydroxide, a bleach stable perfume and as a buffering system whereby the pH of the diluted composition is buffered to a constant value throughout use, carbonate and/or silicate. However, no polycarboxylates as described herein, let alone together with a catalyst are disclosed.

5 **[0013]** EP-A-653 482, EP-A-668 345 and EP-A-688 857 disclose hypochlorite-containing compositions comprising a source of strong alkalinity, a pH buffering means and optionally other types of ingredients such as respectively radical scavengers, polycarboxylate acids of pyridine and periodates. However, no polycarboxylates as described herein, let alone together with a catalyst are disclosed.

10 Summary of the invention

[0014] The present invention encompasses a bleaching composition for the bleaching of fabrics comprising from 0.01% to 95% by weight of the total composition of a hypohalite bleach, and a polycarboxylate according to the formula:



25 wherein n is an integer from 0 to 20, the substituents R₁ and R₄ each independently are -(CH₂)_pCOOH, -(CH₂)_p(CHCOOH)_qCH₃, -(CHCOOH)_qCH₃-(CH₂)_p(CHCOOH)_qCOOH, or -(CHCOOH)_qCOOH, wherein the substituents R₂ and R₃ each independently are hydrogen, -CH₃, -COOH, -(CH₂)_pCH₃, -(CH₂)_pCOOH, -(CH₂)_p(CHCOOH)_qCH₃, -(CHCOOH)_qCH₃, -(CH₂)_p(CHCOOH)_qCOOH, or -(CHCOOH)_qCOOH, and wherein p is an integer from 1 to 20 and q is an integer from 1 to 20.

30 **[0015]** In a preferred embodiment of the present invention the compositions herein further comprise a catalyst, to further enhance the fabric safety and/or whiteness performance delivered by the compositions of the present invention when used to bleach a fabric.

[0016] In another preferred embodiment the compositions of the present invention further comprise a pH buffering component. The presence of a pH buffering component in the compositions of the present invention further contributes to the effective whiteness performance and/or fabric safety of these compositions.

[0017] The present invention also encompasses a method of bleaching fabrics wherein said fabrics are contacted with a bleaching composition according to the present invention.

[0018] The present invention further encompasses the use of a catalyst, in a hypohalite bleach-containing composition comprising a polycarboxylate, to improve the fabric whiteness performance and/or fabric safety of said composition.

40 Detailed Description of the invention

[0019] The compositions of the present invention are bleaching compositions that may be formulated either as solids or liquids. In the case where the compositions are formulated as solids for example as granules, tablets or powders, they are preferably applied on the fabrics to be bleached according to the present invention in a liquid form. In liquid form including gel and pasty form, the compositions are preferably but not necessarily formulated as aqueous compositions. Liquid compositions are preferred herein for convenience of use. Preferred liquid compositions of the present invention comprise water in an amount of from 60% to 98% by weight, more preferably of from 80% to 97% and most preferably 85% to 97% by weight of the total composition.

50 Hypohalite bleach:

[0020] As a first essential ingredient, the compositions of the present invention comprise a hypohalite bleach or a mixture thereof.

55 **[0021]** Hypohalite bleaches may be provided by a variety of sources, including beaches that are oxidative beaches and subsequently lead to the formation of positive halide ions as well as bleaches that are organic based sources of halides such as chloroisocyanurates.

[0022] Suitable hypohalite bleaches for use herein include the alkali metal and alkaline earth metal hypochlorites,

hypobromites, hypoiodites, chlorinated trisodium phosphate dodecahydrates, potassium and sodium dichloroisocyanurates, potassium and sodium trichlorocyanurates, N-chloroimides, N-chloroamides, N-chloroamines and chlorohydrates.

[0023] For liquid compositions, the preferred hypohalite bleaches among the above described are the alkali metal and/or alkaline earth metal hypochlorites selected from the group consisting of sodium, potassium, magnesium, lithium and calcium hypochlorites, and mixtures thereof, more preferably the alkali metal sodium hypochlorite.

[0024] For solid compositions, the preferred hypohalite bleaches among the above described are the alkali metal and/or alkaline earth metal hypochlorites selected from the group consisting of lithium hypochlorites, calcium hypochlorites, chlorinated trisodium phosphate dodecahydrates, potassium dichloroisocyanurates, sodium dichloroisocyanurates, potassium trichlorocyanurates, sodium trichlorocyanurates, and mixtures thereof, more preferably sodium dichloroisocyanurates and/or calcium hypochlorite.

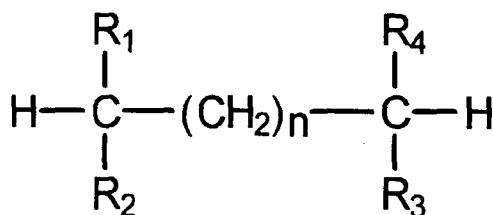
[0025] Preferably, the liquid compositions according to the present invention comprise said hypohalite bleach such that the content of active halide in the composition is of from 0.01% to 20% by weight, more preferably from 0.1% to 10% by weight, even more preferably from 0.5% to 6% and most preferably from 1% to 6% by weight of the composition.

[0026] Preferably, the solid compositions according to the present invention comprise said hypohalite bleach such that the content of active halide in the composition is of from 20% to 95% by weight, more preferably from 25% to 60% by weight of the composition.

Polycarboxylate:

[0027] As a second essential ingredient, the compositions according to the present invention comprise a polycarboxylate as described herein or a mixture thereof.

[0028] Suitable polycarboxylates for use herein are according to the formula:



wherein n is an integer from 0 to 20, the substituents R₁ and R₄ each independently are -(CH₂)_pCOOH, -(CH₂)_p(CHCOOH)_qCH₃, -(CHCOOH)_qCH₃-(CH₂)_p(CHCOOH)_qCOOH, or -(CHCOOH)_qCOOH, wherein the substituents R₂ and R₃ each independently are hydrogen, -CH₃, -COOH, -(CH₂)_pCH₃, -(CH₂)_pCOOH, -(CH₂)_p(CHCOOH)_qCH₃, -(CHCOOH)_qCH₃, -(CH₂)_p(CHCOOH)_qCOOH, or -(CHCOOH)_qCOOH, and wherein p is an integer from 1 to 20 and q is an integer from 1 to 20.

[0029] Preferably n is an integer from 0 to 10, more preferably from 0 to 3 and most preferably n is 0, 1 or 2. Preferably p and q each independently are integers of from 1 to 10, more preferably from 1 to 5, more preferably p and/or q are 1 or 2 and most preferably are 1.

[0030] More preferably the substituents R₁ and R₄ each independently are -(CH₂)_pCOOH, wherein p is an integer from 1 to 10, preferably from 1 to 5 and more preferably p is 1 or 2.

[0031] Preferably the substituents R₂ and R₃ each independently are hydrogen, -CH₃, -(CH₂)_pCOOH, or -COOH, wherein p is an integer from 1 to 10, preferably from 1 to 5 and more preferably is 1 and more preferably R₂ and R₃ each independently are hydrogen, -(CH₂)_pCOOH, or -COOH.

[0032] Examples of preferred polycarboxylates for use herein include 1,2,3,4, butane tetracarboxylate and/or 1,2,3-propanetricarboxylate. Sodium 1,2,3,4, butane tetracarboxylate has been found to be particularly suitable to use according to the present invention.

[0033] Indeed, sodium 1,2,3,4, butane tetracarboxylate may be commercially available from Aldrich (reagent grade materials) and/or from K&K Laboratories.

[0034] Preferably, the liquid compositions according to the present invention comprise from 0.01% to 20% by weight of the total composition of said polycarboxylate or a mixture thereof, more preferably from 0.1% to 10% by weight, more preferably from 0.2% to 5% and most preferably from 0.5% to 2%.

[0035] Preferably, the solid compositions according to the present invention comprise from 0.01% to 40% by weight of the total composition of said polycarboxylate or a mixture thereof, more preferably from 0.2% to 20% by weight, more preferably from 0.5% to 10% and most preferably from 0.5% to 5%.

[0036] It has now been found that such polycarboxylates in a hypohalite bleach-containing composition acts as a fabric protective agent when this composition is used to bleach fabrics. Indeed, it has been found that such polycarboxylates are capable of binding the hydroxyl groups of a fabric thereby significantly improving the whiteness performance and/or the fabric safety profile of a hypohalite bleach-containing composition comprising them. This both when the liquid bleaching compositions of the present invention is used in neat condition, e.g. as a pretreater, as well as in diluted conditions, e.g. typical dilution with water in conventional washing conditions.

[0037] By "binding", it is meant herein any interaction between the carboxylic groups of the polycarboxylates present in the compositions of the present invention and the hydroxyl groups of a fabric bleached in presence of such compositions, including esterification, Van der Waals weak interactions, covalent bindings and so on.

[0038] Cotton fabrics contain cellulose (i.e., $(C_6H_{10}O_5)_n$). When a hypohalite bleach-containing composition, e.g. hypochlorite-containing composition, is used to bleach a cotton fabric, the bleach may react with the hydroxyl substituents of cellulose in position 6, 2, 3 and 5 of the cellulosic ring and thus may introduce new functional groups like carbonylic, aldehydic and/or carboxylic groups. Synthetic fabrics may be made of various synthetic materials like polyamide-elastane that also comprise hydroxyl groups capable of being oxidized by bleach.

[0039] Indeed, the present invention is based on the finding that by binding the hydroxyl groups of a fabric, the oxidation of said hydroxyl groups that otherwise occurs when bleaching a fabric with a hypohalite bleach-containing composition like a hypochlorite-containing composition, is reduced. It is speculated that this oxidation of the hydroxyl groups of a fabric is one of the main mechanisms of fabric damage and/or fabric yellowing. According to the present invention, such interaction can take place on various types of fabrics including not only cotton fabrics but also synthetic fabrics like polyamide-elastane fabrics, despite the low accessibility and reactivity of the hydroxyl groups of such fabrics improving thereby fabric whiteness and/or fabric safety.

[0040] By "improved fabric whiteness", it is meant herein that the whiteness on fabric achieved by using the hypohalite bleach-containing compositions of the present invention (e.g., those containing hypochlorite) is improved, compared to the whiteness obtained by using the same compositions without the polycarboxylate as described herein.

[0041] By "improved fabric safety", it is meant herein that the damage caused on fabric by using the hypohalite bleach-containing compositions of the present invention (e.g., those containing hypochlorite) is reduced, compared to the damage caused by using the same compositions without the polycarboxylate as described herein.

[0042] Indeed, the whitening effect, i.e. the yellowing-prevention effect, and/or safety effect of the present invention can be evaluated by comparing the composition according to the present invention to the same composition without the polycarboxylate.

[0043] The degree of yellowing can be determined by both visual and instrumental grading. Visually, the difference in yellowing between items treated with different compositions can be determined by a team of expert panellists. Instrumentally, the assessment can be determined with the help of Colorimeters such as Ganz Griesser[®] instruments (e.g., Dacolor[®] Spectraflash[®] SF 500, Machbet White-eye[®] 500) or a ZEISS ELREPHO[®] or others which are available for instance from Hunterlab[®] or Gardner[®].

[0044] Fabric safety may be evaluated by different test methods including the degree of polymerisation test method according to UNI (Ente Nazionale Italiano di Unificazione) official method UNI 8282-Determinazione della viscosità intrinseca in soluzione di cupritilendiammina (CED).

pH

[0045] The pH of the liquid compositions according to the present invention, as is, is typically from 8 to 14 measured at 25°C, preferably from 10 to 13.5 and more preferably from 11 to 13.5. Solid compositions or liquid compositions of the invention have a pH of from 7.5 to 13, preferably from 8 to 12, more preferably from 8.5 to 11.5, when diluted into 1 to 500 times its weight of water. It is in this alkaline range that the optimum stability and performance of the hypohalite as well as fabric whiteness and/or safety are obtained. The pH range can suitably be provided by the pH buffering component mentioned hereinafter and the hypohalite bleach mentioned hereinbefore, which are alkalis. However, in addition to these components, a strong source of alkalinity may also optionally be used.

[0046] Suitable sources of alkalinity are the caustic alkalis such as sodium hydroxide, potassium hydroxide and/or lithium hydroxide, and/or the alkali metal oxides such as sodium and/or potassium oxide. A preferred strong source of alkalinity is a caustic alkali, more preferably sodium hydroxide and/or potassium hydroxide. Typical levels of such caustic alkalis, when present, are of from 0.1% to 5% by weight, preferably from 0.3% to 2% and more preferably from 0.5% to 1.5% by weight of the composition.

Catalysts:

[0047] In a preferred embodiment, the compositions according to the present invention further comprise a catalyst or a mixture thereof.

[0048] Suitable catalysts for use herein are according to the formula X_aM wherein X is Cl, Br, O or OH, wherein M is zinc, tin, titanium, bismuth, aluminium, germanium, cobalt, magnesium or antimoine, and wherein a is an integer from 1 to 6 (depending on the oxidation state of M).

[0049] Particularly suitable catalysts for use herein are titanium alcoxides such as tetrabutoxytitanium, titaniumchloride, $ZnCl_2$, $Al(OH)_3$, $SnCl_2$, $BiCl_2$, TiO_2 , Co_3O_4 , $CoSO_4$ and/or GeO_2 . Particularly preferred herein is $ZnCl_2$ and/or $SnCl_2$.

[0050] Zinc chloride is commercially available from Mineral Research and Development Corporation US.

[0051] Tin chloride is commercially available from Aldrich and Fluka (reagent grade materials).

[0052] Other suitable catalysts for use herein also include bismuth subcarbonate and/or subnitrate.

[0053] Preferably, the liquid compositions according to the present invention may comprise from 0% to 2% by weight of the total composition of said catalyst or a mixture thereof, more preferably from 0.01% to 1% by weight, more preferably from 0.04% to 0.5% and most preferably from 0.05% to 0.3%.

[0054] Preferably, the solid compositions according to the present invention may comprise from 0% to 5% by weight of the total composition of said catalyst or a mixture thereof, more preferably from 0.01% to 2% by weight, more preferably from 0.05% to 1% and most preferably from 0.1% to 0.6%.

[0055] Such catalysts are present in the preferred compositions according to the present invention as they contribute to further improve the whiteness performance and/or fabric safety of the compositions of the present invention. Indeed, it is believed that in the bleaching process, the presence of a catalyst facilitates and thus enhances the binding of the hydroxyl groups of the fabric by the polycarboxylate salt, thereby promoting fibre crosslinking.

[0056] Accordingly, the addition of such a catalyst to a bleaching composition comprising a hypohalite bleach and a polycarboxylate allows to significantly increase the whiteness performance and/or the fabric safety profile of said composition. Thus, another aspect of the present invention is the use of a catalyst, in a bleaching composition comprising a hypohalite bleach and a polycarboxylate, to improve the fabric whiteness performance and/or fabric safety of the bleaching composition.

pH buffering components:

[0057] A pH buffering component is an optional but preferred component for the compositions of the invention. The pH buffering component ensures that the pH of the composition is buffered to a pH value ranging from 7.5 to 13, preferably from 8 to 12, more preferably from 8.5 to 11.5 after the composition has been diluted into 1 to 500 times its weight of water.

[0058] Suitable pH buffering components for use herein are selected from the group consisting of alkali metal salts of carbonates, polycarbonates, sesquicarbonates, silicates, polysilicates, boron salts, phosphates, stannates, alluminates and mixtures thereof. The preferred alkali metal salts for use herein are sodium and potassium.

[0059] Suitable boron salts or mixtures thereof for use herein include alkali metal salts of borates and alkyl borates and mixtures thereof. Examples of boron salts include boric acid, alkali metal salts of metaborate, tetraborate, octoborate, pentaborate, dodecaboron, borontrifluoride and alkyl borate containing from 1 to 12 carbon atoms, preferably from 1 to 4. Suitable alkyl borate includes methyl borate, ethyl borate and propyl borate. Particularly preferred boron salts herein are the alkali metal salts of metaborate, such as sodium metaborate, potassium metaborate, and the alkali metal salts of borate, such as sodium borate, or mixtures thereof. Boron salts like sodium metaborate and sodium tetraborate are commercially available from Borax and Societa Chimica Larderello under the name sodium metaborate and Borax®.

[0060] Particularly preferred pH buffering components are selected from the group consisting of sodium carbonate, sodium silicate, sodium borate, sodium metaborate and mixtures thereof.

[0061] The raw materials involved in the preparation of hypohalite bleaches usually contain by-products, e.g calcium carbonate resulting in an amount of up to 0.4% by weight of by-product within the hypohalite composition. However, at such amount, the by-product will not have the buffering action defined above.

[0062] Liquid bleaching compositions herein will preferably contain an amount of pH buffering component of from 0.5% to 9% by weight, preferably from 0.5% to 5% by weight, and more preferably in an amount of from 0.6% to 3% by weight of the composition.

[0063] Solid bleaching compositions herein will preferably contain an amount of pH buffering component of from 3% to 30% by weight, more preferably from 5% to 25% by weight, and most preferably in an amount of from 10% to 20% by weight of the composition.

[0064] It has been found that the buffering action of the pH buffering components allows to reduce the conversion of hypochlorite into hypochlorous acid, one of the species which are responsible for the fabric damage and/or fabric whiteness. In other words, the pH buffering components, when added in a bleaching composition comprising a hypohalite bleach, a polycarboxylate and optionally a catalyst, has a further action in addition to the one of said fabric protective system, allowing thereby to further improve the fabric whiteness and/or the fabric safety of fabrics bleached with said

composition.

[0065] The compositions according to the present invention may further comprise other optional ingredients such as bleach-stable surfactants (e.g., nonionic surfactants, anionic surfactants, cationic surfactants and/or amphoteric surfactants), organic or inorganic alkalis, pigments, dyes, optical brighteners, solvents, builders, thickening agents, perfumes, chelating agents, radical scavengers, bleach activators and the like and mixtures thereof.

Method of bleaching fabrics:

[0066] The present invention further encompasses a method of bleaching fabrics which comprises the step of contacting said fabrics with a bleaching composition according to the present invention comprising a hypohalite bleach, a polycarboxylate and optionally a catalyst. In a preferred embodiment, the compositions used in said method of bleaching fabrics are liquid hypochlorite-containing compositions that may further comprise a pH buffering component as defined hereinbefore. Said method according to the present invention improves the fabric whiteness and/or the fabric safety.

[0067] The compositions according to the present invention are preferably contacted to fabrics in a liquid form. Indeed, by "in a liquid form" it is meant herein the liquid compositions according to the present invention per se in neat or diluted form, as well as the granular or powder compositions or tablets according to the present invention that have been diluted with an appropriate solvent, typically water, before use, i.e., before being contacted to said fabrics.

[0068] The compositions according to the present invention are typically used in diluted form in a laundry operation. By "in diluted form" it is meant herein that the compositions for the bleaching of fabrics according to the present invention may be diluted by the user, preferably with water. Such dilution may occur for instance in hand laundry applications as well as by other means such as in a washing machine. Said compositions can be diluted up to 500 times, preferably from 5 to 200 times and more preferably from 10 to 80 times.

[0069] More specifically, the method of bleaching fabrics according to the present invention comprises the steps of first contacting said fabrics with a bleaching composition according to the present invention, in its diluted form, then allowing said fabrics to remain in contact with said composition, for a period of time sufficient to bleach said fabrics, typically 1 to 60 minutes, preferably 5 to 30 minutes, then rinsing said fabrics in water to remove said composition. If said fabrics are to be washed, i.e., with a conventional composition comprising at least one surface active agent, said washing may be conducted together with the bleaching of said fabrics by contacting said fabrics at the same time with a bleaching composition according to the present invention and said detergent composition, or said washing may be conducted before or after that said fabrics have been bleached. Accordingly, said method according to the present invention allows to bleach fabrics and optionally to wash fabrics with a detergent composition comprising at least one surface active agent before the step of contacting said fabrics with said bleaching composition and/or in the step where said fabrics are contacted with said bleaching composition and/or after the rinsing step when said bleaching composition has been removed from said fabrics.

[0070] In another embodiment of the present invention the method of bleaching fabrics comprises the step of contacting fabrics with a liquid bleaching composition according to the present invention, in its neat form, of allowing said fabrics to remain in contact with said bleaching composition for a period of time sufficient to bleach said fabrics, typically 5 seconds to 30 minutes, preferably 1 minute to 10 minutes and then rinsing said fabrics in water to remove the bleaching composition. If said fabrics are to be washed, i.e., with a conventional composition comprising at least one surface active agent, said washing may be conducted before or after that said fabrics have been bleached. In the embodiment of the present invention wherein the liquid bleaching composition of the present invention, is contacted to the fabrics in its neat form, it is preferred that the level of hypohalite bleach, is from 0.01% to 5%, preferably from 0.1% to 3.5%, more preferably from 0.2% to 2% and most preferably from 0.2% to 1%. Advantageously, the present invention provides liquid hypohalite bleach-containing compositions that may be applied neat onto a fabric to bleach, despite a standing prejudice against using hypochlorite-containing compositions neat on fabrics.

[0071] It is preferred to perform the bleaching methods herein before said fabrics are washed. Indeed, it has been observed that bleaching said fabrics with the compositions according to the present invention (diluted and/or neat bleaching methods) prior to washing them with a detergent composition provides superior whiteness and stain removal with less energy and detergent than if said fabrics are washed first, then bleached.

[0072] Alternatively instead of following the neat bleaching method as described herein above (pretreater application) by a rinsing step with water and/or a conventional washing step with a liquid or powder conventional detergent, the bleaching pre-treatment operation may also be followed by the diluted bleaching method as described herein before either in bucket (hand operation) or in a washing machine.

Examples

[0073] The following compositions which further illustrate the present invention were made by mixing the listed ingre-

dients in the listed proportions:

	Compositions (weight %)	I	II	III	IV	V	VI	VII
5								
	Sodium hypochlorite	5.0	5.0	5.0	2.5	2.5	5.0	5.0
	Sodium hydroxide	1.3	1.3	1.3	0.7	1.4	0.7	1.4
10	Sodium carbonate	1.2	1.2	1.2	1.0	1.2	1.2	1.2
	Sodium silicate	--	--	0.5	--	--	0.2	--
	Sodium metaborate	--	0.5	--	--	--	--	--
15	Sodium 1,2,3,4-butane tetracarboxylate	1.0	0.75	0.75	1.0	0.75	0.5	1.0
	SnCl ₂	--	0.1	0.2	--	0.1	--	--
20	ZnCl ₂	--	--	--	--	0.1	--	0.1
	Minors and water	-----balance up to 100%-----						
25	Compositions (weight %)	VIII	IX	X	XI	XII	XIII	XIV
30	Sodium hypochlorite	5.0	5.0	5.0	2.5	2.5	5.0	5.0
	Sodium hydroxide	1.3	1.3	1.3	0.7	1.4	0.7	1.4
	Sodium carbonate	1.2	1.2	1.2	1.0	1.2	1.2	1.2
35	Sodium silicate	--	--	0.5	--	--	0.2	--
	Sodium 1,2,3,4-butane tetracarboxylate	1.0	1.0	0.75	1.0	0.75	--	--
	Sodium 1,2,3-propane tricarboxylate	--	--	--	--	--	1.0	1.0
40	TiO ₂	0.1	--	0.2	0.1	--	0.1	--
	Bismuth subcarbonate	--	0.1	--	--	0.1	--	--
45	Minors and water	-----balance up to 100%-----						

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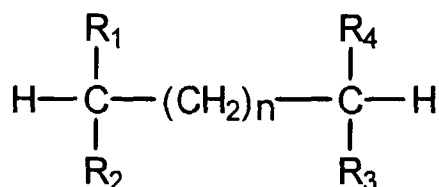
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Compositions (weight %)	XX	XXI	XXII	XXIII	XXIV	XXV	XXVI
Sodium hypochlorite	1.0	1.0	1.0	2.5	3.5	2.5	5.0
Sodium carbonate	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Sodium metaborate	--	--	1.5	--	--	--	--
Sodium silicate	--	--	--	--	--	0.2	--
Sodium 1,2,3,4-butane tetracarboxylate	1.0	1.0	1.0	1.0	1.0	1.0	1.0
SnCl ₂	--	0.1	--	0.1	--	0.1	0.1
Surfactants	5.0	5.0	5.0	5.0	5.0	5.0	--
Minors and water	-----balance up to 100-----						
Sodium hydroxide up to pH 12							

[0074] All the above compositions provide excellent fabric safety and/or excellent whiteness to fabrics when used to treat fabrics. Compositions I to XIX and XXVI are particularly suitable for use in diluted conditions as described herein. Compositions XX to XXIV are particularly suitable for use in neat conditions.

Claims

1. A liquid or solid bleaching composition comprising a hypohalite bleach in an amount of 0.01% to 95% by weight of the total composition, and a polycarboxylate according to the formula:



wherein n is an integer from 0 to 20, the substituents R₁ and R₄ each independently are -(CH₂)_pCOOH, -(CH₂)_p(CHCOOH)_qCH₃, -(CHCOOH)_qCH₃-(CH₂)_p(CHCOOH)_qCOOH, or -(CHCOOH)_qCOOH, wherein the substituents R₂ and R₃ each independently are hydrogen, -CH₃, -COOH, -(CH₂)_pCH₃, -(CH₂)_pCOOH, -(CH₂)_p(CHCOOH)_qCH₃, -(CHCOOH)_qCH₃, -(CH₂)_p(CHCOOH)_qCOOH, or -(CHCOOH)_qCOOH, and wherein p is an integer from 1 to 20 and q is an integer from 1 to 20.

2. A composition according to claim 1 wherein said hypohalite, based on active halide, is present in an amount of from 0.01% to 20% by weight, preferably from 0.1% to 10% by weight of the liquid composition or in an amount of from 20% to 95% by weight, preferably from 25% to 60% by weight of the solid composition.
3. A composition according to any of the preceding claims wherein said hypohalite bleach is, for liquid bleaching compositions, an alkali metal sodium hypochlorite or, for solid compositions, sodium dichloroisocyanurate and/or calcium hypochlorite.

4. A composition according to any of the preceding claims wherein in said polycarboxylate n is an integer from 0 to 10, more preferably from 0 to 3 and most preferably n is 0, 1 or 2, p and q each independently are integers of from 1 to 10, more preferably from 1 to 5, even more preferably p and/or q are 1 or 2 and most preferably are 1, and more preferably the substituents R_1 and R_4 each independently are $-(CH_2)_pCOOH$, and the substituents R_2 and R_3 each independently are hydrogen, $-CH_3$, $-(CH_2)_pCOOH$, or $-COOH$.
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5. A composition according to any of the preceding claims wherein said polycarboxylate is sodium 1,2,3,4, butane tetracarboxylate.
- 10 6. A composition according to any of the preceding claims wherein said polycarboxylate is present in an amount of from 0.01% to 20% by weight, preferably from 0.1% to 10% by weight of the liquid composition or in an amount of from 0.01% to 40% by weight, preferably from 0.2% to 20% by weight of the solid composition.
- 15 7. A composition according to any of the preceding claims which further comprises a catalyst up to a level of 2% by weight, preferably from 0.01% to 1% by weight of the liquid composition or up to a level of 5% by weight, preferably from 0.01% to 2% by weight of the solid composition.
- 20 8. A composition according to claim 7 wherein said catalyst is according to the formula X_aM wherein X is Cl, Br, O or OH, wherein M is zinc, tin, titanium, bismuth, aluminium, magnesium, cobalt, germanium or antimoine, and wherein a is an integer from 1 to 6 (depending on the oxidation state of M) or bismuth subcarbonate, subnitrate or a mixture thereof, and preferably is $ZnCl_2$ and/or $SnCl_2$.
- 25 9. A bleaching composition according to any of the preceding claims, wherein said composition further comprises a pH buffering component which is preferably selected from the group consisting of alkali metal salts of carbonates, polycarbonates, sesquicarbonates, silicates, polysilicates, boron salts, phosphates, stannates, alluminates, and mixtures thereof.
- 30 10. A bleaching composition according to claim 9, wherein said pH buffering component is selected from the group consisting of sodium carbonate, sodium silicates, sodium borate, sodium metaborate and mixtures thereof.
11. A bleaching composition according to any of the claims 9 or 10, wherein said pH buffering component is in an amount of from 0.5% to 9% by weight, preferably 0.5% to 5% by weight of the liquid composition or in an amount of from 3% to 30% by weight, preferably from 5% to 25% by weight of the solid composition.
- 35 12. A bleaching composition according to any of the preceding claims, wherein said composition further comprises a strong source of alkalinity.
13. A composition according to any of the preceding claims wherein said composition is liquid and preferably aqueous.
- 40 14. A method of bleaching fabrics which comprises the step of contacting said fabrics with a bleaching composition according to any of the preceding claims, in its diluted form at a dilution level with water up to 500 times, preferably from 5 to 200 times and more preferably from 10 to 80 times.
- 45 15. A method of bleaching fabrics according to claim 14 which, after the step of contacting said fabrics with said bleaching composition, further comprises the steps of:
 - allowing said fabrics to remain in contact with said bleaching composition for a period of time sufficient to bleach said fabrics,
 - 50 - then rinsing said fabrics in water to remove said bleaching composition.
16. A method according to any of the claims 14 or 15 wherein said fabrics are washed with a detergent composition comprising at least one surface active agent before the step of contacting said fabrics with said bleaching composition and/or in the step where said fabrics are contacted with said bleaching composition and/or after the rinsing step when said bleaching composition has been removed.
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17. A method of bleaching a fabric which comprises the step of contacting said fabric with a bleaching composition according to claim 13, in its neat form, allowing said fabric to remain in contact with said bleaching composition for

a period of time sufficient to bleach said fabric, and then rinsing said fabric in water to remove said bleaching composition.

5 **18.** A method according to claim 17 wherein said fabric is washed with a detergent composition comprising at least one surface active agent before the step of contacting said fabric with said bleaching composition and/or after the rinsing step when said bleaching composition has been removed.

10 **19.** The use of a catalyst, in a bleaching composition comprising a hypohalite and a polycarboxylate, to improve the fabric whiteness performance and/or fabric safety of said composition.

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EUROPEAN SEARCH REPORT

Application Number
EP 97 87 0118

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)
X	US 3 962 149 A (CHIRASH WILLIAM ET AL) * column 3, line 18 - line 49 * * column 8, line 66 - column 9, line 52 * ---	1-3,6, 9-11	C11D3/20 C11D3/395
X	DE 38 28 114 A (COLGATE PALMOLIVE CO) * page 9, line 7 - line 25 * * page 10, line 45 - line 60 * ---	1-4,6, 9-13	
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A	EP 0 274 180 A (ECOLAB INC) * page 5, line 23 - line 26 * * page 7, line 41 - line 56 * -----	1-4,6, 9-18	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			C11D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 16 January 1998	Examiner Richards, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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