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LIQUID CLEANING COMPOSITIONS

Maria Weichbrodt, Cologne-Flittard, and Wolf-Dieter Willmund, Dusseldorf-Holthausen, Germany, assignors to Henkel & Cie G.m.b.H., Dusseldorf-Holthausen, Germany, a corporation of Germany

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ABSTRACT OF THE DISCLOSURE

Liquid cleaning compositions comprising an aqueous solution containing 20 to 50% of an alkaline potassium phosphate and 15 to 40% by weight of a water-soluble salt of amino alkane sulfonic acids.

PRIOR ART

Powdery or solid rinsing, washing and cleansing agents with a relatively high concentration of alkaline salts are well known and have been used for many industrial and household purposes such as washing textiles made of synthetic fibers, cotton, etc., and for washing dishes, tiles, floors, etc. For a long time, attempts have been made to prepare the said agents in the form of liquid concentrates since the liquid form has distinct advantages in manufacturing, packaging, insensitivity to atmospheric humidity and easy and rapid solubility and handling. However, until now, no satisfactory results have been obtained since the liquids had disadvantages such as turbidity, precipitation, phase separations due to poor cold resistance, etc. Concomitant use of dissolving intermediates, organic solvents and the like did not give any satisfactory solution to these problems.

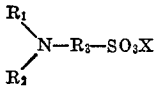
OBJECTS OF THE INVENTION

It is an object of the invention to provide stable liquid cleaning compositions having a high concentration of alkaline acting potassium phosphates.

This and other objects and advantages of the invention will become obvious from the following detailed description.

THE INVENTION

The liquid cleaning compositions of the invention are comprised of an aqueous solution containing 20 to 50% by weight of an alkaline acting potassium phosphate and 15 to 40% by weight of water-soluble salts of amino-alkane sulfonic acids of the formula



wherein R_1 is an aliphatic radical of 12 to 18 carbons which may be interrupted with ether or amino groups, R_2 is an aliphatic radical of 1 to 6 carbon atoms substituted with 1 to 2 hydroxy which may also contain ether groups, R_3 is selected from the group consisting of alkyl and hydroxy alkyl radicals of 1 to 6 carbon atoms and X is an organic or inorganic water soluble cation, at least 50%, preferably at least 70% of the total cations present being potassium ions. The said solutions are clear, aqueous alkaline reacting washing and cleansing agents with a high content of phosphates and do not require any dissolving intermediates. The compositions can contain other known washing agent additives such as silicates, optical brightening agents, disinfectants, whitening agents, agents to control foam and viscosity, etc.

Examples of suitable alkaline acting potassium phosphates which are well known are tripotassium orthophosphate, tetrapotassium diphosphate, pentapotassium triphosphate, etc.

Examples of suitable amino alkane sulfonates are the sodium salt of N-dodecyl-N-(β-hydroxyethyl)-3-aminopropane-1-sulfonic acid, the potassium salt of N-(cocoalkyl) - N-(β-hydroxyethyl)-3-amino-2-hydroxypropane-1-sulfonic acid, wherein the cocoalkyl is a mixture of alkyl radicals of 12 to 18 carbon atoms, the sodium salt of N - (4 - oxahexadecyl) - N-(2,3-dihydroxypropyl)-3-aminopropane-1-sulfonic acid, the potassium salt of N-(4 - azahexadecyl) - N - hydroxymethyl-6-amino-hexane-1-sulfonic acid, the sodium salt of N-(mixed alkyl of 16 to 18 carbon atoms) - N - (β-hydroxypropyl)-2-aminoethane-1-sulfonic acid, triethanolamine salt of N-oleyl-N-(5 - hydroxy-3-oxapentyl)-2-aminoethane-1-sulfonic acid, etc. The salts of the said sulfonic acids are preferably alkali metal and amine salts. Examples of suitable amine salts are ethanolamine, diethanolamine, triethanolamine, diethylamine, butyl amine and other alkyl and hydroxyalkyl amines wherein the alkyl has 1 to 6 carbon atoms.

The said aminoalkane sulfonates can be prepared by well known methods. One method comprises reacting a primary amine of the formula $R_1—NH_2$ with a salt of a haloalkane sulfonic acid or with cyclic anhydrides of oxyalkane sulfonic acid to obtain a sulfonic acid of the formula $R_1—NH—R_3—SO_3X$ and treating the latter with agents such as ethyleneoxide, propylene oxide, glycidol, etc. to introduce the R_2 group. Another method comprises reacting an amino sulfonic acid of the formula $NH_2—R_3—SO_3H$ with first an aliphatic halide having 12 to 18 carbon atoms and then with an agent to introduce the R_2 radical such as by hydroxyethylation.

The aqueous concentrates of the invention are exceptionally stable for prolonged storage, entirely clear and remain homogenous even at relatively low temperatures. They are particularly suitable for washing textiles of cellulose and synthetic fibers and for the washing of dishes, tiles, etc. The amount used will depend upon what is being cleaned. As a rule, 0.3 to 1.0 gram of the liquid concentrate is used per liter of dishwashing solution and about 2 to 6 gm. of liquid concentrate per liter for washing synthetic or cotton textiles.

In the following examples, there are described several preferred embodiments to illustrate the invention. However, it should be understood that the invention is not intended to be limited to the specific embodiments.

Example I

25 parts by weight of tripotassium orthophosphate and 15 parts by weight of the sodium salt of N-(4'-azahexadecyl) - N-(β-hydroxyethyl)-3-amino-2-hydroxypropane-1-sulfonic acid were added to 60 parts by weight of water to obtain a clear, homogenous liquid with good stability. The said liquid was especially suitable for cleaning tiles, floors, etc., and for washing dishes. If a more alkaline solution is desired, alkali metal hydroxides such as potassium hydroxide or sodium hydroxide may be added to the solution to obtain the desired pH.

Example II

One part by weight of a commercial optical brightening agent for synthetic fibers, 20 parts by weight of potassium salt of N-(cocoalkyl)-N-(β-hydroxyethyl)-3-amino-2-hydroxypropane-1-sulfonic acid and 40 parts by weight of pentapotassium triphosphate were dissolved in 39 parts by weight of water to obtain a homogeneous liquid, slightly opalescent because of the optical brightener. The

said liquid was an outstanding agent for synthetic textiles made of perlon, nylon, etc.

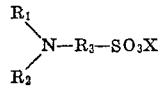
Example III

Twenty parts by weight of the sodium salt of N-(4'-azahexadecyl) - N - (β-hydroxyethyl)-2-aminoethane-1-sulfonic acid, 30 parts by weight of tetrapotassium diphosphate and 1 part by weight of formalin were dissolved in 49 parts by weight of water to obtain a liquid disinfecting, rinsing, washing and cleansing agent having good resistance to cold.

Various modifications of the compositions of the invention may be made without departing from the spirit or scope thereof, and it is to be understood that the invention is to be limited only as defined in the appended claims.

We claim:

1. Clear, aqueous cleaning concentrates consisting essentially of an aqueous solution containing 20 to 50% by weight of an alkaline acting potassium phosphate and 15 to 40% by weight of water soluble salts of aminoalkane sulfonic acids of the formula



wherein R_1 is selected from the group consisting of an aliphatic hydrocarbon radical of 12 to 18 carbon atoms and aliphatic hydrocarbon radicals of 12 to 18 carbon atoms interrupted with a group selected from the group consisting of ether oxygen and amino nitrogen, R_2 is selected from the group consisting of an alkyl radical of 1 to 6 carbon atoms substituted with 1 to 2 hydroxy and alkyl radical of 1 to 6 carbon atoms substituted with 1 to 2 hydroxy and ether oxygen, R_3 is selected from the group consisting of alkyl and hydroxylalkyl radicals of 1 to 6 carbon atoms and X is a cation selected from the group consisting of alkali metal and alkyl amine and hydroxyalkyl amines having alkyl of 1 to 6 carbon atoms, at least 50% of the total cations present in the solution being potassium ions.

2. A concentrate of claim 1 wherein at least 70% of the total cations present in the solution are potassium ions.

3. A concentrate of claim 1 wherein the alkaline acting potassium phosphate is tetrapotassium diphosphate.

4. A concentrate of claim 1 wherein the alkaline acting potassium phosphate is pentapotassium triphosphate.

5. A concentrate of claim 1 wherein the alkaline acting potassium phosphate is tripotassium orthophosphate.

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LEON D. ROSDOL, Primary Examiner

B. BETTIS, Assistant Examiner

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