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1

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NON-PHOSPHATE AUTOMATIC DISHWASHER DETERGENT

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No Drawing. Continuation-in-part of application Ser. No. 133,338, Apr. 12, 1971, now Patent No. 3,701,735.

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14 Claims

ABSTRACT OF THE DISCLOSURE

An alkaline dishwasher detergent capable of inhibiting overglaze attack and essentially free of inorganic phosphates, containing at least 25% by weight of a water-soluble aminopolycarboxylic compound, about 1-20% sucrose and about 1-20% overglaze protector.

The present invention is a Continuation-in-part of co-pending application Ser. No. 133,338 now U.S. Pat. No. 3,701,735, relating to a non-phosphated cleaning composition beneficially adapted to cleaning dishware and the like in automatic dishwashers.

The presence of a hard water sequestrant is an essential ingredient in a detergent formulation and constitutes a major component in automatic dishwashing compositions. In currently marketed products, this function is provided for by the presence of inorganic phosphates which greatly influence performance properties. However, there has been criticism by some individuals of phosphorus as a possible pollutant in certain waters. Consequently, there has been considerable research in the development of a non-phosphated formulation, possessing the requisite measure of cleaning activity. Performance deficiencies such as undue spotting, filming, and overglaze attack tend to result from the removal and/or replacement of the inorganic phosphate salts.

In accordance with the present invention, it has now been found that the water-soluble amino-polycarboxylic compounds selected from the class consisting of nitrilotriacetate, ethylenediamine tetraacetate, and mixtures thereof are suitable replacements for the inorganic phosphates. The addition of sucrose and an overglaze protector to an amino-polycarboxylic based composition provides a dishwasher detergent formulation possessing superior cleaning efficacy and improved overglaze protective properties.

Thus, a primary object of the present invention is the provision of an efficacious non-phosphate detergent formulation.

Another object of the present invention is the provision of a dishwasher product having improved overglaze protective properties.

Still another object of the present invention is the provision of a commercially more desirable cleaning product.

Other objects and advantages of the present invention will become more apparent hereinafter as the description proceeds.

The attainment of the foregoing and related objects is made possible in accordance with the present invention which provides a water-soluble alkaline detergent for automatic dishwashing essentially free of inorganic phosphates, containing at least about 25% by weight of a water-soluble amino-polycarboxylic compound and about 30-65% of at least one water-soluble inorganic builder salt selected from the group of silicates, carbonates, borates and sulfates, about 1-20% sucrose and about 1-20% overglaze protector.

2

The amino-polycarboxylic component of the present invention may be supplied as trisodium nitrilotriacetate, tetrasodium ethylene diamine tetraacetate or as any other water-soluble salt of a cation such as an alkali metal (e.g. potassium, lithium), ammonium, amine, alkylolamine and the like. The corresponding acid may also be used when sodium hydroxide is available as a reactant therewith. These compounds may be used in the form of hydrates or in anhydrous form, depending on the ease with which it can be blended with the other particulate ingredients to yield a product having good flowability.

The amino-polycarboxylic compound constitutes an essential ingredient of instant non-phosphate detergent formulations, in amounts of at least 25% by weight of the total composition up to and including 60% by weight of the total composition.

The sucrose contemplated for use in the practice of the present invention and capable of substantially reducing both spotting and filming of tableware is water-soluble, and may be either fine or granulated. Sucrose is a disaccharide composed of D-glucose and D-fructose, having the chemical formula $C_{12}H_{22}O_{11}$ and also known as saccharose and saccharobiose. Commercially, sucrose is known as sugar, and is produced from can sugar (ordinary table sugar), beet sugar, maple sugar, and sorghum sugar. The type and amount of sugar utilized is dependent on availability, cost and compatibility with the other ingredients of the detergent composition. However, the granulated form of sugar has been found preferable because of the ease with which it can be blended with the other ingredients. It has been found that amounts as low as 1% sucrose by weight are effective in obtaining superior inhibition of spotting and filming of tableware washed in a mechanical dishwasher, although the preferred range is 2 to 10% by weight of the total detergent composition.

The performance in the dishwasher has been evaluated by spotting and film tests in accordance with the method of CSMA, specifically defined in "Soap and Chemical Specialties," Vol. 33, No. 9, September 1957. This method is designed to show spotting and film buildup on glass tumblers and plates in the presence of a milk-margarine-egg soil. According to such method, 5 glass tumblers and 5 photographic cover plates are spaced on the top rack and six dinner plates plus smaller plates are spaced on the lower rack of the washer. Detergent receptacles of the machine are each filled with 30 grams of detergent to give a 0.3% aqueous solution. Forty grams of the above defined soil is placed at the bottom of the machine. With water at 140° F. and 50 p.p.m. or 150 p.p.m. or 200 p.p.m. water hardness, the machine is put through its standard cycle. The contents are cooled to about 75° F. before observation in adequate light and are rated according to the following scale:

1. glass spotless and no film
2. spots at random or barely perceptible film
3. ¼ of glass covered with spots or apparent film
4. ½ of glass covered with spots or moderate film
5. glass completely covered with spots or heavy film

Instant non-phosphate detergents favorably compare with the conventional phosphate-containing detergents presently on the market in regard to both spotting and filming.

It has been found desirable to include minor amounts of overglaze protectors which inhibit the attack on the ornamental patterns found on fine china. A variety of additives can be used to inhibit overglaze attack inclusive of aluminum acetate; aluminum formate; alkali metal aluminum orthophosphates, e.g. sodium acid aluminum phosphate; alkali aluminate, zincate, beryllate; boric acid; boric anhydride, and mixtures thereof. However, the most effective overglaze inhibitors are boric acid, boric anhydride and sodium acid aluminum phosphate and mixtures

thereof. Aforesaid inhibitors exhibit superior cleaning efficacy by virtue of the absence of unsightly deposits or precipitates on the surface of the treated substrata associated with some of the known overglaze inhibitors when utilized in sufficient amounts to effect overglaze protection. The overglaze protector is employed in concentrations ranging from about 1% to about 20% by weight of the total composition with a range of 3% to 15% being preferred.

For purposes of ascertaining the capacity of the various compositions exemplified to ameliorate overglaze attack on fine china samples, the method of the Chemical Specialties Manufacturers Association (CSMA) is employed, such method being described in detail in "Soap and Chemical Specialties," 33, (9), 60, 1957. Such test is designed as an accelerated dishwasher exposure method; thus, the comparative removal of overglaze decoration provides direct means for affording an evaluation of the corrosiveness of dishwashing detergent solutions. According to such method, samples of standard plates (Greenwood pattern) Onondaga Pottery Co., Syracuse, N.Y. are immersed in deionized or distilled water maintained at a temperature of 211° F. and containing the indicated percent concentration of detergent for periods of 2, 4 and 5 hours. The test samples are thereafter removed, hand-rubbed with cloth and compared with untreated samples of the same standard plate. The treated samples are visually scrutinized to determine the extent of overglaze damage with numerical indicia being assigned to indicate the extent of overglaze damage involved. Thus, the scale of 0, 1, 2, 3 and 4 correspond, in terms of damage, to none, slight, moderate, considerable and complete respectively.

The inorganic water-soluble builder adjuvants used as supplemental materials include at least one of the following: borates such as borax, carbonates such as sodium carbonate, silicates, such as sodium metasilicate and hydrous silicates, sulfates and bisulfites such as the sodium salts thereof. The presence of silicates in instant non-phosphate compositions enhances overglaze protection but yields poorer machine performance; whereas non-silicate, carbonate base formulae exhibit excellent machine performance but poorer overglaze characteristics. Consequently, the selection of particular builders or mixtures thereof is determinative of the overall performance of the dishwashing composition. Any other water soluble salt may be employed such as an alkali metal (e.g. potassium, lithium), ammonium, amine, alkylamine and the like. The builder salts are preferably employed in amounts of about 30-65% by weight and sufficient to yield a pH in water of from 9.5 to 12, preferably from 9.5 to 11, in order to obtain optimum detergency performance.

The cleaning composition of this invention has particular utility as an automatic dishwasher product which customarily and preferably contains one or more bleaching agents capable of liberating hypochlorite chlorine and/or hypobromine bromine on contact with aqueous media. Particular examples of bleaching agents include the dry, particulate heterocyclic N-bromo and N-chloro imides such as trichlorocyanuric, tribromocyanuric acid, dibromo- and dichlorocyanuric acid, the salts thereof with water-solubilizing cations such as potassium and sodium, and mixtures thereof. Particular compounds found useful are potassium dichloro-isocyanurate and trichloroisocyanuric acids.

Other N-bromo and N-chloro imides may also be used, such as N-brominated and N-chlorinated succinimide, malonimide phthalimide and naphthalimide. Other compounds include the hydantoin, such as 1,3-dibromo and 1,3-dichloro-5,5-dimethylhydantoin, N-monochloro-5, 5-dimethylhydantoin, methylene-bis (N-bromo-5, 5-dimethylhydantoin); 1,3-dibromo and 1,3-dichloro 5-isobutylhydantoin; 1,3-dichloro 5, methyl-5-ethylhydantoin; 1,3-dibromo and 1,3-dichloro-5,5-diisobutyl-hydantoin; 1,3-dibromo and 1,3-dichloro-5-methyl-5-n-amylhydantoin, and the like. Other useful hypohalite-liberating agents

comprise tribromomelamine and trichloromelamine. Dry particulate, water soluble anhydrous inorganic salts are likewise suitable for use such as lithium hypochlorite and hypobromite. The hypohalite-liberating agent may, if desired, be provided in the form of a stable, solid complex or hydrate, such as sodium p-toluene-sulfo-bromamine-trihydrate, sodium benzene-sulfo-chloramine-dihydrate, calcium hypobromite tetrahydrate, calcium hypochlorite tetrahydrate, etc. Brominated and chlorinated trisodium phosphate formed by the reaction of the corresponding sodium hypohalite solution with trisodium phosphate (and water as necessary) likewise comprise efficacious materials. The present invention contemplates as an additional embodiment the use of bleaching agents capable of liberating hypochlorite as well as hypobromite such as, for example, the N-brominated, N'-chlorinated heterocyclic imides, as for example the N-bromo, N'-chlorocyanuric acids and salts thereof, e.g., N-monobromo-N, N-dichlorocyanuric acid, N-monobromo-N-monochlorocyanuric acid, sodium-N-monobromo-N-monochlorocyanurate, potassium - N - monobromo-N-monochlorocyanurate; and the brominated, N-chlorinated hydantoin, e.g., N-bromo-N-chloro-5, 5-dimethylhydantoin and N-bromo-N-chloro-5-ethyl-5-methyl hydantoin.

The hypohalite-liberating compound is employed in an amount of from 0.5 to 5% by weight of the composition, and preferably in an amount of from about 0.5% to 3% by weight thereof. In any event, the hypohalide material should preferably be employed in amounts sufficient to yield from about 0.5-3% available chlorine, bromine etc. in order to assure optimum results.

Water soluble organic detergents i.e., surface active components may be employed, such materials being well known in the prior art, the term detergent comprehending species of the anionic, cationic, amphoteric and zwitterionic types. In formulating an automatic dishwasher product, it is preferred to utilize a low-foaming detergent such as the nonionics.

Nonionic surface active agents include those surface active or detergent compounds which contain an organic hydrophobic group and a hydrophilic group which is a reaction product of a solubilizing group such as carboxylate, hydroxyl, amido or amino with ethylene oxide or with the polyhydration product thereof, polyethylene glycol.

As examples of nonionic surface active agents which may be used there may be noted the condensation products of alkyl phenols with ethylene oxide, e.g., the reaction product of isooctyl phenol with about 6 to 30 ethylene oxide units; condensation products of alkyl thiophenols with 10 to 15 ethylene oxide units; condensation products of higher fatty alcohols of monoesters of hexahydric alcohols and inner ethers thereof such as sorbitan monolaurate, sorbitol mono-oleate and mannitan monopalmitate, and the condensation products of polypropylene glycol with ethylene oxide.

Further suitable detergents are polyoxyalkylene esters of organic acids, such as the higher fatty acids, rosin acids, tall oil, or acids from the oxidation of petroleum, and the like. The polyglycol esters will usually contain from about 8 to about 30 moles of ethylene oxide or its equivalent and about 8 to 22 carbon atoms in the acyl group. Suitable products are refined tall oil condensed with 16 to 20 ethylene oxide groups, or similar polyglycol esters of lauric, stearic, oleic and like acids.

Additional suitable non-ionic detergents are the polyalkylene oxide condensates with higher fatty acid amides, such as the higher fatty acid primary amides and higher fatty acid mono- and di-ethanol-amides. Suitable agents are coconut fatty acid amide condensed with about 10 to 30 moles of ethylene oxide. The fatty acyl group will similarly have about 8 to 22 carbon atoms, and usually about 10 to 18 carbon atoms in each product. The corresponding sulphonamides may also be used if desired.

Other suitable polyether non-ionic detergents are the polyalkylene oxide ethers of higher aliphatic alcohols,

Suitable alcohols are those having a hydrophobic character, and preferably 8 to 22 carbon atoms. Examples thereof are iso-octyl, nonyl, decyl, dodecyl, tridecyl, tetradecyl, hexadecyl, octadecyl and oleyl alcohols which may be condensed with an appropriate amount of ethylene oxide, such as at least about 6, and preferably about 10–30 moles. A typical product is tridecyl alcohol, produced by the Oxo process, condensed with about 12, 15 or 20 moles of ethylene oxide. The corresponding higher alkyl mercaptans or thioalcohols condensed with ethylene oxide are also suitable for use in compositions of the present invention.

Examples of other suitable wetting agents include low foaming anionic materials such as dodecyl hydrogen phosphate, methyl naphthalene sulfonate, sodium 2-acetamido-hexadecane-1-sulfonate, and mixtures thereof. Mixtures of the foregoing wetting agents may also be employed, and, if desired, foam-reducing additive may be added as appropriate to minimize undesirable foaming tendencies of these wetting agents under conditions of use.

The detergent material is employed in concentrations ranging from about 0.5% to about 5% by weight of total compositions with a range of 1 to 3% being particularly preferred.

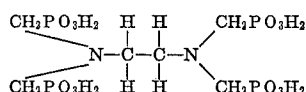
Thus, a relatively minor amount of nonionic type detergent, that is, about 2–4% is especially beneficial inasmuch as it acts as a foam depressant as well as a deterative agent in an automatic dishwashing solution.

The preferred cleaning compositions of this invention can contain any of the usual additives such as perfume, fillers, extenders, pigments, dyes, anti-tarnishing agents, suds depressors, suds builders, anti-redeposition agents, polyelectrolytes which function as soil suspending and/or peptizing agents including polycarboxylates, polyamino-methyl phosphonate, maleic anhydride-acrylic acid polymer, starch degradation products, polymethyl vinyl ether/maleic acid, TiO_2 and the like, which do not interfere with the detergency properties thereof. In various examples herein, polyaminomethyl phosphonate is shown in very small amounts and this organic material is optional, and may be replaced by any suitable suspending and/or peptizing agent such as said polycarboxylates. The compositions are prepared usually by dry blending the ingredients to form a dry particulate product such as a free flowing granular composition or powder. If the product is found to be too powdery, it may be compacted by pressing into tablet form and subsequently grinding the material and passing it through a sieve. Either a fine grain (through –20, +60 sieve) or a coarse grain (–10, +40 sieve) has been found acceptable for use in the dishwasher.

The following examples are given for purposes of illustration only and are not to be considered as constituting a limitation on the present invention. All parts and percentages given are by weight unless otherwise indicated.

EXAMPLE 1

Ingredient:	Percent
Trisodium nitrilotriacetate	35.0
Tetrasodium ethylene diamine tetraacetate	2.0
Polyamino methyl phosphonate ¹	0.5
Potassium dichloroisocyanurate	1.5
Nonionic ²	2.0
Sucrose	6.0
Soda Ash	35.0
Na Sulfate, anhydrous	15.0
Sodium acid aluminum phosphate	3.0



² The nonionic detergent is the product obtained by the condensation of about three moles of polypropylene oxide with the condensation product of one mol of a mixture of essentially straight chain, primary, fatty alcohols in the C_{10} – C_{18} range with about six moles of ethylene oxide.

Detergency efficacy evaluated in accordance with the CSMA method hereinbefore described using 140° F. tap water resulted in a rating of 1S–1.6F for glasses and 1.2S–1.4F for slides (S=spotting; F=filming), which was comparable to conventional phosphate-containing compositions. Its overall machine performance with regard to soil removal, lipstick removal, the cleaning of utensils of stainless steel, silverware, and copper ware was very good. The apparent density of this product is 0.77.

EXAMPLE 2

Example 1 is repeated, but the sodium sulfate is increased to 20%, the soda ash is reduced to 6% and 24% sesquicarbonate ($\text{NaHCO}_3/\text{Na}_2\text{CO}_3$) is added as a buffer in lieu of the soda ash and 0.5% color and perfume replace the phosphate ingredient. The apparent density of this product is increased to 0.82.

Detergency performance is satisfactory.

EXAMPLE 3

Example 1 is repeated, except that 5% anhydrous sodium metasilicate is added; the sodium sulfate is increased to 20%; and the soda ash is reduced to 6% and replaced by 24% sesquicarbonate buffer; the sodium acid aluminum phosphate is increased to 6%; and the nitrilotriacetate ingredient is reduced to 27%. This product has a density of 0.85.

The product offers greater overglaze protection than the product of Example 2.

EXAMPLE 4

Example 1 is repeated, but the phosphonate is replaced by a maleic anhydride-acrylic acid copolymer.

Detergency tests gave ratings of 1.4S–1.4F for glasses and 1S–1F for slides.

EXAMPLES 5, 6 and 7

Example 1 is repeated, but the phosphonate is replaced by a polymethyl vinyl ether/maleic acid; water dispersible TiO_2 ; oil dispersible TiO_2 with equally good detergency ratings.

EXAMPLE 8

Ingredients:	Percent
Trisodium nitrilotriacetate	35.0
Tetrasodium ethylene diamine tetraacetate	2.0
Sucrose	6.0
G.D. silicate	15.0
Nonionic detergent of Example 1	2.0
Potassium dichlorocyanurate	1.5
Sodium acid aluminum phosphate	6.0
Boric Anhydride	6.0
Sodium Sulfate	1.5
Sodium Carbonate	5.0
Sesquicarbonate	20.0

Overall detergency performance of the product was equivalent to the phosphated composition (control) in soil removal, lipstick removal and the cleaning of silverware in 50 p.p.m. water. However greater efficacy was exhibited by instant product in tea stain removal, the spotting and filming of tumblers, plates and copper. When used with harder water (150 p.p.m. hardness), overall cleansing efficacy is not quite as good.

Overglaze tests run at 0.15% concentration gave a CSMA rating of 0, which is superior to the phosphated composition of the control (0+).

EXAMPLE 9

Example 8 is repeated, but the boric anhydride is reduced to 3% and the sodium sulfate is increased to 4.5%. This product gave an equivalent CSMA overglaze rating as the control. Detergency ratings of 2.4S–2F for glass tumblers and 2S–1.6F for slides was recorded as compared to the phosphate-containing compositions of 3S–2F for tumblers and 3.2S–2.2F for slides washed in 50 p.p.m. water. In addition to its superior properties

relating to spotting and filming, this product was better in tea stain removal.

EXAMPLE 10

Example 9 is repeated, but the boric anhydride is replaced by boric acid.

EXAMPLE 11

Example 8 is repeated, but the sodium acid aluminum phosphate is reduced to 3% and the sodium sulfate is increased to 4.5%. CSMA overglaze rating of 0+.

EXAMPLE 12

Example 8 is repeated, but the sodium acid aluminum phosphate is reduced to 3%, the boric anhydride is reduced to 3%, the sodium sulfate is increased to 2.5%, the sodium carbonate is increased to 20%, the sesquicarbonate is omitted and 10% sodium bisulfite is added. CSMA overglaze rating of 0+.

EXAMPLE 13

Example 12 is repeated, but the sodium carbonate is decreased to 4% and is replaced by 16% sesquicarbonate. CSMA overglaze rating of 0+.

EXAMPLE 14

Ingredients:	Percent
Trisodium nitrilotriacetate -----	35.0
Tetrasodium ethylene diamine tetraacetate --	2.0
Polyamino-methyl phosphate -----	0.5
Potassium dichloroisocyanurate -----	1.5
Nonionic of Example 1 -----	2.0
Sucrose -----	6.0
Boric Acid -----	3.0
Boric Anhydride -----	3.0
Sodium carbonate -----	35.0
Sodium sulfate -----	12.0

This product has good detergency properties.

EXAMPLE 15

Example 14 is repeated, but the nitrilotriacetate ingredient is increased to 40%, the tetraacetate ingredient is omitted, the sodium sulfate is replaced by 15% sodium metasilicate, the sodium carbonate is reduced to 30%, the dichloroisocyanurate is reduced to 1% and the phosphonate is omitted.

While the detergent composition of the present invention finds most efficacious utilization in connection with the washing of the dishes and the like in automatic dishwashers, naturally, the detergent may be utilized in other fashions as desired. Usually however, the best mode of use will be in connection with automatic dishwashers which have the ability of dispensing the detergent of the present invention in one or more separate wash cycles. Accordingly, the detergent composition of the present invention is added to the two receptacles, if such are present, in an automatic dishwasher. When the dishwasher is set into operation, after the dishes have been suitably positioned therein, the automatic devices of the dishwasher permit the addition of sufficient water to produce a concentration of the detergent composition of approximately 0.15 to 0.5% and preferably 0.3% by weight. The operation of the dishwasher results in treating, that is, washing of the dishes with the aqueous solution of the detergent composition. Usually, the sequence of operation in utilizing an automatic dishwasher results in one or more rinsing steps following the one or more washing cycles. In utilizing the detergent composition of the present invention it will be noted that even after use in considerable number of washings there will be substantially favorable overall detergency performance with little if any attack on the overglaze of china.

Effective industrial bottle cleaning compositions may be provided in accordance with the present invention by merely admixing the detergent formulation with suitable active ingredients, e.g., caustic alkali whereby to

provide a highly alkaline composition preferably having a pH of approximately 12. Such compositions may be readily formulated in accordance with the parameters hereinbefore described.

Results similar to those described in the foregoing examples are obtained when the procedures delineated therein are repeated but employing in lieu of the specific non-ionic detergent identified a variety of materials selected from nonionic, anionic, cationic, amphoteric and zwitterionic types. Moreover, nothing critical resides in the selection of bleaching agent and accordingly, any of the materials hereinbefore recommended for such purposes may be readily employed to advantage. Similarly, any aminopolycarboxylic compound or combination of aminopolycarboxylic compounds together with compatible inorganic water soluble non-phosphate salts can advantageously be utilized in the formulation of instant dishwasher cleaning composition.

It will be apparent that many changes and modifications of the several features described herein may be made without departing from the spirit and scope of the invention. It is therefore apparent that the foregoing description is by way of illustration of the invention rather than limitation of the invention.

What is claimed is:

1. An alkaline dishwasher detergent capable of inhibiting overglaze attack and essentially free of inorganic phosphates consisting essentially of at least about 25% by weight of a water-soluble hydrated or anhydrous aminopolycarboxylic compound selected from the group consisting of nitrilotriacetic acid, ethylenediamine tetraacetic acid and salts thereof with cation selected from the group consisting of alkali metal, ammonium, and about 30-65% of at least one water soluble inorganic builder salt selected from the group consisting of silicates, carbonates, borates and sulfates, about 1-20% sucrose and about 1-20% of overglaze protector selected from the group consisting of aluminum acetate, aluminum formate, alkali metal aluminum orthophosphates, alkali aluminate, zincate and beryllate, boric acid, boric anhydride and mixtures thereof.

2. A composition according to claim 1 wherein said aminopolycarboxylic compound is a mixture of trisodium nitrilotriacetate and tetrasodium ethylene diamine tetraacetate.

3. A composition according to claim 1 wherein said overglaze protector is sodium acid aluminum phosphate.

4. A composition according to claim 1 wherein said builder is a mixture of sodium sulfate, sodium carbonate and sesquicarbonate.

5. A composition according to claim 1 which also includes about 0.5 to 5% by weight of water soluble organic detergent selected from the group consisting of anionic, cationic, amphoteric and zwitterionic detergents.

6. A composition according to claim 1 wherein said overglaze protector is a mixture of sodium acid aluminum phosphate and boric anhydride.

7. A composition according to claim 1 wherein said builder is sodium metasilicate.

8. A composition according to claim 1 which also includes about 0.5 to 5% by weight of a bleaching agent capable of liberating hypohalite in aqueous media.

9. A composition in accordance with claim 1, wherein the aminopolycarboxylic compound constitutes about 25 to 60% by weight.

10. A composition in accordance with claim 1, wherein about 3-15% by weight of an overglaze protector selected from the class consisting of boric acid, boric anhydride, and sodium aluminum phosphate and mixtures thereof, is utilized.

11. A composition according to claim 5 wherein said detergent is selected from the group consisting of condensation products of alkyl phenol with from 6 to 30 moles of ethylene oxide, condensation products of alkyl thiophenols with 10 to 15 moles of ethylene oxide, con-

densation products of higher fatty alcohols of monoesters of hexahydric alcohols and inner ethers thereof and the condensation products of polypropylene glycol with ethylene oxide.

12. A composition according to claim 8 wherein said bleaching agent is potassium dichloroisocyanurate.

13. A method of treating glasses, dishes and like glazed surfaces to remove foreign bodies from the surfaces thereof without modifying the substrata comprising treating said substrata with a dilute aqueous solution of the composition defined in claim 1.

14. A method of washing glasses, dishes and like glazed surfaces without modifying said glazed surfaces which comprises treating said surfaces with an aqueous solution containing about 0.15–0.5% by weight of the

composition defined in claim 10 and subsequently rinsing with a clear aqueous solution.

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MAYER WEINBLATT, Primary Examiner

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