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(54) **Compositions and methods for removing tarnish from household articles.**

(57) Compositions and methods for the rapid and facile removal of tarnish from household articles having a surface comprising silver or a substantial amount of copper. The composition used in the method comprises at least one chelating agent selected from the group consisting of ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid and diethylenetriamine pentaacetic acid salts, with the proviso that when the chelating agent is other than ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane or 1,2-diaminoisobutane, said aqueous solution also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts (e.g., ammonium chloride, ammonium nitrate and ammonium sulfate).

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COMPOSITIONS AND METHODS FOR REMOVING TARNISH FROM HOUSEHOLD ARTICLES

The present invention relates to compositions and methods for the rapid and facile removal of tarnish from household articles having a surface comprising silver (e.g., sterling silver or silver plate) or a substantial amount of copper (e.g., copper, brass, bronze or German silver).

Removing tarnish from household articles, such as silverware, silver candlesticks, copper-bottomed cooking ware, brass candlesticks and the like, has long been a difficult, unpleasant and time-consuming task. Silver, German silver or silver plated household articles require considerable rubbing before the tarnish is removed, typically with a polishing material that is itself difficult to remove from recesses (e.g., engraved lines or crevices adjacent to rolled edges) in the surface of the article. Household articles made of copper, brass or bronze generally require treatment with abrasive cleansers and, once again, application of considerable "elbow grease". Also, typical prior art polishing materials have unpleasant odors.

Various amines have been used previously for removing corrosion from industrial products. However, the industrial applications of those amines have involved one or more of long treatment times,

excessively high temperatures, and the use of abrasive materials that are unacceptable for household articles. U.S. Patent 2,731,420 (Sylvester) refers to the use of certain ammonia derivatives in detergent compositions that contain water soluble polyphosphates (which are now recognized as being harmful to the environment) to inhibit the tendency of the polyphosphates to tarnish German silver, but there is no recognition by Sylvester that any of his ammonia derivatives are useful to remove tarnish or would perform any useful function in a non-phosphorous containing detergent composition.

The present invention, on the other hand, provides compositions and methods for the convenient, rapid, and effective removal of tarnish from household articles. For example, the compositions of the invention may be dishwashing liquids or dishwashing detergent compositions for automatic dishwashers that include certain tarnish-removing additives.

We have found, surprisingly, that aqueous solutions of certain specific chelating agents (also known as sequestering agents), either alone or with an accelerator selected from certain amines or ammonium salts, may be used to remove rapidly and conveniently tarnish from household articles. Indeed, a brief period of gentle rubbing with a sponge, a nylon scrubber, or similar material is all that is required. It is particularly surprising that certain of the aforementioned chelating agents (e.g., ethylenediamine) are even effective by themselves to remove rapidly and conveniently tarnish from household articles because other related amines (e.g., 1,4-diaminobutane, diethylenetriamine and triethylenetetraamine) are not effective by themselves. More specifically, we have found that when our chelating agent is an acyclic diamine in which the amino groups are adjacent to one another or separated by only a

single carbon atom, the chelating agent is effective by itself to remove tarnish and an accelerator is not required.

The aforementioned chelating agents and accelerators can be used to prepare aqueous solutions that are useful in removing tarnish or they can conveniently be incorporated in conventional dishwashing formulations, both liquids and powders. The resulting dishwashing formulations resemble quite closely general cleaning compositions but will be more useful than such compositions because they will also remove tarnish. Thus, the foregoing dishwashing formulations may be used to clean items that do not require tarnish removal (e.g., articles of porcelain, stainless steel, aluminum or glass) since the chelating agents and accelerators will not harm such materials, but will also be useful in removing tarnish when the need arises.

More particularly, one embodiment of the present invention relates to a phosphorous-free (e.g., containing no phosphates or polyphosphates) dishwashing detergent composition, formulated in the form of a liquid, which is useful in washing dishes by hand and is also useful in removing tarnish from household articles having a surface comprising silver or a substantial amount of copper, said composition comprising water; a chelating agent selected from the group consisting of ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts; at least one surfactant; and at least one antioxidant (e.g., butylated hydroxytoluene (BHT) or butylated hydroxyanisole (BHA)); with the proviso that when the chelating agent is other than ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane or 1,2-diamino-

isobutane, the composition also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts. Preferably, the concentration of the surfactant is at least about 25% by weight, based on the weight of the composition. Other ingredients that are typically used in conventional liquid dishwashing detergent compositions, such as dispensing aids (e.g., ethyl alcohol), stabilizing agents (in addition to antioxidants which are discussed above), colorants and perfumes, may also be included.

As used herein, a phosphorous-free composition means a solution that contains essentially no phosphorous, i.e., no phosphorous or less than about 0.1% by weight of phosphorous.

In another embodiment, the present invention relates to a phosphorous-free dishwashing detergent composition, formulated in the form of a powder, which is useful in washing dishes in an automatic dishwasher and is also useful in removing tarnish from household articles having a surface comprising silver or a substantial amount of copper, said composition comprising a chelating agent selected from the group consisting of ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts; and at least one surfactant; with the proviso that when the chelating agent is other than ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane or 1,2-diaminoisobutane, the composition also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts. Preferably,

the foregoing composition also comprises at least one suds control agent. Other ingredients that are typically used in conventional powder dishwashing detergent compositions, such as corrosion inhibitors (e.g., sodium silicates), colorants and perfumes, may also be included.

In another embodiment, the present invention relates to a phosphorous-containing (containing, for example, phosphates or polyphosphates) dishwashing detergent composition, formulated in the form of a liquid, which is useful in washing dishes by hand and is also useful in removing tarnish from household articles having a surface comprising silver or a substantial amount of copper, said composition comprising water; a chelating agent selected from the group consisting of 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts; at least one phosphorous-containing builder; and at least one surfactant; with the proviso that when the chelating agent is other than 1,2-diaminopropane, 1,3-diaminopropane, or 1,2-diaminoisobutane, the composition also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts. Preferably, the foregoing composition also comprises at least one antioxidant (e.g., BHT or BHA). It is also preferred that the concentration of the surfactant be at least about 25% by weight, based on the weight of the composition. Other ingredients that are typically used in conventional liquid dishwashing detergent compositions may also be included.

In another embodiment, the present invention relates to a phosphorous-containing dishwashing deter-

gent composition, formulated in the form of a powder, which is useful in washing dishes in an automatic dishwasher and is also useful in removing tarnish from household articles having a surface comprising silver or a substantial amount of copper, said composition comprising a chelating agent selected from the group consisting of 1,2-diaminopropane, 1,3-diaminopropane, 1-2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts; at least one phosphorous-containing builder; and at least one surfactant; with the proviso that when the chelating agent is other than 1,2-diaminopropane, 1,3-diaminopropane or 1,2-diaminoisobutane, the composition also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts. Preferably, the foregoing composition also comprises at least one suds control agent. Other ingredients that are typically used in conventional powder dishwashing detergent compositions may also be included.

The foregoing liquid compositions are particularly useful when one desires to remove tarnish by hand. The foregoing powder compositions are particularly useful when one desires to remove tarnish from household articles using an automatic dishwasher.

The liquid compositions of the present invention comprise at least about 0.1% by weight (based on the weight of the composition) of chelating agent, and, if an accelerator is present, at least about 0.1% by weight (based on the weight of the composition) of accelerator. In addition, the weight ratio of chelating agent to accelerator, if an accelerator is present, is in the range of about 1 to 5 to about 5 to 1. More preferably, the

chelating agent is present at a concentration of at least about 1% by weight and the accelerator, if present, is present at a concentration of at least about 1% by weight. In addition, the weight ratio of chelating agent to accelerator, if an accelerator is present, is about 1 to 3 to about 3 to 1. The most preferred concentration is about 3% by weight for the chelating agent and, if an accelerator is present, about 2% by weight for the accelerator. Higher concentrations are effective but are not advantageous and are economically wasteful. The concentration of surfactant in the foregoing liquid compositions is preferably at least about 25% by weight, based on the weight of the composition.

The powder compositions of the invention preferably comprise at least about 1% by weight (based on the weight of the composition), and more preferably at least about 3% by weight of chelating agent and, if an accelerator is present, at least about 1% by weight (based on the weight of the composition) and more preferably at least about 3% by weight of accelerator. If an accelerator is present, the weight ratio of chelating agent to the accelerator in such powder compositions should be in the range of about 1 to 3 to about 3 to 1. More preferably, the ratio is about 2 to 1. Most preferably, the concentration of the chelating agent will be about 6% by weight and the concentration of the accelerator, if an accelerator is present, will be about 3.5% by weight. When using such a composition in a home dishwasher (e.g., the type typically having a capacity for washing service for twelve and utilizing a wash water temperature of about 140°F), the same amount of detergent composition as would normally be used for washing a typical load of dishes will generally be effective in removing tarnish.

The present invention also relates to a method of removing tarnish from household articles having a surface comprising silver or a substantial amount of copper, said method comprising rubbing the tarnished surface by hand with an aqueous solution comprising a chelating agent selected from the group consisting of ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, 1,3-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethyelenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts, with the proviso that when the chelating agent is other than ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane or 1,2-diaminoisobutane, said aqueous solution also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts. Preferably, the aqueous solution used in this method is one of the liquid dishwashing detergent compositions described above.

In another embodiment, the present invention relates to a method of removing tarnish from household articles having a surface comprising silver or a substantial amount of copper, said method comprising contacting the tarnished surface in an automatic dishwasher with an aqueous solution comprising a chelating agent selected from the group consisting of ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethyelenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts, with the proviso that when the chelating agent is other than ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane or 1,2-diaminoisobutane, said aqueous solution also comprises an accelerator selected from the

group consisting of ethanolamine, diethanolamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts. The foregoing aqueous solution may be obtained by dissolving a dishwashing detergent composition, formulated as a powder, in the wash water of the dishwasher during the dishwasher's wash cycle.

Although an accelerator is not required in the compositions and methods of the present invention when the chelating agent is ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, or 1,2-diamino-isobutane, an accelerator may be used together with ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, or 1,2-diaminoisobutane in such compositions and methods. It is also within the scope of the present invention to use mixtures of two or more chelating agents and to use mixtures of two or more accelerators.

As indicated above, each of the four chelating agents ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane and 1,2-diaminoisobutane are effective in removing tarnish even in the absence of an accelerator. Other acyclic diamines in which the amino groups are adjacent to one another or are separated by only a single carbon atom may be substituted for the foregoing four chelating agents to form tarnish removing compositions. If this is done, however, care should be taken that the chelating agent is one that is soluble in aqueous solution to the extent necessary to prepare a solution having a sufficiently high concentration of chelating agent to be effective in removing tarnish.

Preferred ammonium salts for use as an accelerator in the compositions and methods of the present invention are those that are commercially available, relatively inexpensive and non-toxic. Examples of such ammonium salts are ammonium chloride,

ammonium nitrate and ammonium sulfate. Ammonium salts of ethylenediamine tetraacetic acid and of diethylenetriamine pentaacetic acid may be used without an additional accelerator since the ammonium moiety of these salts functions as the accelerator.

Preferred salts of the foregoing polyaminocarboxylate chelating agents are ammonium salts or the salts of alkaline metals such as sodium or potassium. Whether a particular chelating agent is present, in solution, in acid or salt form will depend upon the pH of the solution.

As used herein, surfactant shall include anionic, cationic and nonionic surfactants, including soaps (i.e., alkaline salts of long-chain fatty acids). The preferred surfactants for use in the liquid detergent compositions of the invention are anionic surfactants such as linear sodium alkyl benzene sulfonates, linear alkyl sulfates and linear alkylethoxy sulfates.

Commercial liquid dishwashing detergents generally contain at least one anionic surfactant and many such detergents also contain a nonionic surfactant. Such detergents are generally intended for use in washing dishes by hand.

For automatic dishwashing detergents, nonionic surfactants are preferred because of their lower sudsing characteristics. Commercially used nonionic surfactants include the alkyl ethoxylates, the ethoxylated alkyl phenols, the fatty acid ethanol amides, and complex polymers of ethylene oxide, propylene oxide, and alcohols. Automatic dishwashing detergents may also contain an anionic surfactant. Cationic surfactants may be used, but are not often used, in automatic dishwashing detergents.

It may be advantageous to use an antioxidant (for example butylated hydroxyanisole (BHA) or butylated hydroxytoluene (BHT)) in the compositions

of the present invention that comprise a surfactant. The antioxidant serves to prevent oxidation of the surfactant. Examples of surfactants that are, otherwise, particularly susceptible to oxidation are nonionic surfactants and certain anionic surfactants (e.g., lauryl alcohol derivatives).

A dishwashing detergent composition may also contain one or more of the following additives:

a) Builders. Builders function to sequester calcium and magnesium ions in water. Condensed polyphosphates, such as pentasodium tripolyphosphate (STP) and tetrasodium pyrophosphate, may be used in the dishwashing compositions of the invention, but such polyphosphates are generally considered to be undesirable from an environmental standpoint. Nonphosphate builders that may be used in the invention include, for example, trisodium nitrilotriacetate (NTA) and tetrasodium ethylenediamine tetraacetate (EDTA). EDTA is also useful as a chelating agent in the compositions of the present invention. Generally, when EDTA is used as a builder, it is used in smaller quantities than would be preferred for tarnish removal.

b) Corrosion Inhibitors. The tendency of alkaline detergents to corrode aluminum, porcelain, and the overglaze on fine china may be prevented or minimized by adding one or more corrosion inhibitors to the detergent. Suitable corrosion inhibitors include the soluble sodium silicates.

c) Sudsing Modifiers. Sudsing modifiers may be used to increase sudsing when such additional sudsing is desired to enhance the aesthetic appeal of the detergent. Anionic surfactants, such as mono and diethanol amides of C_{10-16} fatty acids, can be used for this purpose. Sudsing modifiers can also be used to depress sudsing in automatic dishwashers. This can be accomplished by the addition of one or more of the C_{10-16} fatty acids to the detergent.

Sudsing modifiers that are used to depress sudsing are also referred to as suds control agents.

In addition to the foregoing additives, other additives that are conventionally used in dishwashing compositions may be utilized in the compositions of the present invention. Such additives include colorants, perfumes and stabilizing agents.

The compositions described above may be used in several different ways to remove tarnish from household articles. The following are illustrations of how the aforementioned compositions may be used:

a) A small amount (e.g., about 5 ml) of a dishwashing liquid of the invention may be applied full strength, at room temperature or slightly above room temperature (about 20 to 40°C), to a sponge or similar cleaning aid and then gently rubbed on a tarnished article. Typically, only little effort is required when tarnish is removed in this manner. Generally, the same amount of effort is required as would typically be used to clean a Teflon® coated surface, using, for example a sponge or a rubbing implement such as a nylon scrubber.

b) A dishwashing liquid of the invention may be diluted with water, preferably with warm water having a temperature of from about 30 to about 50°C, in a dishpan and subsequently applied to a tarnished article by hand, preferably using a rubbing implement such as a sponge or a nylon scrubber.

c) A dishwashing powder of the invention may be used to remove tarnish from a tarnished article (which may be present together with untarnished articles such as dishes, aluminum pots and the like) in an automatic dishwasher. In such dishwashers, the dishwashing powder is dissolved in hot water at high temperatures (i.e., 140°F or higher). The scrubbing action that occurs during normal operation

of the dishwasher is generally sufficient to remove tarnish from household articles.

(d) A small amount of a dishwashing powder of the invention may be placed on a rubbing implement, e.g., a wet sponge or wet nylon scrubber, and gently rubbed on a tarnished article. The person practicing this method may wish to cover his or her hands (e.g., with rubber gloves) in order to protect them from the dishwashing powder, which might otherwise irritate the hands.

In another embodiment of the method of the invention, tarnish is removed from household articles having a surface comprising silver or a substantial amount of copper by rubbing by hand (preferably, using a rubbing implement such as a sponge or a nylon scrubber) on such articles an aqueous solution consisting essentially of a chelating agent and, if required, an accelerator (e.g., a solution that does not contain any surfactant or phosphate builder). The concentrations of chelating agent and accelerator (if required) in such an aqueous solution are preferably the same as the preferred concentrations of those materials in the liquid dishwashing detergent as set forth above.

The following are examples of compositions which may be used for removing the tarnish from surfaces comprising silver or a substantial amount of copper, in accordance with the method of the present invention. The compositions may be prepared by mixing the listed ingredients. The concentrations are in percent by weight.

EXAMPLE 1

Dishwashing Liquid

Water	50%
Sodium dodecylbenzene sulfonate	30%
Sodium xylene sulfonate	10%
Sodium dioctylsulfosuccinate	5%
Tetrasodium ethylenediamine tetraacetate	3%
Ammonium chloride	2%

EXAMPLE 2

Dishwashing Liquid

Water	55%
Sodium dodecylbenzene sulfonate	25%
Sodium xylene sulfonate	10%
Sodium lauryl sulfate	5%
Pentasodium diethylenetriamine pentaacetate	3%
Ethanolamine	2%

EXAMPLE 3

Dishwashing Liquid

Water	55%
Sodium dodecylbenzene sulfonate	25%
Sodium lauryl sulfate	10%
Coconut oil fatty acids diethanolamide	7%
Ethylenediamine	3%

EXAMPLE 4

Dishwashing Liquid

Water	60%
Sodium dodecylbenzene sulfonate	25%
Sodium xylene sulfonate	5%
Sodium dioctylsulfosuccinate	5%
Tetrasodium ethylenediamine tetraacetate	3%
Diethylenetriamine	2%

EXAMPLE 5

Dishwashing Liquid

Water	55%
Sodium dodecylbenzene sulfonate	25%
Sodium lauryl sulfate	10%
Coconut oil fatty acids diethanolamide	7%
1,2-diaminopropane	3%

EXAMPLE 6

Automatic Dishwasher Detergent Composition

Sodium tripolyphosphate	45%
Sodium carbonate	25%
Coconut oil fatty acids diethanolamide	10%
Sodium silicate	10%
Sodium dichloroisocyanurate	0.5%
Pentasodium diethylenetriamine pentaacetate	6.0%
Triethanolamine	3.5%

CLAIMS

1. A liquid phosphorus-free dishwashing detergent and tarnish removing composition comprising water; a chelating agent selected from the group consisting of ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts; at least one surfactant; and at least one antioxidant; with the proviso that when the chelating agent is other than ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane or 1,2-diaminoisobutane, the composition also comprises an accelerator selected from the group consisting of ethanolamine, diethalonamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts, said composition containing essentially no phosphorous.

2. A phosphorous-free dishwashing detergent and tarnish removing composition, formulated in the form of a powder, said composition comprising a chelating agent selected from the group consisting of ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts; at least one surfactant; with the proviso that when the chelating agent is other than ethylenediamine, 1,2-diaminopropane,

1,3-diaminopropane or 1,2-diaminoisobutane, the composition also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts, said composition comprising essentially no phosphorous.

3. A liquid dishwashing detergent and tarnish removing composition, comprising water; a chelating agent selected from the group consisting of 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts; at least one surfactant; and at least one phosphorous-containing builder; with the proviso that if the chelating agent is other than 1,2-diaminopropane, 1,3-diaminopropane or 1,2-diaminoisobutane, the composition also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylene-triamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts.

4. A dishwashing detergent and tarnish removing composition, formulated in the form of a powder, said composition comprising a chelating agent selected from the group consisting of 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid and diethylenetriamine pentaacetic acid

salts; at least one surfactant, and at least one phosphorous containing builder; with the proviso that when the chelating agent is other than 1,2-diaminopropane, 1,3-diaminopropane or 1,2-diaminoisobutane, the composition also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylene-triamine, 1,4-diaminobutane, triethylenetetraamine, and ammonium salts.

5. A composition according to claim 1 or claim 3 wherein the chelating agent is present at a concentration of at least about 0.1% by weight of the detergent composition and, if the accelerator is present, the accelerator is present at a concentration of at least about 0.1% by weight of the detergent composition and the weight ratio of chelating agent to accelerator is about 1 to 5 to about 5 to 1.

6. A composition according to any one of claims 2, 4 and 5 wherein the chelating agent is present at a concentration of at least about 1% by weight of the detergent composition and, if the accelerator is present, the accelerator is present at a concentration of at least about 1% by weight of the detergent composition and the weight ratio of chelating agent to accelerator is about 1 to 3 to about 3 to 1.

7. A composition according to claim 6 as appendant to claim 5, wherein the chelating agent is present at a concentration of about 3% by weight and the accelerator,

if present, is present at a concentration of about 2% by weight.

8. A composition according to claim 6 as appendant to claim 2 or claim 4, wherein the chelating agent is present at a concentration of at least 3% by weight and the accelerator, if present, is present at a concentration of at least about 3% by weight.

9. A composition according to claim 8, wherein the concentration of the chelating agent is about 6% by weight and the concentration of the accelerator if present, is about 3.5% by weight.

10. A composition according to claim 2 or claim 4, said composition also comprising at least one suds control agent.

11. A composition according to claim 10, said composition also comprising a corrosion inhibitor.

12. A method of removing tarnish from household articles having a surface comprising silver or a substantial amount of copper, said method comprising rubbing the tarnished surface by hand with an aqueous solution comprising a chelating agent selected from the group consisting of ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts, with the proviso thatwhen the chelating agent is other than ethylenediamine, 1,2-diaminopropane, 1,3-

diaminopropane or 1,2-diaminoisobutane, said aqueous solution also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetramine, and ammonium salts.

13. A method according to claim 12, wherein said aqueous solution is a dishwashing liquid that also comprises a surfactant.

14. A method according to claim 12, wherein the chelating agent is present at a concentration of at least about 0.1% by weight of the detergent composition, and if the accelerator is present, the accelerator is present at a concentration of at least about 0.1% by weight of the detergent composition and the weight ratio of chelating agent to accelerator is about 1 to 5 to about 5 to 1.

15. A method according to claim 14, wherein the chelating agent is present at a concentration of at least about 1% by weight of the detergent composition and, if the accelerator is present, the accelerator is present at a concentration of at least about 1% by weight of the detergent composition and the weight ratio of chelating agent to accelerator is about 1 to 3 to about 3 to 1.

16. A method according to claim 15, wherein the chelating agent is present at a concentration of about 3% by weight and the accelerator, if present, is present at a concentration of about 2% by weight.

17. A method of removing tarnish from household articles

having a surface comprising silver or a substantial amount of copper, said method comprising contacting the tarnished surface in an automatic dishwasher when an aqueous solution comprising a chelating agent selected from the group consisting of ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane, 1,2-diaminoisobutane, ethylenediamine tetraacetic acid, ethylenediamine tetraacetic acid salts, diethylenetriamine pentaacetic acid, and diethylenetriamine pentaacetic acid salts, and also comprising a surfactant, with the proviso that when the chelating agent is other than ethylenediamine, 1,2-diaminopropane, 1,3-diaminopropane or 1,2-diaminoisobutane, said aqueous solution also comprises an accelerator selected from the group consisting of ethanolamine, diethanolamine, triethanolamine, diethylenetriamine, 1,4-diaminobutane, triethylenetetramine, and ammonium salts.

18. A method according to claim 17, wherein said aqueous solution is obtained by dissolving a dishwashing detergent composition, formulated as a powder, in the wash water of the dishwasher during the wash cycle of the dishwasher.

19. A method according to claim 17, wherein the chelating agent is present at a concentration of at least about 1% by weight of the detergent composition and, if the accelerator is present, the accelerator is present at a concentration of at least about 1% by weight of the detergent composition and the weight ratio of

chelating agent to accelerator is about 1 to 3 to about 3 to 1.

20. A method according to claim 19, wherein the chelating agent is present at a concentration of at least about 3% by weight and the accelerator, is present, is present at a concentration of at least about 3% by weight.

21. A method acording to claim 20, wherein the concentration of the chelating agent is about 6% by weight and the concentration of the accelerator, if present, is about 3.5% by weight.