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CORROSION AND CHINA PATTERN FADING INHIBITOR

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This invention relates to the protection during dishwashing of designs and patterns on china and dishware as well as of metals, particularly where the dishwashing is performed by mechanical dishwashers.

Prior to the present invention there was not so effective a method of curtailing the corrosive and damaging effects of highly alkaline and chlorine-active mechanical dishwashing agents which did not reduce the agents' cleaning power.

One of the difficulties encountered by those working in the field is the tendency of some otherwise useful inhibitors to cause foaming to an extent undesirable in mechanical dishwashers.

The attack on metals and china patterns by mechanical dishwashing agents is fundamentally caused by their high alkalinity or available chlorine content or both. Mechanical dishwashing agents are generally higher in alkalinity than hand dishwashing agents because of the lower efficiency of the machine. High alkalinity and chlorine provides the destructive power which is the basis of the attack on china patterns of whatever type.

I have found that fading of china patterns and the attack on metals caused by mechanical dishwashing agents can be inhibited through the use of my invention, more fully described herein.

I have found that the addition of a surprisingly small amount of aluminum formate, aluminum formate basic, aluminum acetate, or aluminum acetate basic will effectively inhibit the tendency of highly alkaline dishwashing detergent or other agent to cause fading of patterns and designs on dishes and the like. For example, as little as .25% of aluminum acetate in a dishwashing agent will completely inhibit the destructive tendencies toward metals as well as china patterns without causing excessive foaming or other undesirable side effects. Even smaller amounts exhibit a noticeably beneficial effect.

The action of aluminum acetate, aluminum acetate basic, aluminum formate, and aluminum formate basic in protecting the patterns is effective with all types of dishwashing compounds.

Most mechanical dishwashing agents are to an extent inhibited against metal corrosion in order to protect the metal of the dishwashing machine. The most commonly used metal corrosion inhibitors are silicates, such as sodium metasilicate.

I have found that where aluminum acetate, aluminum acetate basic, aluminum formate, or aluminum formate basic is used with a compound containing a corrosion inhibitor such as a sodium metasilicate, the corrosion inhibitive action of the composition is greatly increased. Moreover, the amount of silicate used may be greatly decreased while the amount of aluminum compound substituted is much smaller, which results in the important advantage of making possible a higher percentage of the more important cleaning components of the composition. The protection provided by the combination is greater than an equivalent amount of either substance alone. For example, a highly alkaline and corrosive mechanical dishwashing composition comprising the following ingredients exhibited excellent minimum corrosive properties in regard to metal and no fading tendencies in

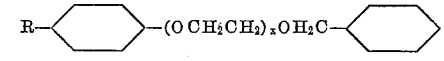
regard to china patterns with the addition of a small amount of aluminum acetate basic:

	Percent
Sodium tripolyphosphate anhydrous	68.70
Sodium metasilicate anhydrous	27
Dichlorcyanuric acid	3.80
Aluminum acetate basic	0.50

It is impossible to obtain the necessary protection in such a composition through the use of sodium silicate alone.

The described composition is not only highly alkaline but also contains a substantial amount of active chlorine, normally highly destructive to metals. My invention provides a corrosion-free environment together with the additional characteristic of the elimination of the tendency to cause fading of designs and patterns on dishware even in compositions otherwise highly corrosive and destructive. Yet the composition retains its excellent cleaning powers.

That my invention is equally effective in compositions not containing active chlorine is demonstrated by its use in the following illustrative formula:

	Percent
Sodium metasilicate pentahydrate	54
Sodium tripolyphosphate anhydrous	42
"Triton CF–10" (a reaction product of benzyl chloride and ethoxylated alkylphenol  where R is an alkyl chain of about nine carbon atoms and X is a whole number from 12 to 20)	3.5
Aluminum acetate basic	0.5

The metal and china damaging tendencies of this otherwise highly destructive composition are for all practical purposes completely inhibited through the use of my invention. The relatively small amount of sodium metasilicate is possible because of the addition of aluminum acetate basic.

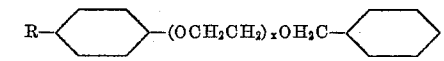
My invention is by no means limited to the above compositions but on the contrary is highly effective in all types of mechanical dishwashing agents with highly destructive tendencies due to high alkalinity or active chlorine or both.

While I have described certain present preferred embodiments of my invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise embodied within the scope of the following claims.

I claim:

1. A mechanical dishwashing composition inhibited against the tendency to cause china pattern fading consisting essentially of, by weight, about 137 parts sodium tripolyphosphate anhydrous, about 54 parts sodium metasilicate anhydrous, 7½ parts dichlorcyanuric acid, and one part aluminum acetate basic.

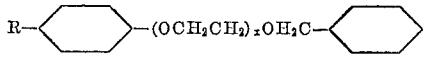
2. A mechanical dishwashing composition inhibited against the tendency to cause china pattern fading consisting essentially of, by weight, about 54% sodium metasilicate pentahydrate, about 42% sodium tripolyphosphate, about 3.5% of a compound selected from the group consisting of those of the general formula



where R is an alkyl chain having from six to 12 carbon atoms and X is a whole number from 12 to 20, and about 0.5% of aluminum acetate basic.

3. A mechanical dishwashing composition inhibited against the tendency to cause china pattern fading, consisting essentially of, by weight, about 40% to about 65%

sodium metasilicate pentahydrate, about 30% to about 50% sodium tripolyphosphate, about 2% to about 5% of a compound selected from the group consisting of those of the general formula



where R is an alkyl chain having from five to 14 carbon atoms and X is a whole number from 12 to 20, and about 0.1% to about 0.5% of a compound selected from the group consisting of aluminum formate, aluminum formate basic, aluminum acetate, and aluminum acetate basic and mixtures thereof.

References Cited in the file of this patent

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