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(73) Proprietor: **ECOLAB INCORPORATED**
370 North Wabasha Street
Saint Paul, MN 55101(US)

(72) Inventor: **BULL, Sandra, L.**
1254 Wilderness Curve
Eagan, MN 55123(US)
Inventor: **GLADFELTER, Elizabeth, J.**
1754 Arona Street
Falcon Heights, MN 55113(US)
Inventor: **OLSON, Keith, E.**
13952 Eveleth Court
Apple Valley, MN 55124(US)

(74) Representative: **Strasse, Maiwald, Meys, Stach & Vonnemann**
Postfach 90 09 54
D-81509 München (DE)

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Rank Xerox (UK) Business Services
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Description

Field of the Invention

The invention relates to a detersive system containing soil removing detergents, an encapsulated halogen source and an organic component such as a polyalkylene oxide polymer, and to the use of the system in cleaning. More specifically the detersive systems of the invention can contain an active encapsulated halogen source and organic component, preferably an alkylene oxide polymer, which are co-stable at relatively high concentration during manufacture, storage, distribution, sale and use. Such detersive systems can be used in a variety of environments including general purpose cleaning, laundry, warewashing, etc., while producing an effective concentration of active chlorine for stain removal and sanitizing purposes in the presence of organic materials such as defoamers, soil removing nonionic surfactants and other polyalkylene oxide polymers.

Background of the Invention

Detersive systems have been used for many years in cleaning environments such as laundry, warewashing, hard surface cleaning and other general cleaning applications. Typically detersive systems are concentrates comprising mixtures of cleaning ingredients that, just prior to use, are mixed with water to form a cleaning medium or final use composition.

Many detersive systems contain organic materials that function in a variety of modes. Such organics can act as defoaming agents, dispersing agents, soil removing surfactants, thickening agents, casting aids, anti-redeposition aids, viscosity modifiers, brightening agents, etc. One important class of organic materials is polyalkylene oxide polymers. The polyalkylene oxide polymers derive their properties from the presence of large polymeric units derived from ethylene oxide, propylene oxide, heteric polymers thereof or block copolymers thereof.

In a variety of use environments for such detersive systems, the presence of oxidizing available halogen such as chlorine or bromine can be important. Such halogen compounds can clean and remove certain residues, and can remove stains by oxidizing and destroying color generating functional groups in organic molecules. Further, the presence of sufficient concentrations of active chlorine can kill microorganisms and provide an antimicrobial or sanitizing action. However, detersive systems manufacturers have been reluctant to produce detersive systems in which organic materials such as polyalkylene oxide polymers and active chlorine yielding substances come into direct contact. Such contact can have undesirable safety and performance consequences.

In the manufacture of a variety of detersive systems, contacting many organic substances with active chlorine compounds is hazardous. At elevated temperatures or at high concentrations, contacting such organic compounds with active chlorine-yielding substances can result in a rapid reaction between the chlorine substances and the organic materials resulting in the production of large volumes of smoke or fire. If the detersive systems are successfully manufactured without rapid reaction between the chlorine and polyalkylene oxide components, the materials during manufacture, packaging, storage, distribution, sale and use can slowly react causing a significant depletion in the concentration of both the organic materials and the active chlorine substance. Such reactions commonly occur at a rate such that the concentration of active chlorine in the detersive system is below the concentration necessary for sanitizing properties and even is often below the concentration required for stain removal. Further such reactions can reduce the concentration of the organic materials to a level that results in substantially reducing the level of properties derived from the polymer.

European Patent Application No. 307,587 discloses a cast detergent composition comprising an alkali metal silicate, alkali metal condensed phosphate, encapsulated bleaching source and optional ingredients such as a surfactant, a defoamer, such as a copolymer of ethylene oxide and propylene oxide, etc. The encapsulated bleaching source is coated with a first inner coating of a separating water soluble compound and a second outer coating of a cellulose ether.

Brennan et al., U.S. Patent No. 3,637,509 discloses dishwashing detergent compositions containing a combination of an alkali metal tripolyphosphate and an organic chlorinating agent, in which the combination is coated with tetrapotassium pyrophosphate. The coated composition is then combined with other detergent ingredients.

We have found that active halogen can be lost through a spontaneous degradation of active chlorine and by reactivity of chlorine with functional groups commonly found in organics used in detersive systems. The common functional groups reactive with active chlorine compounds include olefinic bonds commonly found in unsaturated fatty acids which are a common composition of alkali metal soaps, hydroxyl groups typically found in organic builders, amine groups, ether groups common in polyalkylene oxide polymers and aromatic rings typically found in alkyl benzene sulfonates, alkyl phenol ethoxylates, etc. The prior art commonly kept the concentration of organics less than 5 wt-% to reduce the harmful effects of the organic/chlorine interaction.

Accordingly a substantial need exists in the art for detersive systems containing significant effective concentrations (greater than 5 wt-%) of organic materials in the form of surfactants, foam suppressing agents and other functional materials, and containing effective concentrations (greater than 5 wt-%) of active halogen from halogen yielding compounds.

Brief Description of the Invention

We have found that a cast, solid detersive system containing an effective amount of a source of alkalinity, an effective hardness sequestering agent, at least 5 wt-% of an encapsulated source of halogen and at least 20 wt-% of an organic such as polyalkylene oxide polymer is an effective detersive system that can be used in general purpose cleaning, laundry, warewashing, hard surface cleaning and sanitizing, and a variety of other end uses. We have surprisingly found that such materials when cast in a solid form result in substantial stability of an effective concentration of both halogen and organic materials during manufacture, storage, distribution and use. We have found that for periods typical in the lifetime of such a product, the products can maintain a substantial concentration of active halogen and an effective concentration of organics until the product is entirely consumed.

Detailed Discussion of the Invention

The detersive systems of the invention can comprise an effective amount of a source of alkalinity, an effective amount of a hardness sequestering agent, at least 5 wt-%, up to 60 wt-%, of an encapsulated source of halogen compound, and at least 20 wt-%, up to 50 wt-%, of an organic composition such as a polyalkylene oxide polymer. The detersive systems of this invention are typically in the form of a cast, solid material wherein the material is in the form of a large, solid mass having a minimum weight of 50 grams held within a disposable container. The detersive system or concentrate can he dispensed from the container or can he removed from its container and placed into a dispenser for dilution and use at the use site.

Inorganic Source of Alkalinity

The detersive systems of the invention can contain a source of alkalinity. Sources of alkalinity identified as being useful in combination with the other components of the detersive systems of the invention include but are not limited to the following: alkali metal hydroxide, alkali metal phosphate, alkali metal carbonate, alkali metal bicarbonate, alkali metal sequicarbonate, alkali metal borate, alkali metal silicate, and mixtures thereof. Alkali metal hydroxides are typically used where the detersive system requires strong cleaning action and highest pH. Silicates $M_2O:SiO_2$ compounds having a ratio from 2:1 to 1:3.6 wherein M is an alkali metal ion) are typically a reaction product between an alkali metal hydroxide and silica. Such silicates are primarily used as a source of alkalinity where moderate strength and pH are required. Carbonate and borate sources of alkalinity are typically used in compositions having an alkaline pH but do not require the strength of alkalinity of silicates or hydroxides.

Hardness Sequestering Agents

The detersive systems of the invention typically contain a hardness sequestering agent to reduce the harmful effects of divalent and trivalent metal ions on the components of the detersive systems. The detersive systems of the invention can contain both organic and inorganic hardness sequestering agents. Such sequestering agents are typically in the form of polyanionic materials.

Inorganic hardness sequestering agents include alkali metal condensed phosphates in the form of pyrophosphate, tripolyphosphate, hexametaphosphate, etc. Organic hardness sequestering agents included polymeric and copolymeric compositions having pendent carboxylic acid functionality derived from carboxylic acid containing monomers such as acrylic acid, methacrylic acid, maleic acid, itaconic acid, fumaric acid and mixtures thereof, etc.; alkali metal salts or organic substituted phosphonic acid and polyphosphonic acids, alkali metal salts of gluconic acid, alkali metal salts of ethylene diamine tetraacetic acid, alkali metal salts of nitrilotriacetic acid, and mixtures thereof.

Organic Materials

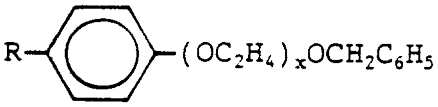
A variety of organic functional materials can be used in the detersive systems of the invention. Such functional materials include absorbents, adsorbents, antimicrobials, antioxidants, anti-soil agents, perfumes, dyes, binders, chelating agents, corrosion inhibitors, coupling agents, defoamers, dispersants, solubilizers, stabilizers, thickeners, and UV absorbers. Examples of such absorbents and adsorbents are microcrystalline cellulose, zinc ricinoleate, free-flowing malto dextrin, powdered acrylate copolymers, and others. Anti-soil or anti-soil redeposition agents that can bed used include fatty acid amides, fluorocarbon surfactants, complex phosphate esters, styrene maleic anhydride copolymers, and cellulosic derivatives such as hydroxyethyl cellulose, hydroxypropyl cellulose, and others. Powder binders that can be used to aid in the formation of solid materials include microcrystalline cellulose, long chain lactate esters, long chain oleate esters, polyacrylamides, microcrystalline waxes, polyvinyl alcohol resins, polyethylene, polyvinyl pyrrolidone, and others.

Defoamers that can be used in the detersive systems of the invention include high molecular weight C_{10-40} linear primary alcohols, polyalkylene glycols, well known silicone defoamers, certain acrylate copolymers, and others.

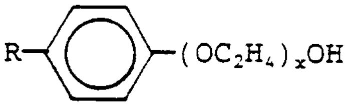
One important class of functional organic materials in the manufacture of detersive systems of the invention comprises organic surfactants. A wide variety of surfactants can be used in the detersive systems of the invention including anionic surfactants, zwitterionic surfactants (containing both anionic and cationid groups), cationic surfactants and nonionic surfactants. Anionic surfactants include alkyl carboxylate (sodium and potassium soaps), alkyl sulfate, alkyl ether sulfate, alkyl benzene sulfonate, alkyl sulfonate, sulfonated fatty acid ester, sulfosuccinate surfactant.

Nonionic surfactants typically in the form of compositions having polyalkylene oxide polymers as a portion of the surfactant molecule can be useful in the detersive systems of the invention.

Nonionic surfactants which are advantageously employed in the composition of this invention include, but are not limited to, the following polyoxyalkylene nonionic detergents: C_8-C_{22} normal fatty alcohol-ethylene oxide or propylene oxide condensates, i.e., condensation products of one mole of a fatty alcohol Containing 8 to 22 carbon atoms with from 2 to 20 moles of ethylene oxide or propylene oxide; polyoxypropylene-polyoxyethylene condensates having the formula $HO(C_2H_4O)_x(C_3H_6O)_y$-H wherein $(C_2H_4O)_x$ equals at least 15% and $(C_3H_6O)_y$ equals 20-90% of the total weight of the compound; alkyl polyoxypropylenepolyoxyethylene condensates having the formula $RO\text{-}(C_3H_6O)_x(C_2H_4O)_yH$ where R is a C_1-C_{15} alkyl group and x and y each represent an integer of from 2 to 98; polyoxyalkylene glycols as described in U.S. Pat. No. 3,048,548; butylene oxide capped alcohol ethoxylates having the formula $R\text{-}(OC_2H_4)_y(OC_4H_9)_xOH$ where R is a C_8-C_{18} alkyl group and y is from 3.5 to 10 and x is from 0.5 to 1.5; benzyl ethers of polyoxyethylene condensates of alkyl phenols having the formula



where R is a C_6-C_{20} alkyl group and x is an integer of from 5 to 40; and alkyl phenoxy polyoxyethylene ethanols having the formula



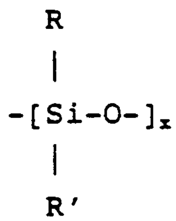
where R is a C_8-C_{20} alkyl group and x is an integer of from 3 to 20.

Non-Surfactant Polyoxyalkylene Groups

Nonsurfactant polyalkylene oxide polymers are used in the manufacture of the detersive systems of the invention as a binder or as a casting agent in which the materials of the invention are blended with the casting agent at elevated temperatures and the cooling of the blended material solidifies the casting agent resulting in a stable cast solid. Such polyalkylene oxide polymers comprise homopolymers of ethylene oxide (EO), homopolymers of propylene oxide (PO), heteric EO/PO copolymers or block EO/PO copolymers, for example, those of molecular weight from 1,000 to 10,000, especially 6,000 to 8,000. These materials are not to be considered as surfactant materials in the context of the present invention.

Additional Ingredients

The detersive systems of the invention can contain anti-foaming agents, typically in an amount of from 0.001% to 2%, preferably 0.05 to 1%. Such foam suppressing or foam regulating agents include silicone compounds, phosphate esters, microcrystalline slack waxes, etc. In somewhat greater detail, preferred foam suppressing agents are silicone materials which are siloxanes having the formula



$$-[\overset{\displaystyle R}{\underset{\displaystyle R'}{|}}\!\!\!\!\!\!\!Si\text{-}O\text{-}]_x$$

wherein X is from 20 to 2,000 and R and R' are each independently selected from the group consisting of C_{1-20} alkyl or alkyl substituted aryl groups. Preferred groups include methyl, ethyl, propyl, butyl, and phenyl. Polydimethyl siloxanes having a molecular weight in the range of 200 to 200,000 and higher are useful suds controlling agents. Other suds suppressing agents include alkyl phosphate esters such as monostearyl phosphate and microcrystalline waxes having a melting point from 65°C. to 100°C. and having a molecular weight from 400 to 1,000.

The detersive systems of the invention can contain neutral organic and inorganic fillers such as sodium sulfate and sodium chloride. Organic fillers that can be used in the invention include starch, sugars, alkylene glycols having from 1 to 10 carbon atoms, etc. Additionally the compositions can contain proteolytic and amylolytic enzymes, tarnish inhibitors such as benzotriazol, antibacterial agents, anti-soil redeposition agents, soil suspending agents, dyes, perfumes, and silicate, glass and aluminum tarnish suppressing agents.

Method of Casting the Detersive Systems

The components of the detersive systems are typically cast in a disposable container which also acts as a mold. The detersive system can be dispensed from the container or can be removed from the container prior to insertion in the dispenser. Alternatively the detersive system components can be cast in a reusable mold wherein the cast material is removed from the mold and placed into a separate disposable container for Shipment and use.

The detersive system can be cast in virtually any order of addition of materials to a mixing unit. Once uniform the material for casting is then placed in an appropriate mold.

A preferred mode of casting the material is to place the low molecular weight and water soluble materials into a mixing chamber in conjunction with any water used in the manufacture of the materials. Next the higher molecular weight or insoluble materials are slowly added to the contents of the mixing unit until a uniform suspension is obtained. Lastly the active halogen source can be added to the mixture. The mixture is carefully agitated at a slow rate such that the integrity of the encapsulate is not compromised.

Encapsulate

The encapsulated sources of halogen of this invention comprise a core of an active halogen compound and at least one coating layer. Preferably the encapsulated sources of halogen have a core and two or more coating layers. If one layer is used it preferably comprises an inorganic coating of a composition compatible with the halogen source, however certain coatings of a synthetic detergent an be used. If two layers are used the first layer comprises a typically inert or inorganic coating agent and the second layer comprises an organic layer or a synthetic detergent layer.

Halogen Source

The halogen releasing substances suitable as a core material include halogen components capable of liberating active halogen species such as a free elemental halogen or -OX- wherein X is Cl or Br, under conditions normally used in detergent-bleaching cleaning processes. Preferably the halogen releasing compound releases chlorine or bromine species. The most preferred halogen releasing compound releases chlorine. Chlorine releasing compounds include potassium dichloroisocyanurate, sodium dichloroisocyanurate, chlorinated trisodium phosphate, calcium hypochlorite, lithium hypochlorite, monochloroamine, dichloroamine, pentaisocyanurate, 1,3-dichloro-5,5-dimethyl hydantoin, paratoluene sulfondichloro-amide, trichloromelamine, N-chloromelamine, N-chlorosuccinimide, N,N'-dichloroazodi-carbonamide, N-chloro-acetyl-urea, N-N-dichlorobiuret, chlorinated dicyandiamide, trichlorocyanuric acid, and dichloroglycoluril.

Sodium dichloroisocyanurate, potassium dichloroisocyanurate and the dihydrates thereof are the most preferred oxidizing chlorine source suitable as a core substance. These materials are commercially available and may be obtained from sources such as Monsanto or Olin Corp.

Coating Materials

The coating on the active halogen source can be a single or multiple layer coating. Single layer coatings can comprise virtually any inert organic or inorganic coating material stable with a halogen source that is solid at room temperature. In the instance that a multiple layer coating is used, often the first layer is an inorganic layer where the second layer comprises an organic layer that can be drawn from a variety or sources.

Nearly any substance may be employed as the first coating so long as it is substantially halogen inert and is a solid at normal storage temperature typically between 30° and 100° F. (-1° to 38° C.). The coating materials is preferably inert with respect to the core material. If the inner coating material is potentially reactive with the core material, the core meterial may be initially coated with an inert material to prevent or retard any reaction between the core and this first coat, the initial cost acting as a chemical barrier between the core and the first and other layers. Useful inorganics in the coating material include alkalies such as sodium carbonate, sodium bicarbonate, sodium sequicarbonate, sodium borate, potassium bicarbonate, potassium sequicarbonate, potassium borate, phosphates such as diammonium phosphates, monocalcium phosphate, tricalcium phosphate, calcium pyrophosphate, iron pyrophosphate, magnesium phosphate, monopotassium orthophosphate, potassium pyrophosphate, disodium orthophosphate, trisodium orthophosphate, tetrasodium pyrophosphate, sodium tripolyphosphate, sodium phosphate glass; neutral salts such as zeolites, sodium sulfate, sodium chloride, and talc; silicates and silicate hydrates such as sodium metasilicate, sodium sequisilicate, dry sodium/potassium silicate water glasses, sodium orthosilicate and mixtures thereof.

A useful initial inorganic coating compound for a halogen bleach core material to be used in a detergent composition would be an admixture of sodium sulfate and sodium tripolyphosphate. Sodium sulfate and sodium tripolyphosphate are relatively inert with respect to halogen bleaches and are components commonly blended into detergent compositions.

Outer Coating Materials

Nearly any substance may be employed as the outer coating material so long as it is solid at normal storage temperatures (typically between -1.1°C (30°F) and 37.8°C (100°F)). A nonexhaustive list of compounds which may be used as the second coat includes alkalies such as sodium carbonate, sodium bicarbonate, sodium sequicarbonate, sodium borate, potassium bicarbonate, potassium sequicarbonate, potassium borate, sodium sulfate hydrate, phosphates such as diammonium phosphates, monocalcium phosphate, tricalcium phosphate, calcium pyrophosphate, iron pyrophosphate magnesium phosphate, monopotassium orthophosphate, potassium pyrophosphate, disodium orthophosphate, trisodium orthophosphate, tetrasodium pyrophosphate, sodium tripolyphosphate, sodium phosphate glass; neutral salts such as zeolites, sodium sulfate, sodium chloride, and talc; silicates and silicate hydrates such as sodium metasilicate, sodium sequisilicate, dry sodium/potassium silicate water glasses, sodium orthosilicate; organic sequestering agents such as copolymers of vinylacetate and maleic anhydride, copolymers or acrylic acid and maleic anhydride, copolymers of maleic anhydride and itaconic acid, polyacrylic acid; and N-alkyl sulfonate, such as octyl sulfonate, sodium carboxymethyl celluloses, hydropropyl cellulose, hydroxyethyl ether of cellulose, hydroxypropylmethyl cellulose; C_{12} to C_{20} fatty acids such as stearic acid, palmitic acid, and n-alkanoic acids; paraffin waxes; microcrystalline waxes; C_{12} and greater primary and secondary solid alcohols; Pluronic surfactants with molecular weight between 8,000 to 16,500; primary and secondary alkyl sulfates; and alkali metal sulfonates and mixtures thereof. The preferred encapsulate uses an outer coating that is insoluble in the liquid composition prior to casting. After the detersive system is cast, the preferred encapsulates are water soluble to permit release of the halogen into the cleaning medium.

The synthetic detergent compound used in the coating must remain sufficiently solid at temperatures likely to be encountered during storage of the product, for example, temperatures of 15 to 50° C., and also remain stable at temperatures likely to be encountered during processing of the product into end use mixtures, for example, temperatures of 15 to 95° C.

Synthetic detergents that can be used include anionic, cationic, nonionic and amphoteric detergent compositions. Examples of anionic detergents useful in the detergent-bleach compositions of the invention are the higher alkyl mononuclear aromatic alkali-metal sulfates and sulfonates, and linear alkyl sulfates and sulfonates such as alkylbenzene sulfonates having 9 to 13 carbon atoms in the alkyl group wherein the alkyl group is derived from polypropylene as described by Lewis in U.S. Pat. No. 2,477,382, or wherein the alkyl group is a hexene dimer or trimer as in McEwan, U.S. Pat. No. 3,370,100, or wherein the alkyl group is derived from alpha-olefins, as in Swenson, U.S. Pat. No. 3,214,462. Also there may be employed primary and secondary alkyl sulfates.

The soaps are included within the definition of anionic detergents as used herein. Examples of operable soaps soluble with the present invention are the sodium and potassium salts of acyclic monocarboxylic acids having chain lengths of 8 to 22 carbon atoms.

A particularly suitable synthetic detergent for use as a coating in the present invention is preoxidized sodium octyl sulfonate. The sodium octyl sulfonate may contain 1,2 alkane bisulfonate as a by-product of manufacture which does not affect the performance of sodium octyl sulfonate as a coating in the invention.

The organic compound coating is applied as a solution in a suitable solvent, water being preferred because of its compatibility with chlorine releasing agents, non-flammability, and non-toxicity.

The compositions of the present invention may be formulated with a detergent builder as a detergency aid, for example, those mentioned hereinafter, to provide a commercially valuable detergent-bleach composition.

Inorganic fillers suitable for coating agents include alkalies such as sodium bicarbonate, sodium sequicarbonate, sodium borate, potassium bicarbonate, potassium sequi-carbonate, potassium borate; phosphates such as diammonium phosphate, monocalcium phosphate monohydrate, tricalcium phosphate, calcium pyrophosphate, iron pyrophosphate, magnesium phosphate, monopotassium orthophosphate, potassium pyrophosphate, dry, disodium orthophosphate, dihydrate, trisodium orthophosphate, decahydrate, tetrasodium pyrophosphate, sodium tripolyphosphate, sodium phosphate glass; neutral soluble salts such as sodium sulfate and sodium chloride; silicates; organic sequestering agents; and anti-redeposition agents.

When carrying out the process of the instant invention, the protective encapsulate materials or coatings of the invention are conveniently applied using fluidized bed encapsulating equipment. Such equipment comprises a coating chamber or cylindrical tower wherein the coating or encapsulation of the particles is accomplished. An unexpanded bed of the particles to be coated is introduced into the equipment. A nozzle constituting a spraying means is disposed within the equipment and adapted to be adjusted vertically so that the liquid coating material discharged in a downwardly diverging three-dimensional spray pattern would just cover the upper surface area of the bed.

The coating solution is contained in a vessel and is fed to the nozzle. Fluidizing gas (typically air) passes into the fluidized bed area. The fluidized gas is heated or cooled if required, in order to maintain the fluidizing gas within a desired temperature range.

A known weight of particles of a halogen source to be coated is placed in the equipment. Air is caused to flow into the fluidized bed thereby expanding the layer of particles, and maintaining the particles in continuous motion within the volume defined by the expanded bed, thus forming a fluidized bed. A solution of a coating substance is sprayed through the nozzle on the fluidized bed of particles until all particles in the bed are completely coated. Particles coated by the above-described procedure are completely encapsulated with a continuous coating, and are free-flowing and non-agglomerated.

It is important that each particle be fully covered to prevent the oxidizing halogen source from reacting in the detersive system environment.

When it is desired to apply an initial coating of a coating agent and a subsequent coating of a synthetic detergent, the double coating may be conducted in a single fluidized bed either by applying the first coat, emptying the solution tank, filling the solution tank with the second coating solution and then applying the second coat; or with a dual coating solution inlet to the nozzle, the fluidized particles in the bed first being coated with the coating agent contained in a solution tank, this first coating being allowed to dry and then a second coating of the synthetic detergent contained in a second solution tank being applied, both coatings being conducted in accordance with the previous discussion on the operation of the fluidized bed.

A third method of applying a double coating in a fluidized bed is to coat the core particles with the coating agent in a first fluidized bed apparatus. The coated material is then allowed to dry and placed in a second fluidized bed apparatus, wherein the encapsulated product produced in the first fluidized bed is coated with a second coating solution of a synthetic detergent. The fluidized bed operation is conducted in accordance with the prior discussion of the operation of the fluidized bed.

Before removal of the encapsulated oxidizing chlorine source from the fluidized bed the temperature in the bed can be increased so as to drive off any solvent remaining in the encapsulate. However, the temperature must remain below the melting temperature of the encapsulant and below the degradation temperature of the encapsulated core and coatings.

The encapsulated halogen bleach sources of the present invention comprise 20 to 90 wt-% halogen bleach source core and 10 to 80 wt-% coating when a single coating is utilized, and 20 to 90 wt-% halogen bleach source core, 0.5 to 50 wt-% inorganic coating agent first coat, and 5 to 70 wt-% synthetic coating when a double coating is utilized.

More particularly, the single coated halogen bleach source comprises 30 to 80 wt-% halogen bleach source core and 20 to 70 wt-% synthetic coating and most particularly 40 to 55 wt-% halogen bleach source core and 45 to 60 wt-% synthetic coating.

A more preferred embodiment of the double coated halogen bleach source comprises 30 to 80 wt-% halogen bleach source core, 5 to 50 wt-% inorganic coating agent first coating, and 5 to 50 wt-% synthetic coating. In a most preferred embodiment, the encapsulate comprises 30 to 60 wt-% chlorine bleach source core, 5 to 45 wt-% inorganic coating agent first coating, and 10 to 35 wt-% detergent second coating.

Dispensing

The cast solid detersive systems of the invention can be dispensed from a manual or automatic dispenser in which a stream of water is contacted with a surface of the cast material providing a concentrate that is directed to a use location.

The cast material can be contained in a disposable container and inserted into the dispenser in that form. Alternatively the cast material can be manually removed from a disposable container directly into a dispenser wherein the stream of water is contacted with at least one surface of the material. Typical dispensers are mechanical apparatus containing a nozzle for directing a stream of water onto the solid cast material. The dispenser typically comprises a housing containing the internal working parts. The housing typically includes a storage portion wherein the mass of the solid block detersive system can be supported. The dispenser contains typically a support means upon which the cast material is placed. The support is typically horizontally mounted within the dispenser and maintains the block material in position adjacent to the spray. The preferred support comprises a screen mounted to the inner walls of the housing at a position fixed above the spray such that the spray contacts the majority of the solid cast detersive system. The spray-forming nozzle is connected to a pressurized source of water by means of a supply line. The spray is controlled by a device that can demand the addition of the concentrate made by spraying water on the cast material. Upon the receipt of demand, water flow is directed through the supply line and nozzle onto substantially the entire lower surface of the cast material at pressures typically greater than 6.9×10^4 Pa (10 psi). Heated water can be used depending on the formulation. The use of heated water, all else being equal, increases the rate of dispensing. The detersive system passes in solution form through the support screen and is directed by underlying collector portion of the housing to an outlet port and through a conduit to a utilization point. The utilization point can be a warewashing machine, a station for charging containers such as buckets or other apparatus with a concentrate for dissolution with additional quantities of water, or other use positions.

Alternatively the dispensing apparatus can be manually operated such that a measured amount of concentrate can be produced by manually triggering the spray onto the cast material.

We have found that the stability of the chlorine source in the presence of the organic compositions relates to the quantity of free water in the cast material. We have found that the detersive systems during manufacture may require some water for processing. Preferably all water present in the detersive system is in the form of bound water or water of hydration or complexed water which is sequestered and removed from reactivity with the components. Free water is water available for reaction with the encapsulated chlorine material and can provide a medium of reaction between released chlorine and any organics present in the cast material. We have found that maintaining the concentration of free water below 10 wt-% can aid in preserving the availability of chlorine in the cast material over a substantial period of time, preferably maintaining the concentration of free water at less than 5 wt-% or most preferably less than 2 wt-% can be very effective in maintaining the stability of the material.

Example I

Chlorinated General Purpose Cleaner

Into a stainless steel jacketed tank equipped with a variable speed turbine agitator was charged 10 parts of soft water which was heated to 76.7 °C (170 °F.). Into the mixed water was added 20 parts of a polyethylene glycol (CARBOWAX 8000, Union Carbide) at a sufficient rate to dissolve the CARBOWAX in the water. Agitation was ended and into the tank was placed 22 parts of a linear alkyl benzene sulfonate, 4 parts of a polyacrylic acid polymer (GOODRITE K-7058D, B. F. Goodrich), 14.5 parts of a powdered sodium tripolyphosphate, and 1 part of a granular sodium tripolyphosphate, 14 parts of anhydrous sodium metasilicate and 6 parts of sodium bicarbonate. The product was cooled to a temperature below 62.8 °C (145 °F.). Next, 8.5 parts of an encapsulated sodium dichloroisocyanurate (of Example II) is added to the tank and the contents of the tank are carefully agitated at a temperature below 62.8 °C (145 °F.) in a manner such that the encapsulate is evenly distributed throughout the product. The material is drawn from the tank and 0.91 kg (2 lbs.) of the warm liquid material is placed in polyethylene containers. The containers and their contents are cooled in an air chiller for 12-15 minutes at a temperature less than -12.2 °C (10 °F.) and are solidified.

Example II

The encapsulated sodium dichloroisocyanurate used in Example I was prepared as follows. Into a cylindrical fluidized bed encapsulating machine was placed 61.25 parts of sodium dichloroisocyanurate. The particles were fluidized and suspended in air by an upwardly moving stream of air at a temperature of about 90 °C. Onto the heated suspended particulate was sprayed a solution comprising in 68.97 parts of soft deionized water, 16.5 parts of sodium sulfate and 5.5 parts of sodium tripolyphosphate. The addition of this solution creates a first inorganic layer of mixed sodium sulfate and sodium tripolyphosphate. After the complete addition of the inorganic layer, a solution comprising 49.62 parts of a sodium linear alkyl sulfonate in 49.62 parts of soft water is than sprayed on the fluidized particle. This second step created an organic encapsulate layer on the exterior of the particle. Substantially all free water (about 151.5 parts were removed) was removed during encapsulation.

Example III

Using the procedure of Example II the following encapsulate was prepared.

Ingredient	Parts by Weight
Core:	
Sodium dichloroisocyanurate	63.2
Coating 1:	
Sodium sulfate	25.8
Sodium tripolyphosphate	8.6
Soft water	103.0
Coating 2:	
Hydroxypropyl cellulose	4.9
Soft water	98.4
Water removed during encapsulation	203.9

Example IV

Using the procedure of Example II an encapsulated chlorine source was prepared using the following ingredients.

Ingredient	Parts by Weight
Core:	
Sodium dichloroisocyanurate	63.2
Sodium sulfate	25.8
Coating 1:	
Sodium tripolyphosphate	8.6
Soft water	103.0
Coating 2:	
Hydroxyethyl cellulose	4.9
Soft water	98.3
Water removed during encapsulation	203.9

Example V

An encapsulated chlorine source was prepared using the procedure of Example II using the following ingredients.

Ingredient	Parts by Weight
Core:	
Sodium dichloroisocyanurate	63.2
Coating 1:	
Sodium sulfate	25.8
Sodium tripolyphosphate	8.6
Soft water	103.0
Coating 2:	
Methyl cellulose	4.92
Soft water	245.92
Water removed during encapsulation	351.46

Example VI

Example IV was repeated with the encapsulate of Example II. The prepared material had a chlorine stability of 57.5% chlorine retained at 37.8 ° C (100 ° F) for two weeks of storage.

Example VII

Chlorinated General Purpose Cleaner

Into a stainless steel mix tank equipped with heating and cooling equipment and a variable speed turbine type agitator was added 10 parts of water and 22 parts of polyethylene glycol (CARBOWAX 8000). The glycol was added at a rate such that it was melted and fully mixed upon addition. Into the heated solution was added 20 parts of a linear alkyl sulfonate, 4 parts of a polyacrylate polymer, 15.5 parts of sodium tripolyphosphate, 14.0 parts of sodium metasilicate, and 6 parts of sodium bicarbonate. The contents of the mixer were agitated until uniform and: into the mixer was added 8.5 parts of the encapsulate of Example II. The contents of the mixer were carefully agitated until just uniform. The material manufactured above had a chlorine stability of 106.06% chlorine retained at 37.8 ° C (100 ° F.) for two weeks of storage.

Table 1

Dispensing Characteristics of Product of Example VII		
Temperature	Grams Dispensed (Average of 5 Tests)	
	At 2.1 x 10^5 Pa (30 psi)	At 3.4 x 10^5 Pa (50 psi)
48.9 ° C (120 ° F.)	34.338	53.735
54.4 ° C (130 ° F.)	38.72	59.2
60.0 ° C (140 ° F.)	50.68	66.184
65.6 ° C (150 ° F.)	55.44	81.7

The data in Table 1 shows that the product of Example VII is easily dispensed using warm water at commonly available temperatures at commonly available pressures at most end use sites. The product can easily be dispensed-for any typical end use by controlling either pressure, temperature or dispensing time.

The product was dispensed by placing the material in a dispenser using a 30-second cycle at either 2.1 x 10^5 Pa or 3.4 x 10^5 Pa (30 or 50 psi) and at temperatures ranging from 48.9 ° C-65.6 ° C (120-150 ° F.).

A useful dispenser is shown in FIGURE 1. Referring to Fig. 1, there is generally disclosed a dispenser having a container or housing 20. The housing has a generally cylindrical upper storage portion 21 having a cylindrical inner wall 22. The wall 22 defines an internal cavity 23. The upper terminous of the storage portion 21 defines an access port 24 into cavity 23 of storage portion 21.

Inner wall 22 of housing 20 converges in the downward direction, defining a lower funnel-shaped collector portion 25 of housing 20. Inner wall 22 of housing 20 is configured to form an annular flange at 26 circumferentially extending around inner wall 22 of housing 20 at the juncture of upper storage portion 21 and lower collector portion 25. The lower terminous of collector portion 25 defines an outlet port 27 from internal cavity 23 for passage therethrough of solution collected by collector portion 25. Outlet pore 27 has a hose clamp extension 28 having a plurality of annular ribs configured for engaging the inner walls of a connecting hose or conduit 29.

The outlet port 27 may be directly connected with the wash chemical solution utilization point by conduit 29 and feed thereto by gravity as it is created or feed thereto by a wash chemical solution pump 30 placed in conduit 29.

Housing 20 may be constructed of any suitable material which is capable of withstanding exposure to cleaning solutions, and is preferably configured of stainless steel or molded plastic material. The housing 20 can be constructed of a transparent or translucent material to allow the operator to see at a glance the amount of wash chemical in storage portion 21 and if dispenser 20 needs to be refilled. If housing 20 is not made of a transparent or translucent material, preferably a portion of storage portion 21 is made transparent or translucent to aid in determining when dispenser 20 should be refilled. A pair of mounting plates 32 are connected to and extend rearwardly from the outer surface of housing 20 for securely mounting housing 20 to a vertical side wall.

A door 34 is sized to extend entirely across and to sealingly close access port 24. Door 34 is pivotally mounted at 35 for pivotal motion between a closed and opened position. The lower collector portion 25 of housing 20 has an outwardly projecting coupling portion 36 extending from collector portion 25 adjacent outlet port 27 of collector portion 25. A tube fitting insert 37 is secured within coupling projection 36 and projects through inner wall 22 of collector portion 25 of housing 20. A spray-forming nozzle 38 is threaded into the end of tube insert 37 and is axially aligned within inner cavity 23 of housing 20 in a direction so as to direct an upwardly projected spray pattern therefrom. Tube fitting insert 37 is provided with an O-ring seal 39.

A horizontal support screen 40 is mounted in resting engagement upon annular flanged portion 26 of housing 20. Support screen 40 has 6.45 cm^2 (1 inch square) openings in order to support a solid block of detersive system 80 without significantly interfering with the impingement of water sprayed from nozzle 38 onto the lower surface of water sprayed from nozzle 38 onto the lower surface 81 of the detersive system 80 (i.e., the surface in contact with support screen 40).

A 1/4 to 1/20 inch (0.63 to 0.13 cm) lower screen 41 is placed in collector portion 25 of housing 20 between spray nozzle 38 and outlet port 27 to catch any undissolved chunks of wash chemical 80 small enough to pass through support screen 40. This prevents small chunks of chemical 80 collecting in outlet port 27 or conduit 29 and blocking the flow of concentrated wash chemical solution out of dispenser 20.

A water supply inlet pipe 42 is connected to tube insert 37 and is in communication therewith for providing a source of water flow to spray-forming nozzle 38. Water supply line 42 passes through one of the mounting plate members 32 and receives structural support therefrom. A siphon breaker 43 interrupts water supply line 42. A safety switch 50 is mounted to door 34 for movement therewith and senses the operative position of door 34 relative to access port 24 of housing 20. In the preferred embodiment, safety switch 50 comprises a mercury actuated switch.

FIGURES 2 and 3 represent an embodiment of the product format for the cast detersive systems of the invention. The solid Cast detersive system of the invention is packaged in a closable container 200 which corprises a lid 210 and a lower container section 211. The lid 210 can be made of a variety of materials including paper, film, foil, etc. The lower container can also be mace of a variety of materials, however thermoplastic deformable material is preferred. The lid 210 is adhered to the container 211 through a releasable layer 212 disposed between the lid and the container.

FIGURE 3 shows a side view of the cast detersive system within its container. In use lid 210 is peeled from the top of the lower portion revealing the upper surface of the cast material 80. The container as a whole without the lid can be inserted into the dispenser. Alternatively the container body 211 if made of a deformable material can be flexed for the purpose of removing the cast material 80 in a solid block which can then directly be inserted into the dispenser for contact with a water stream.

While the foregoing discussion, Examples and data provide a basis to understand the invention, many embodiments of the invention can be made without departing from the spirit and scope of the invention. Thus the invention resides in the claims hereinafter appended.

Claims

1. A solid cast, active halogen-containing, storage-stable, detersive system comprising:
    (a) an effective detersive amount of a source of alkalinity;
    (b) an effective amount of a hardness sequestering agent;
    (c) 5 to 60 wt-% of an encapsulated source of active halogen; and
    (d) 20 to 50 wt-% of a polyalkylene oxide polymer.

2. The detersive system of claim 1 wherein the halogen is chlorine.

3. The detersive system of claim 2 wherein there is 15 to 60 wt-% of the encapsulated source of active chlorine.

4. The detersive system of claim 2 wherein there is 15 to 50 wt-% of the encapsulated source of active chlorine.

5. The detersive system of claim 2 wherein there is 20 to 35 wt-% of the source of encapsulated active chlorine.

6. The detersive system of claim 2 wherein the encapsulate comprises 1 to 80 wt-% of a source of active chlorine and 99 to 20 wt-% of an encapsulating layer.

7. The detersive system of claim 6 wherein the encapsulating layer comprises a synthetic anionic surfactant.

8. The detersive system of claim 6 wherein the encapsulating layer comprises 10 to 90 wt-% of a first inorganic layer and 90 to 10 wt-% of a second layer.

9. The detersive system of claim 8 wherein the organic encapsulating layer comprises a cellulosic layer, a synthetic anionic surfactant or mixtures thereof.

10. The detersive system of claim 9 wherein the cellulosic layer comprises methyl cellulose, a hydroxyalkyl cellulose, or mixtures thereof.

11. The detersive system of claim 2 wherein the source of active chlorine is selected from the group consisting of trichloroisocyanuric acid, potassium dichloroisocyanurate, sodium dichloroisocyanurate, sodium dichloroisocyanurate dihydrate, and mixtures thereof.

12. The detersive system of claim 1 wherein the polyalkylene oxide polymeric composition comprises a polyethylene oxide polymer, a polypropylene oxide polymer, or an ethylene oxide/propylene oxide block copolymer.

13. The detersive system of claim 12 wherein the alkylene oxide polymer comprises a nonionic surfactant.

14. The detersive system of claim 13 wherein the nonionic surfactant comprises a block copolymer containing at least one ethylene oxide block and at least one propylene oxide block.

15. The detersive system of claim 14 wherein the nonionic surfactant comprises an alkyl phenol alkoxylate wherein the alkyl group is a C_{1-12} alkyl and the alkoxylate comprises 2 to 24 moles of ethylene oxide.

16. The detersive system of claim 1 wherein the hardness sequestering agent comprises an organic hardness sequestering agent or an inorganic hardness sequestering agent.

17. The detersive system of claim 16 wherein the organic hardness sequestering agent comprises a polyacrylic acid, an organic phosphonate, or mixtures thereof.

18. The detersive system of claim 16 wherein the inorganic hardness sequestering agent comprises a condensed phosphate hardness sequestering agent.

19. The detersive system of claim 18 wherein the condensed phosphate comprises an alkali metal tripolyphosphate sequestering agent.

20. The detersive system of claim 1 wherein the source of alkalinity comprises an alkali metal hydroxide or an alkali metal silicate having an $M_2O:SiO_2$ ratio of about 2:1 to 1:3.6 wherein M is an alkali metal.

21. The detersive system of claim 1 wherein the source of alkalinity comprises an alkali metal carbonate, an alkali metal bicarbonate, an alkali metal borate and mixtures thereof.

22. The detersive system of claim 1 which additionally comprises an anionic surfactant.

23. The detersive system of claim 22 wherein the anionic surfactant comprises an alkyl sulfonate, an alkyl sulfate, an alkyl benzene sulfonate, an alkyl benzene sulfate, or mixtures thereof.

24. A solid, cast, stable, chlorine-containing laundry detergent comprising:
(a) 0.1 to 50 wt-% of a soil-removing nonionic surfactant;
(b) 0.1 to 95 wt-% of a source of alkalinity:
(c) an effective amount of a hardness sequestering agent;
(d) 5 to 60 wt-% of an encapsulated chlorinated isocyanurate compound; and
(e) 20 to 50 wt-% of a polyalkylene glycol casting agent.

25. The detergent of claim 24 wherein there is 15 to 30 wt-% of the encapsulated source of active chlorine.

26. The detergent of claim 24 wherein there is 20 to 25 wt-% of the source of encapsulated active chlorine.

27. The detergent of claim 24 wherein the encapsulate comprises 1 to 80 wt-% of a source of active chlorine and 99 to 20 wt-% of an encapsulating layer.

28. The detergent of claim 27 wherein the encapsulating layer comprises a synthetic anionic srfactant.

29. The detergent of claim 27 wherein the encapsulating layer comprises 10 to 90 wt-% of a first inorganic layer and 90 to 10 wt-% of a second layer.

30. The detergent of claim 29 wherein the organic encapsulating layer comprises a cellulosic layer, a synthetic anonic surfactant or mixtures thereof.

31. The detergent of claim 30 wherein the cellulosic layer comprises methyl cellulose, a hydroxyalkyl cellulose, or mixtures thereof.

32. The laundry detergent of claim 24 wherein the detergent additionally comprises an effective amount of soil anti-redeposition agent.

33. The detergent of claim 32 wherein the soil anti-redeposition agent comprises a carboxymethyl cellulose composition.

34. The detergent of claim 24 wherein the detergent additionally comprises a dye, a perfume, an anti-redeposition agent, a brightener or mixtures thereof.

35. The detergent of claim 24 wherein the chlorinated isocyanurate compound is selected from the group consisting of trichloroisocyanuric acid, potassium dichloroisocyanurate, sodium dichloroisocyanurate, sodium dichloroisocyanurate dihydrate, and mixtures thereof.

36. The detergent of claim 35 wherein the nonionic surfactant comprises a block copolymer containing at least one ethylene oxide block and at least one propylene oxide block.

37. The detergent of claim 36 wherein the nonionic surfactant comprises an alkyl phenol alkoxylate wherein the alkyl group is a C_{1-12} alkyl and the alkoxylate comprises 2 to 24 moles of ethylene oxide.

38. The detergent of claim 24 wherein the hardness sequestering agent comprises an organic hardness sequestering agent or an inorganic hardness sequestering agent.

39. The detergent of claim 38 wherein the organic hardness sequestering agent comprises a polyacrylic acid, an organic phosphonate, or mixtures thereof.

40. The detergent of claim 38 wherein the inorganic hardness sequestering agent comprises a condensed phosphate hardness sequestering agent.

41. The detergent of claim 40 wherein the condensed phosphate comprises an alkali metal tripolyphosphate sequestering agent.

42. The detergent of claim 24 wherein the source of alkalinity comprises an alkali metal hydroxide or an alkali metal silicate having an $M_2O:SiO_2$ ratio of about 2:1 to 1:3.6 wherein M is an alkali metal.

43. The detergent of claim 24 which additionally comprises an anionic surfactant.

44. The detergent of claim 24 which additionally comprises a quaternary fabric softener.

Patentansprüche

1. Festes, gegossenes, aktives Halogen enthaltendes, lagerstabiles Detergentiensystem, das folgende Bestandteile umfaßt:
(a) eine wirkungsvolle, reinigende Menge einer Alkalitätsquelle;
(b) eine wirkungsvolle Menge eines Härtemaskierungsmittels;
(c) 5 bis 60 Gew.-% einer eingekapselten Quelle aktiven Halogens; und
(d) 20 bis 50 Gew.-% eines Polyalkylenoxidpolymers.

2. Detergentiensystem nach Anspruch 1, worin es sich bei dem Halogen um Chlor handelt.

3. Detergentiensystem nach Anspruch 2, worin der Gehalt an eingekapselter Quelle aktiven Chlors 15 bis 60 Gew.-% beträgt.

4. Detergentiensystem nach Anspruch 2, worin der Gehalt an eingekapselter Quelle aktiven Chlors 15 bis 50 Gew.-% beträgt.

5. Detergentiensystem nach Anspruch 2, worin der Gehalt der Quelle eingekapselten aktiven Chlors 20 bis 35 Gew.-% beträgt.

6. Detergentiensystem nach Anspruch 2, worin das eingekapselte Material 1 bis 80 Gew.-% einer Quelle aktiven Chlors und 99 bis 20 Gew.-% einer Einkapselungsschicht umfaßt.

7. Detergentiensystem nach Anspruch 6, worin die eingekapselte Schicht ein synthetisches anionisches oberflächenaktives Mittel umfaßt.

8. Detergentiensystem nach Anspruch 6, worin die Einkapselungsschicht 10 bis 90 Gew.-% einer ersten anorganischen Schicht und 90 bis 10 Gew.-% einer zweiten Schicht unfaßt.

9. Detergentiensystem nach Anspruch 8, worin die organische Einkapselungsschicht eine Celluloseschicht, ein synthetisches, anionisches oberflächenaktives Mittel oder Mischungen daraus umfaßt.

10. Detergentiensystem nach Anspruch 9, worin die Celluloseschicht Methylcellulose, eine Hydroxylalkylcellulose oder Mischungen daraus umfaßt.

11. Detergentiensystem nach Anspruch 2, worin die Quelle aktiven Chlors aus der Gruppe ausgewählt ist, die aus Trichlorisocyanursäure, Kaliumdichlorisocyanurat, Natriumdichlorisocyanurat, Natriumdichlorisocyanuratdihydrat und Mischungen daraus besteht.

12. Detergentiensystem nach Anspruch 1, worin die Polyalkylenoxidpolymerzusammensetzung ein Polyethylenoxidpolymer, ein Polypropylenoxidpolymer oder ein Ethylenoxid/Propylenoxid-Blockcopolymer umfaßt.

13. Detergentiensystem nach Anspruch 12, worin das Alkylenoxidpolymer ein nichtionisches oberflächenaktives Mittel umfaßt.

14. Detergentiensystem nach Anspruch 13, worin das nichtionische oberflächenaktive Mittel ein Blockcopolymer umfaßt, das mindestens einen Ethylenoxidblock und mindestens einen Propylenoxidblock enthält.

15. Detergentiensystem nach Anspruch 14, worin das nichtionische oberflächenaktive Mittel ein Alkylphenolalkoxylat umfaßt, bei dem die Alkylgruppe ein C_{1-12}-Alkyl ist und das Alkoxylat 2 bis 24 Mole Ethylenoxid umfaßt.

16. Detergentiensystem nach Anspruch 1, worin das Härtemaskierungsmittel ein organisches Härtemaskierungsmittel oder ein anorganisches Härtemaskierungsmittel umfaßt.

17. Detergentiensystem nach Anspruch 16, worin das organische Härtemaskierungsmittel eine Polyacrylsäure, ein organisches Phosphonat oder Mischungen daraus umfaßt.

18. Detergentiensystem nach Anspruch 16, worin das anorganische Härtemaskierungsmittel ein kondensiertes Phosphathärtemaskierungsmittel umfaßt.

19. Detergentiensystem nach Anspruch 18, worin das kondensierte Phosphat ein Alkalimetalltripolyphosphat-Maskierungsmittel umfaßt.

20. Detergentiensystem nach Anspruch 1, worin die Alkalitätsquelle ein Alkalimetallhydroxid oder ein Alkalimetallsilikat mit einem $M_2O:SiO_2$-Verhältnis von ca. 2:1 bis 1:3,6 umfaßt, worin M ein Alkalimetall ist.

21. Detergentiensystem nach Anspruch 1, worin die Alkalitätsquelle ein Alkalimetallcarbonat, ein Alkalimetallbicarbonat, ein Alkalimetallborat und Mischungen daraus umfaßt.

22. Detergentiensystem nach Anspruch 1, das zusätzlich ein anionisches oberflächenaktives Mittel umfaßt.

23. Detergentiensystem nach Anspruch 22, worin das anionische oberflächenaktive Mittel ein Alkylsulfonat, ein Alkylsulfat, ein Alkylbenzolsulfonat, ein Alkylbenzolsulfat oder Mischungen daraus umfaßt.

24. Festes, gegossenes, stabiles, chlorhaltiges Wäschedetergens, das folgende Bestandteile umfaßt:
(a) 0,1 bis 50 Gew.-% eines schmutzentfernenden nichtionischen oberflächenaktiven Mittels;
(b) 0,1 bis 95 Gew.-% einer Alkalitätsquelle;
(c) eine wirkungsvolle Menge eines Härtemaskierungsmittels;
(d) 5 bis 60 Gew.-% einer eingekapselten chlorierten Isocyanuratverbindung; und
(e) 20 bis 50 Gew.-% eines Polyalkylenglykolgießmittels.

25. Detergens nach Anspruch 24, worin der Gehalt an eingekapselter Quelle aktiven Chlors 15 bis 30 Gew.-% beträgt.

26. Detergens nach Anspruch 24, worin der Gehalt der Quelle eingekapselten aktiven Chlors 20 bis 25 Gew.-% beträgt.

27. Detergens nach Anspruch 24, worin das eingekapselte Material 1 bis 80 Gew.-% einer Quelle aktiven Chlors und 99 bis 20 Gew.-% einer Einkapselungsschicht umfaßt.

28. Detergens nach Anspruch 27, worin die Einkapselungsschicht ein synthetisches, anionisches oberflächenaktives Mittel umfaßt.

29. Detergens nach Anspruch 27, worin die Einkapselungsschicht 10 bis 90 Gew.-% einer ersten anorganischen Schicht und 90 bis 10 Gew.-% einer zweiten Schicht umfaßt.

30. Detergens nach Anspruch 29, worin die organische Einkapselungsschicht eine Celluloseschicht, ein synthetisches anionisches oberflächenaktives Mittel oder Mischungen daraus umfaßt.

31. Detergens nach Anspruch 30, worin die Celluloseschicht Methylcellulose, eine Hydroxyalkylcellulose oder Mischungen daraus umfaßt.

32. Wäschedetergens nach Anspruch 24, worin das Detergens zusätzlich eine wirkungsvolle Menge eines Mittels zur Verhinderung einer Wiederablagerung von Schmutz umfaßt.

33. Detergens nach Anspruch 32, worin das Mittel zur Verhinderung einer Schmutzwiederablagerung eine Carboxymethylcellulosezusammensetzung umfaßt.

34. Detergens nach Anspruch 24, worin das Detergens zusätzlich einen Farbstoff, einen Duftstoff, ein Mittel zur Verhinderung der Schmutzwiederablagerung, einen Weißmacher oder Mischungen daraus umfaßt.

35. Detergens nach Anspruch 24, worin die chlorierte Isocyanuratverbindung aus der Gruppe ausgewählt ist, die aus Trichlorisocyanursäure, Kaliumdichlorisocyanurat, Natriumdichlorisocyanurat, Natriumdichlorisocyanuratdihydrat und Mischungen daraus besteht.

36. Detergens nach Anspruch 35, worin das nichtionische oberflächenaktive Mittel ein Blockcopolymer umfaßt, das mindestens einen Ethylenoxidblock und mindestens einen Propylenoxidblock umfaßt.

37. Detergens nach Anspruch 36, worin das nichtionische oberflächenaktive Mittel ein Alkylphenolalkoxylat umfaßt, worin die Alkylgruppe ein C_{1-12}-Alkyl ist und das Alkoxylat 2 bis 24 Mole Ethylenoxid umfaßt.

38. Detergens nach Anspruch 24, worin das Härtemaskierungsmittel ein organisches Härtemaskierungsmittel oder ein anorganisches Härtemaskierungsmittel umfaßt.

39. Detergens nach Anspruch 38, worin das organische Härtemaskierungsmittel eine Polyacrylsäure, ein organisches Phosphonat oder Mischungen daraus umfaßt.

40. Detergens nach Anspruch 38, worin das anorganische Härtemaskierungsmittel ein kondensiertes Phosphat-Härtemaskierungsmittel umfaßt.

41. Detergens nach Anspruch 40, worin das kondensierte Phosphat ein Alkalimetalltripolyphosphat-Maskierungsmittel umfaßt.

42. Detergens nach Anspruch 24, worin die Alkalitätsquelle ein Alkalimetallhydroxid oder ein Alkalimetallsilikat mit einem $M_2O:SiO_2$-Verhältnis von ca. 2:1 bis 1:3,6 umfaßt, worin M ein Alkalimetall ist.

43. Detergens nach Anspruch 24, das zusätzlich ein anionisches oberflächenaktives Mittel umfaßt.

44. Detergens nach Anspruch 24, das zusätzlich einen quaternären Gewebeweichmacher umfaßt.

Revendications

1. Système détersif solide coulé, renfermant un halogène actif, stable au stockage, comprenant:
   (a) une quantité efficace détersive d'une source d'alcalinité;
   (b) une quantité efficace d'un agent séquestrant pour adoucir l'eau,
   (c) 5 à 60% en poids d'une source encapsulée d'halogène actif; et
   (d) 20 à 50% en poids d'un polymère de polyolkylène oxyde

2. Système détersif selon la revendication 1 dans lequel l'halogène est du chlore.

3. Système détersif selon la revendication 2 dans lequel la teneur en source encapsulée de chlore actif est de 15 à 60% en poids.

4. Système détersif selon la revendication 2 dans lequel la teneur en source encapsulée de chlore actif est de 15 à 50% en poids.

5. Système détersif selon la revendication 2 dans lequel la teneur en source encapsulée de chlore actif est de 20 à 35% en poids.

6. Système détersif selon la revendication 2 dans lequel la capsule comprend de 1 à 80% en poids de chlore actif et de 99 à 20% en poids d'une enveloppe encapsulante.

7. Système détersif selon la revendication 6 dans lequel l'enveloppe encapsulante renferme un tensio-actif anionique synthétique.

8. Système détersif selon la revendication 6 dans lequel l'enveloppe encapsulante renferme de 10 à 90 % en poids d'un revêtement primaire inorganique et de 90 à 10% en poids d'un revêtement secondaire.

9. Système détersif selon la revendication 8 dans lequel l'enveloppe encapsulante organique contient un revêtement cellulosique, un surfactant anionique synthétique, ou des mélanges de ceux-ci.

10. Système détersif selon la revendication 9 dans lequel le revêtement cellulosique contient de la méthylcellulose , de l'hydroxyméthylcellulose, ou des mélanges de celles-ci.

11. Système détersif selon la revendication 2 dans lequel la source de chlore actif est choisie dans le groupe constitué d'acide trichlorolsocyanurique, dichloroisocyanurate de potassium, dichloroisocyanurate de sodium, dictloroisocyanurate de sodium dihydraté, et des mélanges de ceux-ci.

12. Système détersif selon la revendication 1 dans lequel la composition polymérique à base de polyalkylène oxyde comprend un polymère de polyéthylène oxyde, un polymère de polypropylène oxyde, ou un copolymère séquencé d'éthylène oxyde/propylène oxyde.

13. Système détersif selon la revendication 12 dans lequel le polymère d'alkylène oxyde comprend un surfactant non ionique.

14. Système détersif selon la revendication 13 dans lequel le surfactant non ionique comprend un copolymère séquencé contenant au moins un bloc de polyéthylène oxyde et un bloc de polypropylène oxyde.

15. Système déterif selon la revendication 14 dans lequel le surfactant non ionique comprend un alcoxylate d'alkylphénol dans lequel le groupe alkyle est un radical alkyle en C_{1-12} et l'alcoxylate comprend 2 à 24 moles d'oxyde d'éthylène.

16. Système détersif selon la revendication 1 dans lequel l'agent séquestrant pour adoucir l'eau comprend un agent complexant organique ou un agent complexant inorganique.

17. Système détersif selon la revendication 16 dans lequel l'agent séquestrant organique pour adoucir l'eau comprend un acide polyacrylique, un phosphonate organique, ou leurs mélanges.

18. Système détersif selon la revendication 16 dans lequel l'agent séquestrant inorganique pour adoucir l'eau comprend un agent séquestrant à base de phosphate condensé.

19. Système détersif selon la revendication 18 dans lequel le phosphate condensé comprend un agent séquestrant à base de tripolyphosphate de métal alcalin.

20. Système détersif selon la revendication 1 dans lequel la source d'alcalinité comprend un hydroxyde de métal alcalin ou un silicate de métal alcalin ayant un rapport $M_2O:SiO_2$ d'environ 2:1 à 1:3,6 où M est un métal alcalin.

21. Système détersif selon la revendication 1 dans lequel la source d'alcalinité comprend un carbonate de métal alcalin, un bicarbonate de métal alcalin, un borate de métal alcalin et leurs mélanges.

22. Système détersif selon la revendication 1 qui comprend en outre un surfactant anionique.

23. Système détersif selon la revendication 22 dans lequel le tensio-actif anionique comprend un sulfonate d'alkyle, un sulfate d'alkyle, un sulfonate d'alkylbenzène, un sulfate d'alkylbenzène, ou leurs mélanges.

24. Détergent solide, coulé, stable, renfermant du chlore, pour lessive comprenant:
(a) 0,1 à 50 % en poids d'un agent tensio-actif non ionique pour l'élimination des salissures;
(b) 0,1 à 95% en poids d'une source d'alcalinité;
(c) une quantité efficace d'un agent séquestrant pour adoucir l'eau;
(d) 5 à 60 % en poids d'un composé d'isocyanurate chloré encapsulé; et
(e) 20 à 50 % en poids d'un agent de moulage à base de polyalkylènc-glycol.

25. Détergent selon la revendication 24 dans lequel la teneur en source encapsulée de chlore actif est de 15 à 30% en poids.

26. Détergent selon la revendication 24 dans lequel la teneur en source encapsulée de chlore actif est de 20 à 25% en poids.

27. Détergent selon la revendication 24 dans lequel la capsule comprend 1 à 80% en poids d'une source de chlore actif et 99 à 20% en poids d'une enveloppe encapsulante.

28. Détergent selon la revendication 27 dans lequel l'enveloppe encapsulante comprend un surfactant anionique synthétique.

29. Détergent selon la revendication 27 dans lequel l'enveloppe encapsulante comprend 10 à 90 % en poids d'un revêtement primaire inorganique et 90 à 10 % en poids d'un revêtement secondaire.

30. Détergent selon la revendication 29 dans lequel l'enveloppe encapsulante organique comprend un revêtement cellulosique, un surfactant synthétique anionique ou leurs mélanges.

31. Détergent selon la revendication 30 dans lequel le revêtement cellulosique comprend de la méthylcellulose, de l'hydroxycellulose, ou leurs mélanges.

32. Détergent pour lessive selon la revendication 24 dans lequel le détergent comprend en outre une quantité efficace d'un agent antiredéposition des salissures.

33. Détergent selon la revendication 32 dans lequel l'agent antiredéposition des salissures comprend une composition à base de carboxyméthylcellulose.

34. Détergent selon la revendication 24 dans lequel le détergent comprend en outre un colorant, un parfum, un agent antiredéposition, un agent d'avvivage ou leurs mélanges.

35. Détergent selon la revendication 24 dans lequel le composé d'isocyanurate chloré est choisi dans le groupe constitué d'acide trichlorisocyanurique, dichloroisocyanurate de potassium, dichloroisocyanurate de sodium dichloroisocyanurate de sodium dihydraté, et de mélanges de ceux-ci.

36. Détergent selon la revendication 35 dans lequel le tensio-actif non ionique comprend un copolymère séquencé contenant au moins un bloc de polyéthylène oxyde et au moins un bloc de polypropylène oxyde.

37. Détergent selon la revendication 36 dans lequel le surfactant non ionique comprend un alcoxylate d'alkylphénol dans lequel le groupe alkyle est un radical alkyle en C_{1-12} et l'alcoxylate comprend 2 à 24 moles d'oxyde d'éthylène.

38. Détergent selon la revendication 24 dans lequel l'agent séquestrant pour adoucir l'eau comprend un agent complexant organique ou un agent complexant inorganique.

39. Détergent selon la revendication 38 dans lequel l'agent séquestrant organique pour adoucir l'eau comprend un acide polyacrylique, un phosphonate organique, ou mélanges de ceux-ci.

40. Détergent selon la revendication 38 dans lequel l'agent séquestrant pour adoucir l'eau comprend un agent complexant à base de phosphate condensé.

41. Détergent selon la revendication 40 d'ans lequel le phosphate condensé comprend un agent complexant à base de tripolyphosphate de métal alcalin.

42. Détergent selon la revendication 24 dans lequel la source d'alcalinité comprend un hydroxyde de métal alcalin ou un silicate de métal alcalin ayant un rapport de $M_2O:SiO_2$ d'environ 2:1 à 1:3,6 dans lequel M est un métal alcalin.

43. Détergent selon la revendication 24 qui comprend en outre un surfactant anionique.

44. Détergent selon la revendication 24 qui comprend en outre un assouplisseur textile quaternaire.

FIG. 1

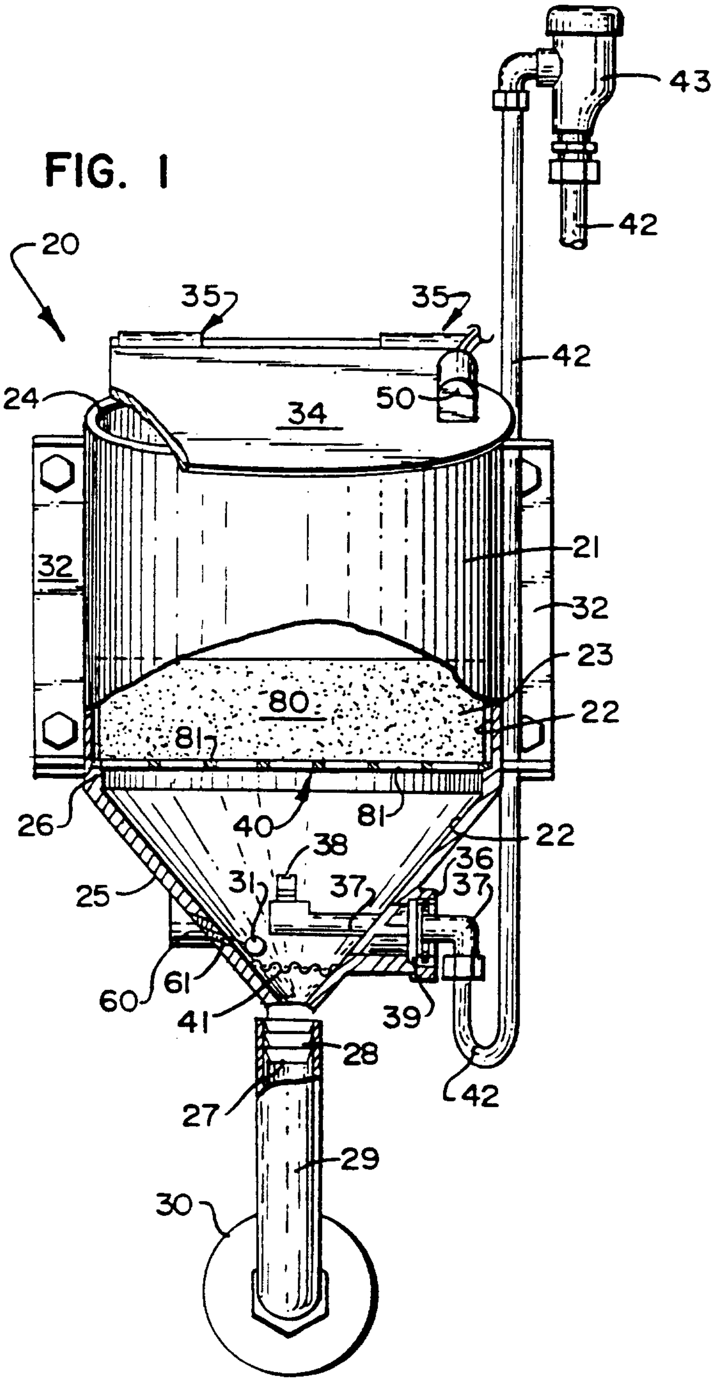

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FIG. 2

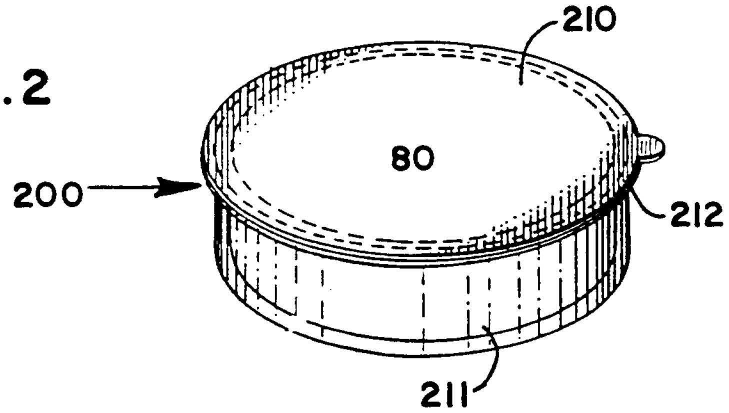

FIG. 3