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Abrasive, Detergent Composition

The present invention relates to a stable liquid detergent composition in the form of a suspension. More particularly, the invention relates to an abrasive-containing liquid detergent composition having excellent deterging and abrasive powers, particularly, a mild effect on the hands and the skin and a high dispersion stability.



Statement of Prior Arts

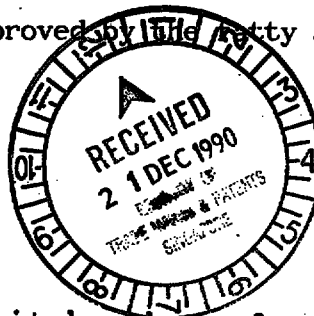
Most of kitchen detergents used heretofore for washing vegetables and tablewares, have such a composition that a deterging power of only a surfactant is utilized. Though such detergents have a high power of deterging vegetables or removing liquid oils and semisolid oils, their power of removing foods and solid oils denatured or semisolidified by cooking or by leaving to stand or burnt oils are relatively weak. Usually, a granular powdery or liquid abrasive cleanser has been used as a deterging assistant in washing tablewares and cooking tools to which difficulty removable substances adhere.

On the other hand, various liquid detergent compositions containing a water-insoluble abrasive have been proposed recently. Though these detergents are excellent since they have an ordinary deterging power to remove non-sticking stains and an abrasive power to remove sticking stains, these detergents have defects that when the amount of the abrasive is increased to improve the abrasive power, the substance to be cleaned are damaged and that the abrasive contained therein is precipitated during the storage. When a clay comprising smectites, clay minerals having a

double-chain structure or both of them is incorporated in the detergent to overcome said defects and to improve its dispersion stability, the viscosity of the detergent is increased and reduction in the foaming and deterging powers are unavoidable. When a sufficient shear is not applied in the course of the incorporation of the clay minerals, the resulting composition has a quite low dispersion stability and the intended object cannot be attained. Further, when a fatty acid salt is used as a thickening and dispersion-stabilizing agent, this compound may dissolve in the surfactant present or may melt at high temperatures, thus reducing the viscosity and impairing the thixotropic properties and, therefore, the resulting composition displays extremely poor dispersion stability at such temperatures, though the dispersion stability at room temperature may be improved by the fatty acid salt.

Summary of the Invention

Under these circumstances, it has been demanded to develop an abrasive-containing detergent composition having excellent deterging properties such as abrasive, deterging and foaming powers and a sufficiently low viscosity for facilitating the pouring at the time of the use and capable of maintaining the stability for



a long period of time. After intensive investigations made for the purpose of developing a detergent which satisfies the above-mentioned requirements, the inventors have found that a detergent containing indispensable components which will be described below and having a pH adjusted to 4.0 to 6.5 has excellent deterging, foaming and abrasive powers, mild effects on the hands and skin and a viscosity of 2,000 cP or less which suggests that the detergent can be poured easily from a vessel and, in addition, it has a high abrasive dispersion stability not only at a low temperature but also at a high temperature. The present invention has been completed on the basis of this finding.

A reason why the composition of the present invention has an excellent dispersion stability, though its viscosity is low, is supposedly that in the detergent composition of the present invention, the anionic surfactant and the amine oxide form a stable aggregate at weakly acidic pHs to widen the temperature zone to -15°C to $+70^{\circ}\text{C}$ over which the detergent is present in the form of single phase smectic liquid crystals having high storage stability and thermal stability and exhibiting desired viscosity.

The present invention provides in one aspect an aqueous stable abrasive detergent composition free from inorganic thickeners and having a viscosity not exceeding 2000 cp at room temperature which comprises the following substances (a) to (d) as indispensable components:

(a) 3 to 25 wt.% of one or more anionic surfactants selected from polyoxyethylene alkyl ether sulfates having an average molar number (n) of added ethylene oxide units in the range of 0.5 to 7 and having 9 to 16 carbon atoms in the alkyl group, alkylbenzene sulfonates having 10 to 16 carbon atoms in the alkyl group, α -olefin sulfonates having 10 to 20 carbon atoms, and alkane sulfonates having 10 to 20 carbon atoms.

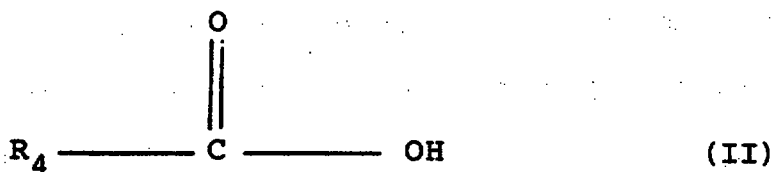
(b) 1 to 10 wt.% of a monolong straight or branched-chain alkyl tertiary-amine oxide having formula (I) wherein R_2 represents a straight-chain or branched alkyl group having 12 to 14 carbon atoms and R_3 and R_4 each represent a methyl or ethyl group.

(c) 1 to 10 wt.% of a higher fatty acid alkanolamide and

(d) 4 to 25 wt.% of a water-insoluble abrasive material having an average particle size of 1 to 100 microns and a Mohs' hardness of 2 to 8, said compositions having proportions of the components (a), (b) and (c) within the range surrounded by triangular co-ordinates defined by A (73:20:7), B (20:73:7), C (11:39:50) and D

(39:11:50), and having a pH value of 4.0 to 6.5.

The composition may further comprise (e) 0.1 to 5 percent by weight of a nonionic surfactant having no nitrogen atom and an HLB value of 6.0 to 19.5 and (f) 0.01 to 1.0 percent by weight of a fatty acid having 10 to 16 carbon atoms, straight or branched, ^{e.g.,} of the formula (II):

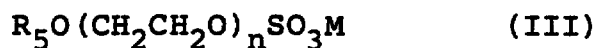


wherein R_4 is a straight or branched alkyl having 9 to 15 carbon atoms.

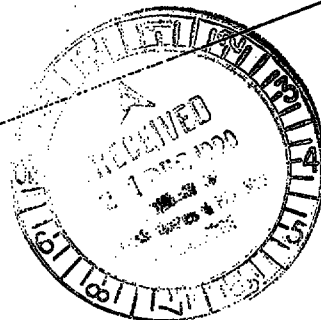
It is preferable in the composition containing the components (e) and (f) that the component (d) has an average particle size of 5 to 100 microns.

It is preferable that the composition has a viscosity of 800 to 2000 cp. It may further comprise 0.05 to 10 percent by weight of an organic acid selected from the group consisting of short-chain aliphatic carboxylic acids having 1 to 6 carbon atoms, hydroxy acids and salts thereof, amino acids and salts thereof, aromatic carboxylic acids, nicotinic acid, kainic acid, sorbic acid, benzenesulfonic acid, toluenesulfonic acid and pyrrolidonecarboxylic acids.

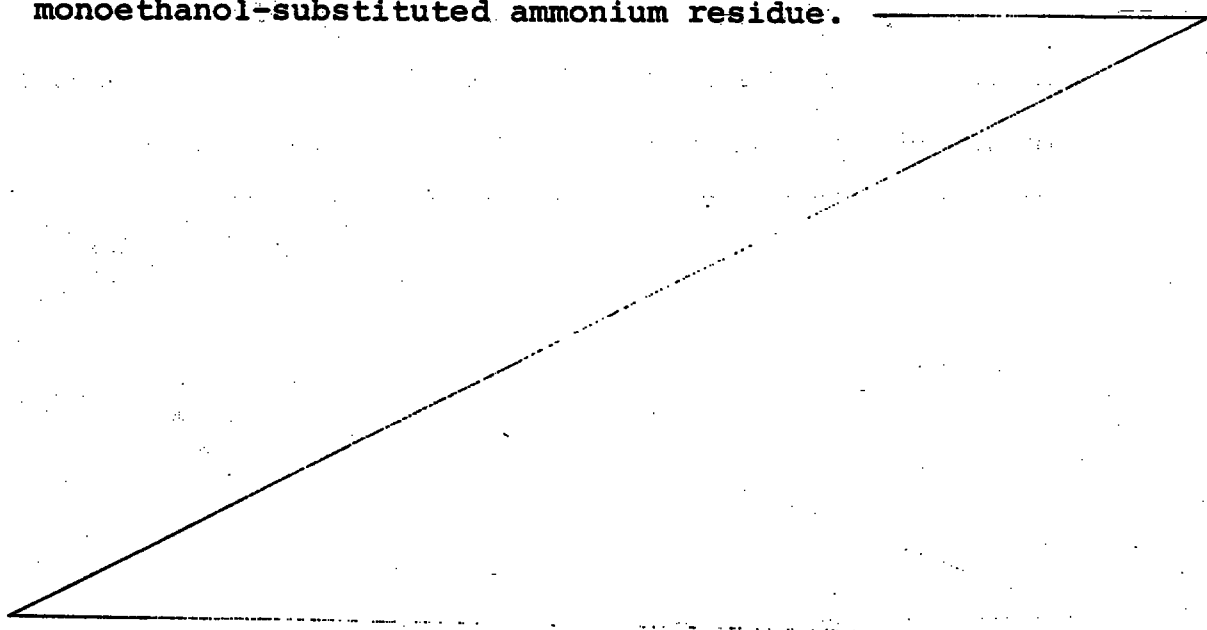
In component (a) the polyoxyethylene alkyl ether sulfates of the following general formula:



wherein R_5 represents a straight chain or branched alkyl group having 9 to 16 carbon atoms, n represents a real number of 0.5 to 7 on average and M represents an alkali metal, alkaline earth metal, ammonium group or alkanol-substituted ammonium group are preferred from the viewpoint of mildness of the effects on the hands and the skin. When R_5 has less than 9 carbon atoms, the deterging power of the detergent is low and when it has more than 16 carbon atoms, the easiness of the rinsing is reduced seriously and the abrasive contained in the composition is easily precipitated to reduce the storage stability unfavorably. Particularly preferred carbon number is in the range of 10 to 13. The molar number n of added ethylene oxide in the above general formula is

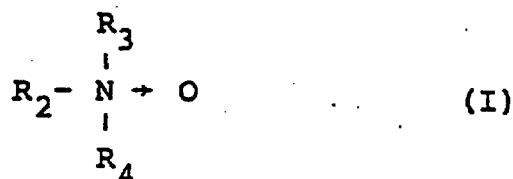


in the range of 0.5 to 7 on average so as to obtain a wide temperature range in which a stable liquid crystal phase is present or in which a high solubilization is attained. When the molar number n is not within said range, the dispersion stability of the abrasive at a high temperature of above 35°C or a low temperature of below -5°C is poor, since the liquid crystal phase is absent. Further, when the molar number n is less than 0.5, an irritative effect of the detergent on the skin is increased. Particularly preferred molar number n of added ethylene oxide is in the range of 2.0 to 5.5. M in the above formula represents an alkali metal such as potassium or sodium, an alkaline earth metal such as magnesium or ^{calcium}~~calcium~~, ammonium residue, or alkanol-substituted ammonium residue such as diethanol-substituted ammonium residue or monoethanol-substituted ammonium residue.



The amount of the the component (a) in the composition of the present invention is in the range of 3 to 25 wt.%. When it is less than 3 wt.%, the deterging and defoaming powers are insufficient and when it exceeds 25 wt.%, the stability of the composition is reduced. The preferred amount is in the range of 8 to 12 wt.%.

The monolong chain alkyl tertiary amine oxide contained as the component (b) in the composition of the present invention is an oxide of a tertiary amine, of the following general formula: _____

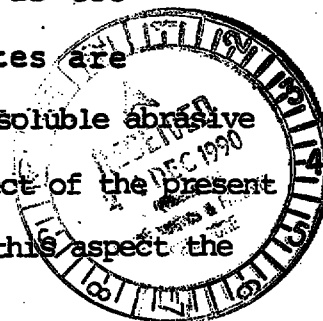


wherein R_2 represents a straight-chain or branched alkyl group having 12 to 14 carbon atoms and R_3 and R_4 each represent a methyl or ethyl group. When R_2 has less than 12 carbon atoms, the detergency of the composition is low while when it has more than 14 carbon atoms, the storage stability is reduced unfavorably. R_3 and R_4 in the above general formula may be the same or different and represent each a methyl or ethyl group. The amount of the tertiary amine oxide should be 1 to 10 wt. % in the detergent composition. When it is not within said range, the detergency obtained by the combination thereof with the component (a) is reduced or the stability is damaged.

The higher fatty acid alkanolamides used as the component (c) in the composition of the present invention are preferably those prepared from one or a mixture of two or more saturated or unsaturated fatty acids having 10 to 18 carbon atoms and an alkanolamine. Examples of them include lauroyldiethanolamide, cocoyldiethanolamide and cocoylmonoethanolamide. Among them, coconut oil fatty acid or

lauric acid diethanolamide is particularly preferred. The amount of the higher fatty acid alkanolamide is in the range of 1 to 10 wt. %.

The water-insoluble abrasives used as the component (d) in the composition of the present invention have an average particle size of 1 to 100 μ and a Mohs' hardness of 2 to 8. When the Mohs hardness is below 2, the abrasive power is too low to exhibit a sufficient abrasive effect while when it exceeds 8, the substance to be cleaned is damaged unfavorably. Examples of the suitable abrasives include agate, quartz, silica, alumina, diatomaceous earth, pearlite, feldspar, aluminosilicates, aluminum hydroxide, emery, dolomite, magnesium oxide, titanium oxide, silicon carbide, powders of plastics such as polystyrene, polyacrylate and nylon and pulverized natural products such as sand. They may be used either alone or in the form of a mixture of two or more of them. When the particle diameter of the abrasive is less than 1 μ , the abrasive power is extremely low though the dispersion stability is high, while when it is too large the stainless steel or glass substrates are damaged unfavorably. The amount of the water-insoluble abrasive contained in the composition according to the one aspect of the present invention is in the range of 4 to 25 wt. %. When in this aspect the



amount is less than 4 wt. %, the abrasive power is insufficient while when it exceeds 25 wt. %, the viscosity of the detergent composition is increased to reduce the easiness of the use such as easiness of pouring from the vessel unfavorably. Said amount is preferably in the range of 5 to 15 wt. %.

When the composition contains the components (e) and (f), it includes the component (d) in the range of 1 to 25 percent by weight.

Examples of the nitrogen-free nonionic surfactants contained as the component (e) in the composition of the present invention include polyoxyethylenesorbitan fatty acid esters such as polyoxyethylenesorbitan monolaurate, polyoxyethylenesorbitan monopalmitate and polyoxyethylenesorbitan monooleate; polyoxyethylene-glycerol fatty acid esters such as polyoxyethylene-glycerol monostearate; and polyoxyethylene straight-chain or branched higher alcohol ethers having an HLB of 6.0 to 19.5. They may be used either alone or in the form of a mixture of two or more of them. The amount of the nonionic surfactant in the composition of the present invention is in the range of 0.1 to 5.0 wt. %. When said amount is less than 0.1

wt. %, the viscosity of the detergent composition is increased to reduce the easiness of the use such as easiness of pouring from the vessel unfavorably. When it exceeds 5.0 wt. %, the suspension stability is not improved. Said amount is preferably in the range of 0.5 to 3.0 wt. %.

The fatty acids represented by the above general formula (II) and contained as the component (f) in the composition of the present invention are straight-chain or branched fatty acids such as lauric acid, myristic acid and palmitic acid. The amount of the fatty acid contained in the composition of the present invention is in the range of 0.01 to 1.0 wt. %. When said amount is less than 0.01 wt. %, the rinsing cannot be effected efficiently while when it exceeds 1.0 wt. %, the viscosity is increased to damage the feeling upon the use unfavorably.

Brief Description of the Drawings:

Fig. 1 shows the proportions of components (a), (b) and (c) according to the present invention. Fig. 2 shows the phase equilibrium in the three-component system of (a), (b) and (c). Fig. 3 shows an iso-viscosity curve of the three-component system of (a), (b) and (c).

The proportions of the components (a), (b) and (c) in the composition of the present invention are within the range surrounded by triangular coordinates defined by A [(a) 73: (b) 20: (c) 7], B [(a) 20: (b) 73: (c) 7], C [(a) 11: (b) 39: (c) 50] and D [(a) 39: (b) 11: (c) 50] shown in Fig.

1. When the proportions are outside this range, the dispersion stability of the abrasive is apt to be reduced. This phenomenon can be readily explained by taking the proportions of the above-mentioned components, viscosities and phase diagrams into account. Fig. 1 shows the range preferred in the present invention. The outer tetragon represents the range of the proportions of the components (a), (b) and (c) as set forth in the Claim. Figs. 2 and 3 show the phase diagram showing the relationship between the proportions of the components (a), (b) and (c) and a phase of an enlarged, stable solubilization region or a region in which the suitable structural viscosity and high storage stability and thermal

stability can be maintained at pH 4.0 to 6.5 at 20°C, namely, a region in which the stable, monophasic smectic liquid crystal phase can be obtained at a temperature ranging widely from -15°C to +70°C, and the viscosity. A portion where the phase of an enlarged, stable solubilization region or the region indicating the smectic liquid crystal phase having suitable structural viscosity and high storage stability and thermal stability (I and L.C.) in Fig. 2 overlaps the region showing a suitable viscosity (800 to 2,000 cP) in Fig. 3 is the characteristic range of the present invention. "II" in Fig. 2 means a liquid-liquid two-phase system and the numerals in Fig. 3 represent the viscosity (cP/20°C). Namely, when the relative amount of the component (a) is increased in order to obtain a composition having a low viscosity and a high easiness in use, the dispersion medium becomes thermodynamically unstable and the dispersion stability of the composition is reduced. When the relative amount of the components (b) and (c) are increased in order to obtain a high dispersion stability, the easiness in use is reduced because of an excessively high viscosity and further the foaming power is also reduced.

Preferred proportions of the components (a) (b) and (c) are within the range surrounded by tri-



angular coordinates defined by A [(a)73:(b)20:(c)7], E [(a)55:(b)38:(c)7], F [(a)55:(b)25:(c)20], G [(a)50:(b)25:(c)25] and H [(a)50:(b)14:(c)36]. Within this range, the composition having particularly high rinsing easiness and excellent finish can be obtained.

The pH of the composition of the present invention is 4.0 to 6.5. When it is less than 4.0, the irritation to the skin is increased, the finish of the cleaned glass tablewares is unsatisfactory, since they become water repellent, and the viscosity of the detergent composition is increased to make the pouring from the vessel difficult. When the pH exceeds 6.5, the structural viscosity is lost and the dispersion stability is damaged unfavorably. From the viewpoints of the dispersion stability, low irritation to the skin and rinsing easiness, a preferred pH of the composition ranges from 5.0 to 6.5.

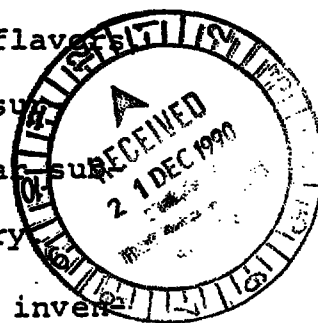
The composition of the present invention is made in liquid form by using water as the medium and the viscosity thereof is adjusted to that suitable for the easy use, for example, 800 to 2000 cP at room temperature.

The stability of the composition of the present invention can be further improved and the viscosity thereof can be lowered by incorporating therein one

or more organic acids or salt(s) thereof selected from the group consisting of short-chain aliphatic carboxylic acids having 1 to 6 carbon atoms, hydroxy acids and salts thereof, amino acids and salts thereof, aromatic carboxylic acids, nicotinic acid, kainic acid, sorbic acid, benzene-sulfonic acid, toluenesulfonic acid and pyrrolidone-carboxylic acids. Among them, hydroxycarboxylic acids such as tartaric acid, malic acid and citric acid are particularly preferred. The amount of them is 0.05 to 10 wt. %, particularly 0.5 to 5 wt. %.

The composition of the present invention may contain other additives contained in ordinary liquid detergent compositions so far as its performance is not damaged. These additives include, for example, hydrotrops such as polyhydric alcohols and lower alkyl-benzene sulfonates, viscosity modifiers such as inorganic sulfates and inorganic hydrochlorates, amphoteric proteins such as keratin and collagen, foaming-improvers such as alkenylsuccinic acids, glycerol and sorbitol, flavors, dyes, antiseptic and antifungal agents, other surfactants, touch improvers such as high molecular substances, e.g. cationized cellulose, if necessary.

The detergent composition of the present invention can be used quite easily because it can be poured



easily from the vessel. In addition, this detergent composition is free of various defects of common detergents of the same type and has high detergency,

rinsing easiness, abrasive power and dispersion stability and only a slight irritation to the skin. Thus, the abrasive-containing detergent composition of the present invention has thus a high practical value.

[Examples]

The following examples will further illustrate the present invention, which by no means limit the invention.

Example 1

Compositions shown in Table 1 were prepared and the detergency, foaming power, viscosity, storage stability and easiness of pouring from the vessel of each composition were examined. The properties of the detergent compositions were examined and evaluated as follows:

<Test methods>

(Detergency)

0.1 wt. % of Sudan III (red dye) used as an indicator was added to beef tallow. 5 g of the mixture was applied to each porcelain dish having a diameter of 25 cm. The dishes were rubbed with a sponge im-

pregnated with a detergent and water. The number of the dishes cleaned before the beef tallow could no more be removed from the dish was counted.

(Foaming power)

0.1 wt. % of a commercially available butter used as a soil was added to a 0.5 wt. % detergent solution and the foaming power thereof was examined. In the test, the detergent solution containing butter was placed in a glass cylinder having a diameter of 5 cm and stirred rotationally for 5 min. The height of the foam after completion of the stirring was measured.

(Viscosity)

The composition was placed in a viscosity beaker kept at 20°C and the viscosity thereof was determined with a Brookfield viscometer [rotor No. 3 (or rotor No. 4 when the viscosity exceeds 2,000 cP); rotation speed of 60 rpm].

(Storage stability)

100 ml of each composition was placed in a 100-ml glass bottle having an inner diameter of 40 mm and a height of 70 mm, and the bottle was closed tightly and stored for 1 month. The appearance of the composition was observed with the naked eye. The criteria were as follows:

o no separation (stable)

Δ slight separation

x clear separation

(Easiness in pouring from the vessel)

150 ml of each composition was placed in a 60-ml vessel designed for a commercially available kitchen detergent. The vessel was fixed on a support inclined at an angle of 45° and the composition flowing out through a cap (aperture: 3.0 mm) of the vessel when a lead weight weighing 2 kg was placed thereon was weighed. The criteria were as follows:

o ... above 7.0 g ... easy to pour

Δ ... 3.0 to 7.0 g ... slightly difficult to pour

x ... less than 3.0 g ... difficult to pour

Table 1

Composition No.																
Component																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	inven- tion *1	inven- tion *1	inven- tion *1	inven- tion *1	inven- tion *1	inven- tion *1	inven- tion *1	comp. *1	comp. *1	comp. *1	comp. *1	comp. *1	comp. *1	comp. *1	comp. *1	
Sodium dodecylbenzenesulfonate				10	12	11	7									
Sodium α -olefinsulfonate (average hydrocarbon chain length: C=14)							3									
Sodium polyoxyethylene (4.0) lauryl ether sulfate	10	12	11					15	15	15	4		10		10	
Lauryldimethylamine oxide	4	6	4	4	6	4	4	2	2	4	2	4	4	4	4	
Coconut fatty acid diethanolamide	5	2	3	5	2	3	5	5	5	3	5	5	5	5	5	
Silica powder ^{*2}	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
p-Toluenesulfonic acid								2	4	2	2					
Sodium laurate								1	1	1	1					
Water	B	B	B	B	B	B	B	B	B	B	B	B	B	B	P	
pH ^{*3}	5	6	5	5	6	5.3	5	4.0	6.3	5.2	5	7	7	7	3.6	
Detergency (number of dishes)	11	12	12	11	12	12	11	11	11	12	12	11	12	11	11	
Foaming power (mm)	83	85	80	80	85	80	81	82	81	83	85	84	81	79	68	
Viscosity (20°C, cP)	1500	1200	1000	1500	1200	1000	1240	3500	2110	3360	2860	740	560	3890	2400	
50°C	o	o	o	o	o	o	o	Δ	x	Δ	Δ	x	x	Δ	o	
Storage stability	o	o	o	o	o	o	o	o	Δ	o	o	x	x	Δ	o	
-10°C	o	o	o	o	o	o	o	Δ	Δ	o	o	x	x	o	o	
Easiness of pouring out of the vessel	o	o	o	o	o	o	o	x	Δ	Δ	Δ	o	o	x	Δ	

*1: "invention" means the present invention and "comp." means a comparative example.

*2: "TMC-200" (having an average particle diameter of 20 μ and Mohs hardness of 7) (a product of Tsuchimoto Kogyo Co.)

*3: The pH was adjusted on occasion with hydrochloric acid or sodium hydroxide.

Example 2

The compositions shown in Table 2 were prepared and the detergency, foaming power, viscosity, storage stability and easiness of pouring from the vessel of each composition were examined. The easiness of pouring from the vessel was determined by 30 housewives after the practical use in the kitchen according to the following criteria:

+2 very easy to pour

+1 easy to pour

0 medium

-1 slightly difficult to pour

-2 difficult to pour

*2: Inorganic hectorite thickening agent (a product of R.T. Venderbilt)

*3: "TMC-200"

Table 2

Component	Composition No.	16	17	18
		inven- tion *1	comp.	comp
Sodium polyoxyethylene (4) lauryl ether sulfate		12	15	15
Lauryldimethylamine oxide		4	2	2
Coconut fatty acid diethanolamide		5	5	5
Lauric acid				0.8
Ethanol		3	3	3
Malic acid		1.5		
Sodium p-toluenesulfonate			2	
Veegum T *2 (Trade Mark)			1	
Silica powder *3		10	10	10
Water		B	B	B
pH		5.0	7.0	7.0
Detergency (number of dishes)		11	12	11
Foaming power (mm)		92	92	71
Viscosity (20°C, cP)		1020	3520	3630
Storage stability	50°C	o	Δ	Δ
	20°C	o	o	o
	-10°C	o	o	o
Easiness of pouring out of the vessel (average of 30 housewives)		+1.8	-0.6	-1.3

Example 3

Each composition shown in Table 3 was prepared and tested in the same way as shown in Example 1, except that stability was examined after storage for three months. Results are shown in Table 3.

*2: glycerol monostearate

*3: "Softanol 70" (Trade Mark), a product of Nippon Shokubai Kagaku Kogyo Co., Ltd.

*4: POE(20) nonylphenyl ether

Example 4

Each composition shown in Table 4 was prepared and tested in the same way as shown in Example 2. Results are shown in Table 4.

Table 3

Component	Composition No.										
	1	2	3	4	5	6	7	8	9	10	11
	Inven- tion inven- inven- inven- inven- comp. comp. comp. comp. comp. comp.										
Sodium dodecylbenzenesulfonate				10	10	7					16
Sodium α -olefinsulfonate (average hydrocarbon chain length: C=14)						3					
Sodium polyoxyethylene (4.0) laurylsulfate	10	12	12		2		12	10	10	10	4
Lauryldimethylamine oxide	4	4	5	4	4	3	2	4	4	4	2.5
Coconut fatty acid diethanolamide	5	2	5	5	5	2	5	2	2	5	1
Nonionic surfactant (HLB=2.8) *2										1	
(HLB=14.5) *3	1	1	4	0.5	1.0	2	1			3	
(HLB=20.0) *4								1			
Lauric acid	0.1	0.1	0.1	0.1	0.1	1.0	0.2	0.1	0.1	2	
Silica powder TMC-200	10	10	10	10	10	10	10	10	10	10	10
Water	B	B	B	B	B	B	B	B	B	B	B
pH (adjusted as necessary)	5	5	6.5	5	5	6	7	5	5	5	7
Detergency (number of dishes)	12	12	13	14	13	11	12	12	11	10	12
Foaming power (mm)	85	86	92	88	92	87	80	85	87	67	90
Viscosity (20°C, cP)	1000	830	1620	1430	1550	1350	1500	1200	2430	4720	830
Storage stability											
50°C	O	O	O	O	O	O	X	X	X	A	X
20°C	O	O	O	O	O	O	A	A	O	O	X
-10°C	O	O	O	O	O	O	A	A	O	O	X
Easiness of pouring out of the vessel	O	O	O	O	O	O	A	O	X	X	O

Table 4

Component	Composition No.	12 inven- tion	13 comp.
Sodium polyoxyethylene (4) lauryl ether sulfate		12	15
Lauryldimethylamine oxide		4	2
Coconut fatty acid diethanolamide		5	5
Softanol 70 (HLB=14.5)		1	
Lauric acid		0.1	
Ethanol		3	3
Silica powder "TMC-200"		10	10
Inorganic thickening agent (hectorite) Veegum T			1
Water		B	B
pH		5.0	7.0
Detergency (number of dishes)		11	12
Foaming power (mm)		85	92
Viscosity (20°C, cP)		1220	3520
	50°C	o	Δ
Storage stability	20°C	o	Δ
	-10°C	o	o
Easiness of pouring out of the vessel (average of 30 housewives)		+1.4	-0.8



CLAIMS:

1. An aqueous stable abrasive detergent composition free from inorganic thickeners and having a viscosity not exceeding 2000 cp at room temperature which comprises the following substances (a) to (d) as indispensable components:

(a) 3 to 25 wt.% of one or more anionic surfactants selected from polyoxyethylene alkyl ether sulfates having an average molar number (n) of added ethylene oxide units in the range of 0.5 to 7 and having 9 to 16 carbon atoms in the alkyl group, alkylbenzene sulfonates having 10 to 16 carbon atoms in the alkyl group, α -olefin sulfonates having 10 to 20 carbon atoms, and alkane sulfonates having 10 to 20 carbon atoms.

(b) 1 to 10 wt.% of a monolong straight or branched-chain alkyl tertiary-amine oxide having the formula:



wherein R_2 represents a straight-chain or branched alkyl group having 12 to 14 carbon atoms and R_3 and R_4 each represent a methyl or ethyl group.

(c) 1 to 10 wt.% of a higher fatty acid alkanolamide and

(d) 4 to 25 wt.% of a water-insoluble abrasive

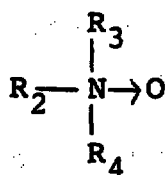


material having an average particle size of 1 to 100 microns and a Mohs' hardness of 2 to 8, said compositions having proportions of the components (a), (b) and (c) within the range surrounded by triangular co-ordinates defined by A (73:20:7), B (20:73:7), C (11:39:50) and D (39:11:50), and having a pH value of 4.0 to 6.5.

2. An aqueous stable abrasive detergent composition free from inorganic thickeners and having a viscosity not exceeding 2000 cp at room temperature which comprises the following substances (a) to (d) as indispensable components:

(a) 3 to 25 wt.% of one or more anionic surfactants selected from polyoxyethylene alkyl ether sulfates having an average molar number (n) of added ethylene oxide units in the range of 0.5 to 7 and having 9 to 16 carbon atoms in the alkyl group, alkylbenzene sulfonates having 10 to 16 carbon atoms in the alkyl group, α -olefin sulfonates having 10 to 20 carbon atoms, and alkane sulfonates having 10 to 20 carbon atoms.

(b) 1 to 10 wt.% of a monolong straight or branched-chain alkyl tertiary-amine oxide having the formula:



(I)



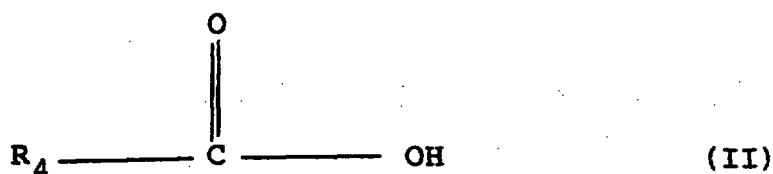
wherein R_2 represents a straight-chain or branched alkyl group having 12 to 14 carbon atoms and R_3 and R_4 each represent a methyl or ethyl group.

(c) 1 to 10 wt.% of a higher fatty acid alkanolamide and

(d) 1 to 25 wt.% of a water-insoluble abrasive material having an average particle size of 1 to 100 microns and a Mohs' hardness of 2 to 8, said compositions having proportions of the components (a), (b) and (c) within the range surrounded by triangular co-ordinates defined by A (73:20:7), B (20:73:7), C (11:39:50) and D (39:11:50), and having a pH value of 4.0 to 6.5, ^{and} which further comprises (e) 0.1 to 5 wt.% of a nonionic surfactant ^{having} ~~containing~~ no nitrogen and an HLB value of 6.0 to 19.5 and (f) 0.01 to 1.0 wt.% of a fatty acid having 10 to 16 carbon atoms, straight or branched.

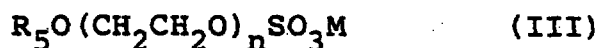
3. A composition as claimed in Claim 1, which further comprises (e) 0.1 to 5 wt.% of a nonionic surfactant ^{having} ~~containing~~ no nitrogen and an HLB value of 6.0 to 19.5 and (f) 0.01 to 1.0 wt.% of a fatty acid having 10 to 16 carbon atoms, straight or branched.

4. A composition as claimed in Claim 2 or 3, in which the component (f) has the formula (II):



in which R_4 is a straight or branched alkyl having 9 to 15 carbon atoms.

5. A composition as claimed in Claims 1 to 4, in which the component (a) has the formula (III):



in which R_5 is a straight or branched-chain alkyl having 9 to 16 carbon atoms, n has an average value of 0.5 to 7, and M is an alkali metal, an alkaline earth metal, ammonium or an alkanol-substituted ammonium.

6. A composition as claimed in Claim 5, in which component (a) is a polyoxyethylene alkyl ether sulfate, and wherein R_5 is a straight or branched-chain alkyl group having 10 to 13 carbon atoms.

7. A composition as claimed in Claim 6, in which component (a) of the formula (III) has an average molar number (n) of added ethylene oxide in the range 2.0 to 5.5.



8. A composition as claimed in Claim 7 in which component (a) comprises 8 to 12 wt.% of said composition.
 9. A composition as claimed in Claim 2, in which the component (d) has an average ^tparticle size of 5 to 100 microns.
 10. A composition as claimed in Claim 9, which has proportions of the components (a), (b) and (c) within the range surrounded by triangular co-ordinates defined by A (73:20:7), E (55:38:7), F (55:25:20), G (50:25:25) and H (50:14:36).
 11. A composition as claimed in Claim 10, which has a viscosity of 800 to 2000 cp at room temperature.
 12. A composition as claimed in Claim 11, which further comprises 0.05 to 10 wt.% of one or more organic acids or salt(s) thereof selected from the group consisting of short-chain aliphatic carboxylic acids having 1 to 6 carbon atoms, hydroxy acids and salts thereof, amino acids and salts thereof, aromatic carboxylic acids, nicotinic acid, kainic acid, sorbic acid, benzenesulfonic acid, toluenesulfonic acid and pyrrolidonecarboxylic acids.
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