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LONG-CHAIN ALIPHATIC ETHER-AMIDES IN DETERGENT COMPOSITIONS

James Rutherford Trowbridge II, New York, N. Y., assignor to Colgate-Palmolive Company, Jersey City, N. J., a corporation of Delaware

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The present invention relates to new synthetic detergent compositions, and, more particularly to compositions of the type of the anionic sulfated and sulfonated detergents having improved properties.

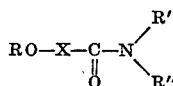
There has been a considerable amount of research to discover substances or additives which aid the efficiency of detergent compositions. The problem is exceedingly complex, however, in view of the various physico-chemical mechanisms or properties and the like involved in the action of a detergent composition including suspension, interfacial tension, micellar structure, dispersion, foam stability, etc. and the general difficulty usually encountered in determining the particular mechanism which is being altered by changes in the formulation of detergent compositions.

During recent years, synthetic detergents of the type of the organic sulfates and sulfonates have been developed which have properties which render them highly advantageous for certain uses. In general, the exploration for suitable additives or builders for synthetic detergent compositions of the type of the anionic sulfates and sulfonates has been directed by the requirements of increased foaming and/or detergency power. While the exact relationship, if any, between foaming and detergency is not known, it is highly desirable that these detergent compositions exhibit excellent foaming properties, in addition to a high level of detergency efficiency, particularly for consumer appeal and certain home and industrial uses. In view of the complex nature of both the foam and detergency phenomena, the character of such non-soap synthetic detergents, and the many other variables in detergent compositions, additives in general exhibit a certain degree of specificity of action.

Certain ether-amides such as the B alkoxy N-alkyl propionamides and their homologues and derivatives have found utility as intermediates in the manufacture of acrylic type compounds and polymers, and insecticides, etc.

It has now been discovered that the presence of an ether-amide having a long-chain alkoxy radical in detergent compositions consisting essentially of anionic sulfated and sulfonated detergent is effective to achieve a significant enhancement in surface-active properties such as detergency and foaming. More particularly, the improved detergent compositions consist essentially of water-soluble sulfated or sulfonated detergency salts, and as an organic builder a minor proportion of a higher alkoxy substituted lower aliphatic amide sufficient to enhance the action of the detergent composition in aqueous solution.

The enhancing additives of the present invention are characterized by limited water-solubility and may be represented by the formula:



wherein RO— is a higher alkoxy radical, X is a lower aliphatic radical, and R' and R'' may be the same or different, each being selected from the group consisting of hydrogen and lower aliphatic radicals. The higher alkoxy substituent may be branched or straight-chain in structure; it comprises moreover such groups as octoxy, decoxy, dodecoxy, tetradecoxy, and hexadecoxy, mixed long-chain alkoxy radicals derived from

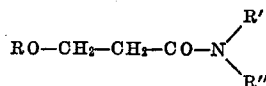
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long-chain fatty materials such as fatty alcohols, polymers of mono-olefins, etc. This higher alkoxy substituent will generally be from at least about 8, generally up to about 18 carbon atoms, and preferably from about 10 to about 14 carbon atoms. In the above relationship, X will usually be from about 1 to about 4 carbons, and preferably a divalent saturated alkylene group, either branched- or straight-chain in structure, such as methylene, ethylene, propylene, etc. The XCO-acyl radical will usually be derived from a lower fatty acid, such as acetic, n-propionic, isopropionic, n-butyric, isobutyric, etc. The R' and R'' substituents attached to the nitrogen atom will preferably be hydrogen, lower alkyl or lower alkylol in character, the latter groups usually totalling up to about six carbons, and preferably not in excess of about three carbons each.

Included within the ambit are the following preferred classes of compounds suitable as additives:

1. $\text{RO}-\text{CH}_2-\text{CH}_2-\text{CO}-\text{NH}_2$ wherein RO— has the significance set forth above. Suitable examples of such beta-alkoxy-propionamides are B-n-decoxypropionamide, B-n-dodecoxypropionamide, B-n-tetradecoxypropionamide, B-n-hexadecoxypropionamide, B "cocoxy" propionamide, wherein the "cocoxy" substituent is a mixture of long-chain alkoxy groups derived from mixed coconut oil fatty acids.

2.



wherein R' is a lower alkylol group and R'' is selected from the class consisting of hydrogen and lower alkylol groups. The alkylol group may be either mono- or polyhydroxy in structure. Suitable examples are B-n-decoxypropionic monoethanolamide, B-n-dodecoxypropionic diethanolamide, B-n-dodecoxypropionic glycerylamide, B-n-tetradecoxypropionic propanolamide, B-n-dodecoxypropionic isopropanolamide, B- "cocoxy" propionic monoethanolamide, etc.

Other suitable additives may contain a N-lower alkyl substituent such as B-n-dodecoxypropionic N-methyl amide, B-n-decoxypropionic N-ethyl amide, B-n-decoxypropionic N-methyl monoethanolamide, etc.

In place of the typical alkoxy n-propionamide type compounds illustrated above, other suitable types of additives are the alkoxy, n-butyric amides, alkoxy isobutyric amides, alkoxy isopropionamides or alpha alkoxy propionamides, alkoxy acetamides, etc. Typical examples are B-dodecoxy n-butyric amide, ethanolamide and N-methyl amide, etc., B-dodecoxyisobutyric amide, monoethanolamide and glycerylamide, etc., alpha dodecoxypropionamide, monoethanolamide, N-methyl amide, isopropanolamide, and glycerylamide, etc., dodecoxy acetamide and monoethanolamide, etc.

These various ether-amides may be prepared in any suitable manner and several processes for the production of such type compounds are known in the art. A convenient mode of synthesis, for example of the propionamides, involves the addition of higher fatty alcohols to acrylonitrile to form the corresponding alkoxypropionitrile which may be hydrolyzed to the ester, by treatment for example with a lower alcohol such as ethanol in the presence of hydrochloric acid or the like. The alkoxy propionate ester may thereafter be reacted with ammonia or suitable amine to form the desired alkoxy propionamide derivative. Similarly, a suitable alkylolamine, such as monoethanolamine, diethanolamine, monopropanolamine, monoisopropanolamine, 1 amino 2, 3 propanediol (monoglycerylamine), etc. may be heated and condensed with the propionate ester, acid or acid chloride to form the corresponding N-alkylol derivatives. As an alternative procedure, the fatty alcohol may be treated with acrylic esters with sodium methylate to form the alkoxy compounds which may thereafter be condensed with ammonia, amine, or alkylolamine to form the corresponding propionamide type compound. Other alkoxy amide additives may be prepared similarly by reacting the appropriate alkoxy

acid, ester or like acylating agent with ammonia, or suitable primary or secondary amines or alkylolamines to form the desired alkoxy amide type compounds, etc.

The novel compositions of the present invention contain as the active ingredient the anionic sulfated and sulfonated detergents, including suitable mixtures thereof. Included therein are the aliphatic sulfated or sulfonated agents, such as the aliphatic acyl-containing compounds wherein the acyl radical has about 8 to about 22 carbon atoms, and, more particularly, the aliphatic carboxylic ester type, containing at least about 10 and preferably about 12 to about 26 carbon atoms to the molecule. Among the aliphatic detergent compounds, it is preferred to use the sulphated aliphatic compounds having about 12 to about 22 carbon atoms. As suitable examples of aliphatic detergents may be found the sulphuric acid esters of polyhydric alcohols incompletely esterified with higher fatty acids, e. g. coconut oil monoglyceride monosulfate, tallow di-glyceride monosulfate; the long chain pure or mixed higher alkyl sulfates e. g. lauryl sulfate, cetyl sulfate, higher fatty alcohol sulfates derived from coconut oil; the hydroxy sulfonated higher fatty acid esters, e. g. higher fatty acid esters of 2, 3 di-hydroxy propane sulfonic acid; the higher fatty acid esters of low molecular weight alkylol sulfonic acids, e. g. oleic ester of isethionic acid; the higher fatty acid ethanolamide sulfates; the higher fatty acid amines of amino alkyl sulfonic acids, e. g. lauric amide of taurine, and the like.

It is a feature of this invention that the effects are particularly enhanced with the alkyl aryl sulfonate detergents. These aromatic sulfonate detergents are also known in the art. They may be mononuclear or polynuclear in structure. More particularly, the aromatic nucleus may be derived from benzene, toluene, xylene, phenol, cresols, naphthalene, etc. The alkyl substituent on the aromatic nucleus may vary widely, as long as the desired detergent power of the active ingredient is preserved.

More specific examples of suitable alkyl aromatic sulfonate detergents are the higher alkyl aromatic sulfonates. The higher alkyl group may be branched- or straight-chain in structure, and comprise decyl, dodecyl, keryl, mixed long-chain alkyls from polymeric lower mono-olefins, etc. Preferred examples of this class are the higher alkyl mononuclear aryl sulfonates wherein the alkyl groups is about 8 to about 22, and preferably about 12 to about 18 carbon atoms. More particularly, it is preferred to use the higher alkyl benzene sulphonates wherein the higher alkyl group averages about 12 to about 16 carbon atoms. For example, propylene may be polymerized to the tetramer and condensed with benzene in the presence of a Friedel-Crafts catalyst to yield essentially the dodecyl benzene derivative which is suitable for sulfonation to the desired sulfonate compounds.

These various anionic detergents are gradually used in the form of their water-soluble salts, such as the alkali metal, alkaline earth metal, ammonium, amine, and alkylolamine salts. While the sodium, potassium, ammonium and alkylolamine (e. g. mono-, di-, and triethanolamine) salts are preferred ordinarily, other salts such as the lithium, calcium, and magnesium salts may be used if desired. For general use, it is ordinarily preferred to use the sodium and potassium salts. For certain specialized uses, it may be preferred to select the ammonium and alkylolamine salts in view of their generally greater solubility in aqueous solution. The concentration of these water-soluble salts (including suitable mixtures thereof) in the detergent compositions of the present invention is generally at least about 10% by weight of total solids, and preferably from about 10-50%. With built compositions, particularly in particulate form, an active ingredient content of 10-50%, and preferably about 15-40% yields highly satisfactory results. Compositions with very high concentrations of these active ingredients are prepared for specialized uses generally. Thus in liquid detergent compositions, any suitable concentrations may be employed, e. g. 90% of total solids or about 20 to about 60% of the weight of the total liquid detergent composition.

The amount of the substituted ether-amide additives in the detergent composition is generally minor in proportion to the weight of the active ingredient and effective in producing the desired improvements in detergent capacity and/or foaming power. Generally, the proportion of active ingredient to additive should be from about 50:1 to

about 2:1. It is preferred that the additive be from about 5 to about 30% of the active ingredient. In particulate detergent compositions the additive will usually be from about 1/2 to about 15% by weight of the detergent composition. Particularly effective results have been achieved wherein the additives are present in amounts of the order of about 1 to 10% of the total detergent composition. It is preferred usually to use about 1-5% additive however. The optimum amount of additive and its ratio to the active ingredients will vary according to the specific materials, the contemplated field of application and manner of use.

It has been found that particularly desirable effects are obtained with such additives in "built" synthetic detergent compositions consisting essentially of the synthetic detergents and the water-soluble polyphosphate salts. These salts have the property of inhibiting precipitation of calcium material and the like in aqueous solution and may be considered as derived from orthophosphoric acid or the like by the removal of water, though any suitable means of manufacture may be employed if desired. These molecularly-dehydrated polyphosphate salts may be wholly or partially neutralized, such as the alkali metal or ammonium salts of tripolyphosphoric, tetraphosphoric, and pyrophosphoric acids. Suitable examples are sodium tripolyphosphate ($\text{Na}_5\text{P}_3\text{O}_{10}$), potassium tripolyphosphate, tetrasodium pyrophosphate, hexasodium hexametaphosphate (Graham's salt), hexasodium tetraphosphate, etc.

With such compositions, it is preferred that the synthetic detergent be about 10 to about 50% and usually about 15 to about 40%, and about 10 to about 80% and usually about 20 to about 60% of these water soluble polyphosphates, preferably tripolyphosphate, the above percentages being by weight of total solids of the detergent compositions, with an effective amount of the organic additive described above.

The organic additives may be incorporated with active ingredient and any other ingredients at any point during the manufacturing process at which subsequent operations will not adversely modify the properties of the detergent compositions. A variety of procedures which have proved to be convenient, economical, and productive of best results are: the additives may be added to a hot aqueous slurry of about 40 to 50% solids concentration comprising the active ingredient with vigorous stirring to form a smooth, uniform and homogeneous paste, the additives may be dissolved in a suitable solvent and added to the slurry of the active ingredient, or a mixture or emulsion of the additives in water with a minor proportion of the active ingredient may be incorporated into the slurry.

Thereafter, these compositions may be prepared in the form of solutions, pastes or as dry or partially hydrated solid products, preferably in a finely divided condition. It is preferred to prepare the products in particulate form. Accordingly, the slurry of the detergent composition may be subjected to any suitable drying operations and converted to particle form. The mixture may thus be subjected to conventional spray-drying, roll-drying or drum-drying operations utilizing temperatures above about 212° F. to obtain homogeneous detergent particles.

It is common to employ various adjuvant materials in synthetic detergent compositions. The detergent compositions of the present invention may include any of these substances employed by the art in admixture with such detergent compositions generally, provided the use of any such materials does not completely neutralize or remove the effect of the ether-amide type additives in the relationship set forth. These adjuvant builders or additives may be inorganic or organic in structure and may be mixed with the active ingredient in any suitable manner. Such convenient inorganic builders or additives as the various alkali metal phosphates (e. g. tri-sodium phosphate), the alkali metal silicates, sulphates, carbonates, etc. may be employed in these compositions. Suitable organic materials such as sodium carboxymethylcellulose may also be employed herein.

The following examples are additionally illustrative of the nature of the present invention and it will be understood that the invention is not limited thereto:

EXAMPLE I

B-n-decoxypropionamide is prepared as follows: B-n-decoxypropionitrile (one mole) is dissolved in five moles

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of ethanol in a vessel immersed in an ice-water bath. The solution is saturated with hydrogen chloride gas, and heated to the refluxing temperature for two hours. Ammonium chloride which precipitates during the reflux period is removed by filtration, and the filtrate is poured into 1500 ml. of ice-water. This mixture is extracted with five 100 ml. volumes of ethyl-ether in a separatory funnel, and the ether-extract is dried over anhydrous sodium sulfate. After removal of any excess ether by evaporation, the residue is distilled under vacuum to recover 62 g. of ethyl B-n-dodecoxypropionate, B. P. 120 to 130° C. (4 mm.). This product is dissolved in 500 ml. of methyl alcohol and the solution is saturated with ammonia gas at 0° C. The solution is sealed in a pressure flask and is allowed to stand at room temperature for seven days. After cooling 45 g. of crystals of B-n-dodecoxypropionamide, M. P. 75 to 76° C., is recovered by filtration.

A detergent composition is prepared by mixing on a weight basis 20% sodium dodecyl benzene sulphonate (the dodecyl group being derived from a propylene tetramer), 40% sodium tripolyphosphate, 3% sodium carbonate, 2% B-n-dodecoxypropionamide, and the balance essentially sodium sulphate. This composition is subjected to repeated laundering and dishwashing operations in comparison to similar operations conducted with the same composition without the ether-amide additive. In each case, it may be noted that the foam of the detergent composition containing the ether-amide exhibits greater volume, stability, creaminess and consistency, in both soft and in hard water.

Similarly satisfactory results are obtained with 4% of the ether-amide additive in the same relationship. It may also be observed that a larger amount of foam is obtained during laundering operations using the above composition containing 20% sulphonate detergent and 4% ether-amide, in comparison to a detergent composition containing 35% of the sulphonate detergent, a correspondingly diminished sodium sulphate content in the absence of the ether-amide.

EXAMPLE II

B-n-dodecoxypropionamide, M. P. 81 to 82° C. is prepared by a procedure similar to that described above for dodecoxypropionamide.

The detergent compositions are prepared as in Example I with the modifications that the ether-amide additive is B-n-dodecoxypropionamide in 2 and 4% concentrations by weight. These compositions similarly exhibit improved foaming power.

EXAMPLE III

B-n-dodecoxypropionic monoethanolamide is prepared as follows: Ethyl B-n-dodecoxypropionate (110 g.) is heated with 40 g. of monoethanolamine for two hours with stirring at 155–170° C., and an orange-colored product solidifies upon cooling. After successive recrystallization from Skellysolve C and alcohol, B-n-dodecoxypropionic monoethanolamide is obtained as colorless crystals, M. P. 81–82° C.

Improved detergent compositions are prepared as in Example I using the B-n-dodecoxypropionic monoethanolamide as the suitable ether-amide additive in 2% and 4% concentrations by weight also. These compositions similarly exhibit higher initial and sustained lathering power during washing operations in soft and in hard water with a high level of deterative power also.

It has also been found that the present combinations tend to increase the tolerance of the detergent composition for the assimilation or holding in suspension of a maximum amount of dirt, grease, etc. with less foam loss than is found without the use of the desired additives. In practical dishpan tests wherein greased dishes are washed by hand in a dishpan of water containing a small amount of the detergent composition, the compositions of the present invention exhibit superior foaming properties. As increasing numbers of greased plates are washed, the foam decreases. The rate of foam decrease is considerably slower on solutions of the present compositions than with corresponding solutions of the detergent compositions without the desired additives.

The table below discloses comparatively the average approximate results in foam endurance or duration obtained in the dishwashing of various greased plates using a standard detergent composition consisting essentially of

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20% sodium salts of dodecyl benzene sulfonate (the dodecyl group being derived from a propylene tetramer), 40% sodium tripolyphosphate, and the balance essentially sodium sulphate with and without the ether-amide additives indicated below in 2% concentrations. The tests are conducted in hard water at 0.25% concentration at 115° F. with the number of greased plates washed by the detergent composition without additive being taken as a standard of 100%. The results with compositions containing the desired additives are tabulated in terms of per cent of the standard.

Table

Additive	Foam Endurance in Dish- washing
	Percent
None.....	100
2% B-dodecoxypropionamide.....	182
2% B-dodecoxypropionic monoethanolamide.....	159

The unusual effects obtained by the detergent compositions containing the ether-amide additives is evident from the data. It is clear that in the relationship set forth the additives achieve the desired enhancement in foam duration and in resistance to greasy soil.

EXAMPLE IV

A detergent composition is prepared by forming about a 60% solids slurry containing on a solids basis about 35% sodium propylene tetramer benzene sulfonate salt, 40% sodium tripolyphosphate, 15% sodium sulphate, 3% dodecoxypropionic monoethanolamide, and the remainder minor amounts of sodium chloride, sodium hydroxide, sodium carboxymethylcellulose, etc. This slurry is agitated at about 140° F. in a conventional soap crutcher to form a homogeneous mixture. The slurry is submitted to spray-drying with heated air at a temperature of about 350° F. with a resultant moisture loss of about 40%. The resulting composition is recovered in the form of beads, and possesses a high degree of deterative and foaming properties in both hard and soft water.

EXAMPLE V

The procedure of Example IV is repeated with the modifications that the active ingredient consists essentially of the keryl benzene sulfonated salt, the organic additive is the B-tetradecoxy propionic monoethanolamide, and the slurry is roll dried at about 50 lbs. steam pressure to flake form. This composition also possesses highly desirable deterative properties.

EXAMPLE VI

Using the procedure of Example I an improved detergent composition is prepared from the following components: 20% sodium lauryl sulfate, 40% sodium tripolyphosphate, 38% sodium sulfate, and 2% B-dodecoxypropionamide.

EXAMPLE VII

Another suitable detergent composition is prepared by compounding 25% sodium coconut monoglyceride sulfate, 10% diacid disodium pyrophosphate, 62% sodium sulfate and 3% B-dodecoxy propionic glycerylamide.

Other formulations productive of desired results are:

EXAMPLE VIII

	Per cent
Sodium coconut alcohol sulfates.....	16
Sodium chloride.....	1
Sodium tripolyphosphate.....	38
Tetrasodium pyrophosphate.....	15
Sodium sulfate.....	27
Decoxyisopropionamide.....	3

EXAMPLE IX

	Per cent
Sodium dodecylbenzene sulfonate.....	10
Sodium lauryl sulfate.....	10
B-dodecoxypropionic diethanolamide.....	3
Sodium carboxymethylcellulose.....	0.5
Sodium carbonate.....	1.5
Sodium sulfate.....	20
Sodium tripolyphosphate.....	44
Tetrasodium pyrophosphate.....	12

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EXAMPLE X

	Per cent
Higher fatty acid amides of taurine derived from coconut oil	25
Sodium sulfate	30
Sodium tripolyphosphates	42
B-decoxypropionamide	3

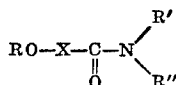
Certain general conclusions are apparent from the many tests which have been conducted to determine the effectiveness of the alkoxy amide type additives in the relationship set forth. The most appropriate additive and its most effective concentration for each particular sulfonated or sulphated detergent composition may be suitably determined by routine controls. In each case the intended use (e. g. hard or soft water, rug shampoos or machine washing compositions, etc.) and the proper washing conditions should be taken into consideration in order to derive the maximum beneficial effects.

The term "consisting essentially of" as used in the definition of the ingredients present in the composition claimed is intended to exclude the presence of other materials in such amounts as to interfere substantially with the properties and characteristics possessed by the composition set forth but to permit the presence of other materials in such amounts as not substantially to effect said properties and characteristics adversely.

Although the present invention has been described with reference to particular embodiments and examples, it will be apparent to those skilled in the art that variations and modifications of this invention can be made and that equivalents can be substituted therefor without departing from the principles and true spirit of the invention.

Having described the invention, what is desired to be secured by Letters Patent is:

1. A detergent composition consisting essentially of a detergent selected from the class consisting of water-soluble anionic organic sulfate and sulfonate detergents, and an organic builder represented by the formula:



wherein RO— is a higher alkoxy radical, X is a saturated lower aliphatic radical, and R' and R'' are each selected from the group consisting of hydrogen and saturated lower aliphatic radicals, the proportion of detergent to said organic builder being from about 50:1 to about 2:1 by weight.

2. A detergent composition in accordance with claim 1 having about 10 to 50% by weight of said detergent and about 10 to 80% by weight of a water-soluble inorganic polyphosphate salt.

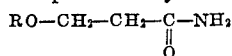
3. A detergent composition in accordance with claim 1 wherein said higher alkoxy radical has 10 to 14 carbon atoms.

4. A detergent composition in accordance with claim 1 wherein said detergent is a water-soluble higher alkyl benzene sulfonate detergent.

5. A detergent composition in accordance with claim 1 wherein said detergent is a water-soluble higher alkyl sulfate detergent.

6. A detergent composition in accordance with claim 1 wherein said detergent is a water-soluble higher fatty acid monoglyceride sulfate detergent.

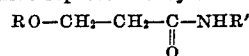
7. A detergent composition consisting essentially of a detergent selected from the class consisting of water-soluble anionic organic sulfate and sulfonate detergents, and an ether-amide represented by the formula:



wherein RO— is a higher alkoxy radical having about 10 to 14 carbon atoms, the proportion of detergent to ether-amide being from about 50:1 to about 2:1 by weight.

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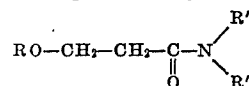
8. A detergent composition consisting essentially of a detergent selected from the class consisting of water-soluble anionic organic sulfate and sulfonate detergents, and an ether-amide represented by the formula:



wherein RO— is a higher alkoxy radical having about 10 to 14 carbon atoms and R' is a lower alkylol radical, the proportion of detergent to ether-amide being from about 50:1 to about 2:1 by weight.

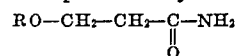
9. A detergent composition in accordance with claim 8 wherein the lower alkylol radical of said ether-amide is the ethanol radical.

10. A detergent composition consisting essentially of a detergent selected from the class consisting of water-soluble anionic organic sulfate and sulfonate detergents, and an ether-amide represented by the formula:



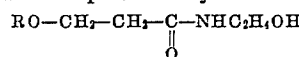
wherein RO— is a higher alkoxy radical having about 10 to 14 carbon atoms, and R' and R'' are lower alkylol radicals, the proportion of detergent to ether-amide being from about 50:1 to about 2:1 by weight.

11. A detergent composition consisting essentially of a water-soluble higher alkyl benzene sulfonate detergent, and an ether-amide represented by the formula:



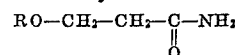
wherein RO— is a higher alkoxy radical of about 10 to 14 carbon atoms, the proportion of detergent to ether-amide being from about 50:1 to about 2:1 by weight.

12. A detergent composition consisting essentially of a water-soluble higher alkyl benzene sulfonate detergent, and an ether-amide represented by the formula:



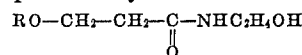
wherein RO— is a higher alkoxy radical of about 10 to 14 carbon atoms, the proportion of detergent to ether-amide being from about 50:1 to about 2:1 by weight.

13. A detergent composition consisting essentially of a water-soluble higher alkyl sulfate detergent, and an ether-amide represented by the formula:



wherein RO— is a higher alkoxy radical of about 10 to 14 carbon atoms, the proportion of detergent to ether-amide being from about 50:1 to about 2:1 by weight.

14. A detergent composition consisting essentially of a water-soluble higher alkyl sulfate detergent, and an ether-amide represented by the formula:



wherein RO— is a higher alkoxy radical of about 10 to 14 carbon atoms, the proportion of detergent to ether-amide being from about 50:1 to about 2:1 by weight.

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