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DETERGENT COMPOSITION CONTAINING BUFFERS

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This invention relates to improved compositions suitable for use as detergents and wetting agents, and more particularly to compositions containing detergent salts of strong mineral acid derivatives of organic materials.

It has been observed that many detergent salts, particularly the detergent salts of sulfuric derivatives of olefins, are somewhat unstable and even though prepared in substantially neutral condition, slowly develop acidity and accordingly cannot be safely used for the treatment of textiles which are sensitive to acid. It is an object of this invention to provide stable compositions containing such unstable detergent salts which may be stored and used for long periods of time without the development of objectionable acidity. Other and further objects of this invention will be apparent from the following description and the claims.

The improved compositions according to this invention are prepared by adding to the unstable detergent salt or to solutions containing such detergent salts a suitable buffer which is soluble in water and does not cause precipitation therein of said detergent salts. Such buffers are preferably slightly basic salts of weak acids in combination with basic elements which may be either organic or inorganic and which do not form insoluble compounds with the acid components of the detergent salt. Examples of such buffers are the salts of mono and polybasic aliphatic and aromatic acids with the alkali and alkaline earth metals, ammonia and organic bases.

The buffer may be used in any desired proportion suitable for preventing the development of strong mineral acid and for maintaining a pH of 7 to about 8 in washing solutions containing the detergent salt. It is ordinarily sufficient to use very small amounts of the buffer in proportion to the amount of detergent salt used and about 1 to 5 or 10% (based on the total amount of detergent salt and buffer and excluding water) is satisfactory, although somewhat higher amounts of buffer may be desirable with unusually unstable detergent salts.

The following example illustrates one type of detergent salt composition to which this invention applies and is not to be considered in any way as limiting the scope of this invention. Petrolatum is subjected to destructive distillation at a pressure below about 50 lbs. per square inch. The resulting cracked distillate boiling between about 300 and 600° F. is chilled to a temperature of about 0 to 10° F. and fuming sulfuric acid containing 20% by weight of sulfuric anhydride, is then added thereto with vigorous agitation and continued cooling to maintain the temperature of the reaction mixture below about 20° F. As soon as a thorough admixture of the reagents is obtained, the excess of strong sulfuric acid is removed from the reaction mixture by dilution with water to reduce the strength of the acid below about 60% or by neutralization with an aqueous solution of caustic soda. The temperature of the mixture is maintained below about 20° F. until sufficient caustic soda has been added to neutralize about one-quarter of the total acid used and the temperature is then permitted to rise to about room temperature, but preferably no higher. The resulting detergent salt is then separated from the oil by extraction with isopropyl alcohol of above about 90% strength. The alcohol is added in sufficient amount to produce a three layer separation in the resulting mixture, namely, an upper oily layer consisting of unreacted hydrocarbons, a middle alcohol layer containing most of the detergent salt, and a lower aqueous solution of inorganic salts. The middle alcohol layer is separately withdrawn and is mixed with additional alcohol to throw out dissolved inorganic salts, which are then removed by filtration.

The detergent salt may be recovered from this alcoholic solution by evaporation of alcohol, which may be removed under fractionating conditions to remove alcohol selectively and to leave sufficient water in the detergent salt to avoid overheating of the same, if desired. The detergent salt solution develops strong acidity even while still liquid and grows progressively darker as the drying operation nears completion. This discoloration of the detergent salt may be avoided by conducting the drying operation in the presence of an excess of a base such as ammonia or sodium carbonate or hydroxide, etc. This, however, while stabilizing the detergent salt during the drying operation does not stabilize the detergent salt when later used in aqueous solutions. The detergent salt still contains unstable compounds, such as dialkyl sulfates, which may undergo hydrolysis. This procedure may also result in a final detergent salt containing free alkali, which is ordinarily objectionable and involves additional complications in converting the final soap into a neutral product.

5 parts by weight of sodium acetate per 100 parts of detergent salt are added to the alcoholic solution obtained in the above example. The dry detergent salt may then be obtained from this solution without development of acidity or of ob-

jectionable color bodies by drying the detergent salt solution on a drum dryer or by spray drying, in which the solution is atomized in a stream of heated air, or by other suitable means. The finished detergent salt thus obtained remains stable over extended periods of time and develops no appreciable acidity, even when dilute aqueous solutions thereof suitable for laundering are permitted to stand for several hours at elevated temperatures.

Buffers such as sodium acetate and sodium oleate may also be added to relatively stable detergent salts which had been stabilized while drying by the presence of a base such as ammonia or sodium carbonate or hydroxide, etc., further increasing the life of such detergent salts.

If desired, as in the preparation of crude commercial products, the amount of alcohol used in the above example may be only sufficient to break the emulsion resulting on neutralization of the acid-oil reaction mixture. In this event, the lower aqueous alcoholic solution containing most of the inorganic salts, i. e. sulfates formed on neutralization, as well as most of the detergent salt is obtained and the finished product resulting on drying this solution consists of a detergent salt composition containing substantial amounts of inorganic salts. Such compositions also are unstable and may be improved by the addition thereto of small amounts of buffers, according to the present invention.

While this invention is applicable to the preparation of improved detergents from substantially any soaps undergoing limited hydrolysis, it is particularly applicable to detergent salts obtained by the treatment of cracked paraffins, of the class of paraffin wax and petrolatum, with fuming sulfuric acid at low temperatures to the detergents and wetting agents prepared by the treatment of cracked hydrocarbons of more than about eight carbon atoms with fuming sulfuric acid at temperatures below about 32° F., and to the wetting agents prepared by the treatment of crude petroleum oils and fractions thereof obtained by distillation and/or extraction by treatment with fuming sulfuric acid at temperatures below about 32° F.

This invention is not to be limited to any specific examples or descriptions which are presented herein solely for purposes of illustration, but only by the following claims in which it is desired to claim all novelty insofar as prior art permits.

I claim:

1. Process for preparing an improved detergent and wetting composition comprising reacting cracked wax distillate containing olefins of more than 8 carbon atoms per molecule with concentrated sulfuric acid, separating the reacted sulfuric products including unstable alkyl sulfates from the unreacted hydrocarbons, neutralizing the reacted sulfuric products with an alkali to form water-soluble neutralized products, separating the said water-soluble reacted sulfuric products from the other ingredients, and adding from 1 to 10% of a water-soluble buffer capable of maintaining a pH value of about 7 to 8 in a water solution of the mixture thus formed and which does not cause a precipitate to form.

2. Process for preparing an improved detergent and wetting composition which comprises cracking a high molecular weight plastic to solid paraffinic material derived from petroleum at less than 50 pounds per square inch to secure a distillate boiling between 300 and 600° F., treating said distillate with concentrated sulfuric acid, separating the sulfuric derivatives thereby obtained, neutralizing the said derivatives to form water-soluble salts having tendencies to form mineral acids in water solutions, mixing said water-soluble salts with about 1 to 10% of a water-soluble buffer, capable of maintaining a pH value of about 7 to 8 in a water solution of said mixture and which does not cause a precipitate to form therewith.

3. Improved detergent composition comprising alkali metal salts of sulfuric acid derivatives of cracked paraffin wax distillate olefins having more than 8 carbon atoms per molecule, said salts being water-soluble and including alkyl sulfates subject to hydrolysis with development of acidity, and in admixture with said salts, 1 to 10% of a water-soluble buffer salt capable of maintaining a pH value of between about 7 and 8 in an aqueous solution of the mixture, and which does not cause a precipitate to form.

4. Composition in accordance with claim 3 in which the water soluble buffer is sodium oleate.

5. Composition in accordance with claim 3 in which the water soluble buffer salt is sodium acetate.

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