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COMPOSITION FOR RECONSTITUTING
FROZEN AQUEOUS SYSTEMS AND
METHOD FOR MAKING

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No Drawing. Continuation of application Ser. No. 229,209, Oct. 8, 1962. This application Dec. 6, 1965, Ser. No. 512,008

1 Claim. (Cl. 252—8.8)

This application is a continuation of application Ser. No. 229,209, filed Oct. 8, 1962, now abandoned, having the same entitlement.

This invention relates to chemical agents which can be used to improve the consistency and fluidity of the aqueous systems of quaternary ammonium compounds at temperatures near freezing, and more particularly relates to non-ionic surface active agents comprising alkylene oxide adducts of fatty alcohols, glycols, and acids, and mixtures of partially esterified glycols and acids, and mixtures of fatty alcohols and alkylene oxide adducts of fatty alcohols.

The additives of this invention when added to aqueous dispersions of quaternary ammonium compounds enable the dispersions to be reconstituted from frozen state to original states of fluidity and uniformity upon thawing. The agents are particularly useful for stabilizing dispersions of quaternary ammonium compounds such as are used for textile softeners, cosmetic formulations, corrosion inhibitors, adhesive bonding agents and similar products that may freeze at ambient storage temperatures.

It is an object of this invention to provide additives for aqueous based compositions and mixtures which are effective in reconstituting the system from a frozen state to a state of uniform fluidity.

It is another object of this invention to provide a textile softening composition which is reconstituted to its original state and effectiveness after being frozen.

It is another object of this invention to provide an additive for a textile softener comprising quaternary ammonium compound which retards the action of the softener and permits smoother and more even application to fabric.

It is another object of this invention to provide the composition which is effective in reducing the viscosity of solutions comprising quaternary ammonium compounds.

The preferred additives of this invention are alkylene oxide adducts of long chain fatty alcohols with unsaturated fatty materials being preferred although saturated fatty materials may be used. When used in conjunction with textile softeners comprising quaternary ammonium compounds the compositions enhance the rewetting properties of treated fabrics. The compositions of this invention may be present in concentrations of from 5% to 30% of the weight of softener ingredient and preferably in concentrations of from 10% to 20%. The optimum concentration in aqueous concentrate is from 0.1% to 3% of the weight of the concentrate with the preferred range being from 0.3% to 1.5%. Fatty materials having from 8 carbon atoms to 24 carbon atoms per chain in saturated or unsaturated alcohols, glycols, or like materials when reacted with alkylene oxide are useful for providing the additive compositions of this invention.

The following examples illustrate the invention, but the invention is to be understood as being limited only in accordance with the appended claim:

EXAMPLE I

10 gram moles of stearyl alcohol are melted and reacted with 150 gram moles of ethylene oxide by bubbling gaseous ethylene oxide through the alcohol until pressure

within the reaction vessel drops to substantially atmospheric. The reaction product is added to an aqueous dispersion of di-stearyl ammonium chloride comprising 77% solids until the reaction product constitutes 12% of total solids. The dispersion is diluted with water to provide a 5% total solids softener-concentrate. Upon being repeatedly frozen and thawed the mixture is reconstituted as a smooth uniform fluid. The material may be suitably used by adding to a laundry rinse bath to provide in the order of a few parts per million of solids in the bath. Fabrics rinsed in the bath are uniformly coated with softener and exhibit exceptional ability to be rewetted after being dried.

EXAMPLE II

1 gram mole of melted oleyl alcohol is reacted with 15 gram moles of ethylene oxide by bubbling gaseous ethylene oxide into the melt until reaction is complete. Isopropanol is added to provide about 80% solids, and the material is added to a fabric softener constituting a 77% aqueous dispersion of methyl chloride quaternary of di-stearyl polyethoxyethanol. One part of the reaction product solids is added per 20 parts of softener solids. Upon dilution to provide 5% total solids in water a softener concentrate is obtained which may be reconstituted from frozen state to provide a fluid of smooth uniform consistency. When added to a laundry rinse bath the composition is readily dispersed in either hot or cold water.

EXAMPLE III

The procedure of Example I is followed using 50 gram moles of ethylene oxide. The reaction product obtained is added to the fabric softener of Example I. The concentration of reaction product in the mixture is marginally sufficient to provide fluidity as evidenced by incipient gelation which can be observed after freezing and thawing the mixture diluted to consist of 8% solids.

EXAMPLE IV

The procedure of Example I is followed using 10, 20, 30, 50 and 100 gram mole portions of ethylene oxide per mole of oleyl alcohol. The reaction product in each case when added to quaternary ammonium compound to provide a dispersion of 0.6% additive solids and 9% total solids provides a superior household laundry softener composition which is evenly and uniformly deposited on the fabric and which reconstitutes easily after freezing.

EXAMPLE V

The following fatty materials are reacted with ethylene oxide in varying mole ratios shown below following the procedure of Example I.

[Moles ethylene oxide/mole fatty material]

	A	B	C	D	E	F	G
Oleyl alcohol (Iodine No. 75-85).....	---	5	10	15	20	50	---
Oleyl alcohol (Iodine No. 60-75).....	---	---	---	15	20	---	---
Oleyl alcohol (Iodine No. 85-90).....	---	---	---	---	20	---	100
Lauryl alcohol.....	4	---	10	---	20	---	---
Tall Oil.....	---	5	---	15	---	---	---
Sorbic Acid.....	---	---	10	---	20	---	---
Palmitic Acid.....	4	---	---	---	---	50	---
Polyoxyethylene sorbitol lanolin.....	---	---	---	15	20	---	---
Tallow alcohol ethoxylated adduct.....	---	5	---	15	---	---	---
1mole propylene oxide + 20 moles ethylene oxide on stearic acid.....	---	5	---	15	---	---	---

Reaction product from groups A, B, C, etc. as above designated are individually provided for use with aqueous dispersions of quaternary ammonium softener compositions as shown below, and compositions selected from each of the groups are admixed with the appropriately paired quaternary compound to provide dispersions com-

prising from 0.1% to 3% additive solids and from 1% to 12% of softener solids.

Additive group:	Softener
A -----	Di-methyl di-stearyl ammonium chloride.
B -----	Di-methyl di-stearyl ammonium methosulfate.
C -----	Methyl di-stearyl polyethoxyethanol ammonium chloride.
D -----	Methyl di-stearyl polypropoxypropanol ammonium chloride.
E -----	Methyl di-stearyl polyethoxyethanol ammonium methosulfate.
F -----	Methyl ethoxy di-stearyl amidoammonium chloride.
G -----	Methyl ethoxy di-stearyl amidoammonium methosulfate.

Additives comprising groups A and B are marginally effective in preventing substantial congelation of components of the dispersion upon repeated freezing and thawing. Additives comprising groups C, D, E, F and G are more effective in providing substantially uniformly reconstituted softener fluid from the frozen state without stirring than the additives in groups A and B through the given range of concentrations.

The more highly unsaturated additives (as indicated by high iodine numbers) are of superior ability in providing properties of homogeneous fluidity and lower viscosity to quaternary ammonium compound reconstituted from frozen state than are additives of lesser unsaturation or saturated compositions. The additives of this invention which are derived from oleyl alcohols are preferred and exhibit superior properties tending to prevent thickening and jelling of quaternary ammonium components of a formulation stored at a temperature which renders it semi-solid. The additives hereof enhance the application of

quaternary ammonium compounds on surfaces by exerting a retarding action which enables the material to be more evenly and uniformly applied to the surface to be treated before being fixedly bonded. The compositions which may be used are long chain fatty alcohols, glycols and the like having from 8 to 22 or more carbon atoms in a chain with 16 and 18 carbon atoms being preferred.

Alkylene oxides other than ethylene oxide such as propylene oxide and butylene oxide may be used to provide additive compositions of this invention, but are not preferred.

While certain modifications and embodiments of the invention have been described, it is of course to be understood that there are a great number of variations which will suggest themselves to anyone familiar with the subject matter thereof and it is to be distinctly understood that this invention should not be limited except by such limitations as are clearly imposed in the appended claim.

I claim:

1. A composition for reconstituting frozen aqueous systems, said composition consisting essentially of from 5 to 30 parts by weight of a condensate of from 10 to 100 moles of ethylene oxide with 1 mole of oleyl alcohol having an iodine number of from 75 to 90 and 100 parts by weight of a quaternary ammonium fabric softener, said condensate and softener being dispersed in water in a concentration of 5% to 12% by weight of solids.

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