PATENT SPECIFICATION 744,688

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COMPLETE SPECIFICATION.

Process of Treating Aqueous Rubber Dispersions.

We, REVERTEX LIMITED, formerly of King William Street House, Arthur Street, London, E.C.4, now of 51 to 55, Strand, London, W.C.2, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a process for the treatment of aqueous rubber dispersions.

There are certain applications of rubber latex for which it is desirable to employ a latex of an acid reaction. Thus, for example, in the deposition from rubber latex on to certain textile materials it is often advantageous to use an acid latex. Moreover, in the chemical modification of latex rubber, for example, in cyclising latex rubber or for forming rubber hydrochloride or rubber-sulphur dioxide adducts, it is generally necessary to use an acid latex.

Hitherto for the foregoing and other purposes, it has been customary to convert the usual alkaline types of commercial rubber latex into acid latices by incorporating non-ionogenic stabilisers with the alkaline latices and thereafter cautiously adding acid.

In such cases it is not always possible to add highly concentrated acids to the alkaline latex and there is always some danger that coagulation of the latex occurs during the neutralisation of the alkaline latex or when the alkalinity of the latex has been neutralised.

Moreover the neutralised latex is of necessity greatly diluted as compared with the original alkaline latex, which entails a very high consumption of acid relative to the weight of the rubber of the latex with a correspondingly high cost.

The present invention is based on the discovery that it is possible to concentrate a natural rubber latex in the presence of an acid, by stabilising the same with the aid of a non-ionogenic surface active agent. The resultant concentrated acid latices have been found to withstand the addition of strong acids so that they can be used in the chemical modification of latex rubber with considerable economy in the acid reagent employed.

Based on the foregoing discovery, the present invention broadly contemplates stabilising a latex by incorporating therewith a non-ionogenic surface active agent, bringing the *p*H of the mixture to a value between 5 and 7, and thereupon subjecting the thus stabilised latex to concentration by any of the usual methods such as evaporation or centrifuging.

The non-ionogenc surface active agent employed in carrying out the invention should be one which does not attack the rubber and which is at the same time unaffected by the acid present in the acidified latex.

The surface active agents preferably employed in carrying out the invention are condensation products of polyethylene glycols with long chain carboxylic acids, or with long chain alcohols, or with long chain organic amines, or with long chain organic amides, or with a long chain alkyl phenol.

Examples of surface active agents of the foregoing kind are those known under the Trade Names "Lubrol W", "Vulcastab LW", "Lissapol N" (all manufactured by Imperial Chemical Industries Limited), "Ethofats", "Ethomeens", "Ethomids" (all manufactured by Armour & Company), "Emulphor O" I.G.Farbenindustrie A.-G), and non-ionic stabiliser 12NR50 (manufactured by Oxirane Limited).

The amount of non-ionogenic surface active agent employed may advantageously be between 0.5 and 5% by weight calculated on the total solids content of the latex and preferably between 1 and 3% of such total solids content.

[*Price* 3*s*. 0*d*.]

For the purpose of the present invention it is immaterial whether a very small amount of a strong acid or larger amounts of a weak acid are employed to bring the latex to the required *p*H. The acids employed may be sulphuric acid, hydrochloric acid and the lower carboxylic acids e.g. formic or acetic acid. However the nature of the acids employed and/or their concentration should be such that they do not attack either the rubber or the surface active agent.

It has however been found that boric acid is particularly useful for acidifying the rubber latex, producing a concentrate of rubber latex which is only slightly acidic, and since boric acid is a bactericide the concentrates produced with the aid of boric acid are extremely stable. Naturally other acids having a bactericidal action can be employed in carrying out the invention.

The invention will be illustrated by the following Examples:—

EXAMPLE I.

To 3 kgs. of fresh rubber latex of 33% total solids content were added 25 gms. of Lubrol W and dilute sulphuric acid until the reaction of the mixture was *p*H 6. The mixture was then evaporated on a rotary drum evaporator until the total solids content was 65%, whereupon a stable fluid concentrated latex was obtained which was not coagulated by the addition of concentrated sulphuric acid.

EXAMPLE II.

2 kgs. of fresh rubber latex of 33% total solids content were mixed with 17 gms. of non-ionogenic stabiliser 12NR50 (i.e. 2.5% by weight on the latex solids), and sufficient boric acid was added until the *p*H fell to 6. The latex was then evaporated in a rotary drum evaporator to a stable fluid concentrate of 70% total solids content which was stable to the addition of strong sulphuric acid.

EXAMPLE III.

20 gms. of non ionogenic stabiliser 12NR50 were added to 2 kgs. of fresh rubber latex of 33% total solids content, and the mixture acidified to *p*H 5—6. On evaporation in a rotary drum evaporator, a concentrated latex of 73% total solids content was obtained which was stable to strong sulphuric acid.

EXAMPLE IV.

2 kgs. of fresh rubber latex of 33% total solids content were treated with 17 gms. Ethomeen 18/60 (i.e. 2.5% on latex solids) and sufficient boric acid to bring to *p*H 6.

A stable concentrated latex was obtained by evaporation to 70% solids content.

EXAMPLE V.

265 lb. of fresh rubber latex of 33% total solids content were treated with 2.5 lb. of Lubrol W and 1 lb. of boric acid before evaporation in a vacuum evaporator to yield 125 lb. of a concentrate of 70% total solids content and a *p*H of 6.6.

The concentrate, which was of a stability adequate for shipment, did not coagulate on the addition of strong sulphuric acid.

What we claim is:—

1. A process of treating an aqueous rubber dispersion such as natural rubber latex, which comprises stabilising said dispersion by incorporating therewith a non-ionogenic surface active agent, bringing the *p*H of the mixture to a value between 5 and 7 and thereupon subjecting the thus stabilised dispersion to concentration by any known method.

2. Process as claimed in Claim 1, in which the surface active agent employed is a condensation product of polyethylene glycol with a long chain carboxylic acid or with a long chain alcohol, or with a long chain organic amine or with a long chain organic amide or with a long chain alkyl phenol.

3. Process as claimed in Claim 1 or 2, in which the amount of non ionogenic surface active agent employed lies between 0.5 and 5% by weight calculated on the total solids content of the rubber dispersion and preferably between 1 and 3% of said total solids content.

4. Process as claimed in any of Claims 1 to 3, in which boric acid is employed for acidifying the rubber dispersion.

5. Process of treating aqueous rubber dispersions such as natural rubber latex, substantially as described with reference to the foregoing Examples.

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PROVISIONAL SPECIFICATION.

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The concentrate, which was of a stability adequate for shipment, did not coagulate on the addition of strong sulphuric acid.

What we claim is:—

1. A process of treating an aqueous rubber dispersion such as natural rubber latex, which comprises stabilising said dispersion by incorporating therewith a non-ionogenic surface active agent, bringing the *p*H of the mixture to a value between 5 and 7 and thereupon subjecting the thus stabilised dispersion to concentration by any known method.

2. Process as claimed in Claim 1, in which the surface active agent employed is a condensation product of polyethylene glycol with a long chain carboxylic acid or with a long chain alcohol, or with a long chain organic amine or with a long chain organic amide or with a long chain alkyl phenol.

3. Process as claimed in Claim 1 or 2, in which the amount of non ionogenic surface active agent employed lies between 0.5 and 5% by weight calculated on the total solids content of the rubber dispersion and preferably between 1 and 3% of said total solids content.

4. Process as claimed in any of Claims 1 to 3, in which boric acid is employed for acidifying the rubber dispersion.

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The present invention is based on the discovery that it is possible to concentrate a natural rubber latex in the presence of an acid, by stabilising the same with the aid of non-ionogenic surface active agent. The resultant concentrated acid latices have been found to withstand the addition of strong acids so that they can be used in the chemical modification of latex rubber with considerable economy in the acid reagent employed.

Based on the foregoing discovery, the present invention broadly contemplates stabilising a latex by incorporating therewith a non-ionogenic surface active agent, bringing the *p*H of the mixture to a value between 2 and 7, preferably between 4 and 7, and thereupon subjecting the thus stabilised latex to concentration by any of the usual methods such as evaporation or centrifuging. Alternatively, the latex may be acidified before adding the stabiliser and finally concentrated.

The non-ionogenic surface active agent employed in carrying out the invention should be one which does not attack the rubber and which is at the same time unaffected by the acid present in the acidified latex.

The surface active agents preferably employed in carrying out the invention are condensation products of polyethylene glycols with long chain carboxylic acids, or with long chain alcohols, or with long chain organic amines, or with long chain organic amides.

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