PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Process for Concentrating Rubber Latex

We, DUNLOP RUBBER COMPANY LIMITED, a British Company, of 1, Albany Street, London, W.1, 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 concentrating rubber latex.

It is known to concentrate rubber latex by subjecting it to an electric potential difference while located between two or more vertical semi-permeable membranes, whereby the rubber particles are caused to migrate towards one of the two electrodes between which the potential difference is set up, and form a rubber-rich region in the latex adjacent each membrane. As a result of the difference in density thus produced between the part of the latex adjacent the membranes and the remainder of the latex, the rubber-rich portion rises and separation into a rubber-enriched layer and a rubber-impoverished layer thus results. This process is commonly known as an electrodecantation process.

The latex subjected to electrodecantation is usually stabilized by addition of an alkali, e.g. ammonia or a dilute alkali metal hydroxide which is added partly to maintain the mechanical stability of the latex and partly to retard bacterial action on the proteins in the latex and on the membranes.

Because bacterial action is more rapid at the elevated temperature used for electrodecantation than at room temperature, considerably more alkali is needed than would be required merely to maintain the stability of the latex. Usually the latex contains ammonia in amounts of the order of 1% by weight of the latex. Most of this ammonia is lost in the rubber-impoverished layer of the latex and consequently a further quantity of ammonia has to be added to the rubber-rich layer after electrodecantation to restabilise it. The cost of the process is thus increased. Also, the concentrate is not suitable, without further treatment, for making compositions, e.g. adhesives, in which a small ammonia content is needed.

It is also known that bactericidal salts of nuclear substituted phenols may be used for the preservation of rubber latex, e.g. in a process for concentrating latex by means of creaming agents or with the aid of a centrifuge.

It is an object of the invention to provide a method of concentrating rubber latex by electrodecantation which can be carried out using a small proportion of alkali.

According to the present invention a method of obtaining concentrated rubber latex comprises subjecting to electrodecantation a rubber latex containing alkali, and a bactericidal salt of a nuclear substituted phenol.

The bactericidal salt of the nuclear substituted phenol preserves both the membranes of the electrodecantation apparatus and proteins in the latex against bacterial attack, and its presence in the latex enables the alkali content thereof to be reduced to a level which is sufficient only to maintain the mechanical stability of the latex.

Moreover at least a substantial proportion of the bactericidal salt of the nuclear substituted phenol is absorbed on the surface of the rubber particles, so that it is carried into the rubber-rich layer formed during electrodecantation and it is not necessary to add a further quantity to the rubber-rich layer subsequent to the electrodecantation process. The invention is particularly suitable for concentrating latices in which the alkali is ammonia. In the process of the present invention it is possible to subject to electrodecantation a rubber latex containing

only 0.1% to 0.4% by weight of ammonia.

The salt of the nuclear substituted phenol is preferably an ammonium or alkali metal salt of a polyhalogenated phenol, particularly of a tetrachlorophenol or pentachlorophenol. These salts may be added to the latex in amounts of the order of 0.025 to 0.2% by weight of the latex.

The process may be carried out batchwise, an electrodecantation apparatus being charged with latex containing the salt of the nuclear substituted phenol and sufficient alkali to give the latex stability, electrodecantation then being carried out and the rubber-rich layer so formed containing the bactericidal salt of the nuclear substituted phenol and the rubber-impoverished layer then removed separately. The process may also be conducted in a continuous manner, for example by means of the apparatus described in copending Application No. 25276/49 (Serial No. 683,133).

What we claim is:—

1. A method of concentrating rubber latex which comprises subjecting to electrodecantation a rubber latex containing an alkali and a bactericidal salt of a nuclear substituted phenol.

2. A method according to claim 1 wherein the bactericidal salt is a salt of a polyhalogenated phenol.

3. A method according to claim 2 wherein the bactericidal salt is sodium pentachlorophenate.

4. A method according to claim 2 where the bactericidal salt is ammonium pentachlorophenate.

5. A method according to any of the preceding claims wherein the bactericidal salt is present in an amount from 0.025% to 0.2% by weight of the latex.

6. A method according to any of the preceding claims wherein the said alkali is ammonia.

7. A method according to claim 6 wherein the latex contains 0.1% to 0.4% by weight of ammonia.

8. Concentrated rubber latex wherever obtained by a process according to any of the preceding claims.

G. W. I. SHEAVYN,
Agent for the Applicants.

PROVISIONAL SPECIFICATION

Process for Concentrating Rubber Latex

We, DUNLOP RUBBER COMPANY LIMITED, a British Company, of 1, Albany Street, London, N.W.1, do hereby declare this invention to be described in the following statement:—

This invention relates to a process for concentrating rubber latex.

It is known to concentrate rubber latex by subjecting it to an electric potential difference while located between a plurality of vertical semi-permeable membranes, e.g. of regenerated cellulose, whereby the rubber particles of the latex are caused to migrate towards one face of each membrane and form a rubber-rich region in the dispersion adjacent that face of the membrane and a rubber-poor layer adjacent the other face. As a result of the density difference thus produced between different parts of the dispersion the latex in one region moves upwards and the latex in the other moves downwards and separation thus results into an upper rubber-rich layer and a lower rubber-impoverished layer. The rubber-rich layer can be isolated and a concentrated rubber latex is thus obtained. This process is generally referred to as electrodecantation.

The latex subjected to electrodecantation usually contains ammonia, which is added partly to maintain the stability of the latex and partly to retard bacterial action on the proteins in the latex and the material of the diaphragms. Because bacterial action is more rapid at the elevated temperature used for electrodecantation than at room temperature, considerably more ammonia is needed than would be required merely to maintain the stability of the latex. Usually the ammonia content is of the order of 1% of the latex. Most of this ammonia is lost in the rubber-impoverished layer of the latex and a further quantity of ammonia has to be added to the rubber-rich layer after electrodecantation to restabilise it. The cost of the process is thus increased. Also, the concentrate is not suitable, without further treatment, for making compositions, e.g. adhesives, in which a small ammonia content is needed.

It is an object of the invention to provide a method of concentrating rubber latex by electrodecantation which can be carried out using a smaller proportion of ammonia.

According to the present invention a process for concentrating rubber latex comprises subjecting to electrodecantation a rubber latex containing ammonia and a soluble salt of a bactericidal nuclear substituted phenol.

The salt of the bactericidal nuclear substituted phenol preserves both the membranes of the electrodecantation apparatus

only 0.1% to 0.4% by weight of ammonia.

The salt of the nuclear substituted phenol is preferably an ammonium or alkali metal salt of a polyhalogenated phenol, particularly of a tetrachlorophenol or pentachlorophenol. These salts may be added to the latex in amounts of the order of 0.025 to 0.2% by weight of the latex.

The process may be carried out batchwise, an electrodecantation apparatus being charged with latex containing the salt of the nuclear substituted phenol and sufficient alkali to give the latex stability, electrodecantation then being carried out and the rubber-rich layer so formed containing the bactericidal salt of the nuclear substituted phenol and the rubber-impoverished layer then removed separately. The process may also be conducted in a continuous manner, for example by means of the apparatus described in copending Application No. 25276/49 (Serial No. 683,133).

What we claim is:—

1. A method of concentrating rubber latex which comprises subjecting to electrodecantation a rubber latex containing an alkali and a bactericidal salt of a nuclear substituted phenol.

2. A method according to claim 1 wherein the bactericidal salt is a salt of a polyhalogenated phenol.

3. A method according to claim 2 wherein the bactericidal salt is sodium pentachlorophenate.

4. A method according to claim 2 where the bactericidal salt is ammonium pentachlorophenate.

5. A method according to any of the preceding claims wherein the bactericidal salt is present in an amount from 0.025% to 0.2% by weight of the latex.

6. A method according to any of the preceding claims wherein the said alkali is ammonia.

7. A method according to claim 6 wherein the latex contains 0.1% to 0.4% by weight of ammonia.

8. Concentrated rubber latex wherever obtained by a process according to any of the preceding claims.

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This invention relates to a process for concentrating rubber latex.

It is known to concentrate rubber latex by subjecting it to an electric potential difference while located between a plurality of vertical semi-permeable membranes, e.g. of regenerated cellulose, whereby the rubber particles of the latex are caused to migrate towards one face of each membrane and form a rubber-rich region in the dispersion adjacent that face of the membrane and a rubber-poor layer adjacent the other face. As a result of the density difference thus produced between different parts of the dispersion the latex in one region moves upwards and the latex in the other moves downwards and separation thus results into an upper rubber-rich layer and a lower rubber-impoverished layer. The rubber-rich layer can be isolated and a concentrated rubber latex is thus obtained. This process is generally referred to as electrodecantation.

The latex subjected to electrodecantation usually contains ammonia, which is added partly to maintain the stability of the latex and partly to retard bacterial action on the proteins in the latex and the material of the diaphragms. Because bacterial action is more rapid at the elevated temperature used for electrodecantation than at room temperature, considerably more ammonia is needed than would be required merely to maintain the stability of the latex. Usually the ammonia content is of the order of 1% of the latex. Most of this ammonia is lost in the rubber-impoverished layer of the latex and a further quantity of ammonia has to be added to the rubber-rich layer after electrodecantation to restabilise it. The cost of the process is thus increased. Also, the concentrate is not suitable, without further treatment, for making compositions, e.g. adhesives, in which a small ammonia content is needed.

It is an object of the invention to provide a method of concentrating rubber latex by electrodecantation which can be carried out using a smaller proportion of ammonia.

According to the present invention a process for concentrating rubber latex comprises subjecting to electrodecantation a rubber latex containing ammonia and a soluble salt of a bactericidal nuclear substituted phenol.

The salt of the bactericidal nuclear substituted phenol preserves both the membranes of the electrodecantation apparatus

and proteins in the latex against bacterial attack and its presence in the latex enables the ammonia content thereof to be reduced to that which is sufficient only to maintain the stability of the latex. Moreover at least a substantial proportion of the salt of the bactericidal nuclear substituted phenol is absorbed on the surface layers of the rubber particles, so that it is carried into the rubber-rich layer formed during electrodecantation and it is not necessary to add a further quantity to the rubber-rich layer subsequent to the electrodecantation process. In general it is possible by means of this process to subject to electrodecantation a rubber latex containing only 0.1% to 0.4% of ammonia.

The salt of the nuclear substituted phenol may be, for example, an ammonium or alkali metal salt of a polyhalogenated phenol, for example of a tetrachlorophenol or pentachlorophenol. Particularly suitable is the sodium salt of pentachlorophenol. These salts may be added to the latex in amounts of the order of 0.1% to 0.2% by weight of the latex.

The process may be carried out batchwise, an electrodecantation apparatus being charged with latex containing the salt of the nuclear substituted phenol and sufficient ammonia to give the latex stability, electrodecantation then being carried out and then the rubber-rich layer so formed containing the salt of the bactericidal nuclear substituted phenol and the rubber-impoverished layer then removed separately. The process may also be conducted in a continuous manner, for example by means of the apparatus described in co-pending Application No. 25276/49 (Serial No. 683,133).

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