

United States Patent [19][11] **3,838,967****Shepley**[45] **Oct. 1, 1974**[54] **TREATMENT OF TEXTILE MATERIALS**[75] **Inventor:** Martin Alan Shepley, Runcorn,
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[30] **Foreign Application Priority Data**

Sept. 29, 1970 Great Britain 46246/70

[52] **U.S. Cl.**..... 8/111, 8/142, 252/102,
252/103, 252/104[51] **Int. Cl.**..... **D06I 3/02**[58] **Field of Search** 8/111, 142; 252/104, 102,
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[57]

ABSTRACT

A process for the bleaching and/or desizing of textile materials which comprises treating a textile material with hydrogen peroxide in the presence of a base, the hydrogen peroxide being applied as an emulsion of aqueous hydrogen peroxide in a hydrocarbon or halogenated hydrocarbon solvent.

27 Claims, No Drawings

TREATMENT OF TEXTILE MATERIALS

This invention relates to a textile treatment process and particularly to a process for the treatment of textile materials to at least partially bleach them.

In co-pending Application No. 33,485 now U.S. Pat. No. 3,708,260 (Dutch Patent Application No. 7006688 corresponds) we describe and claim a process for the treatment of textile materials which comprises applying to the textile material an emulsion or suspension of a bleaching agent in a hydrocarbon or halogenated hydrocarbon solvent, causing the solvent substantially to be removed from the textile material, and subsequently washing the textile material.

We have now discovered that when hydrogen peroxide is used as the bleaching agent improved bleaching may be obtained if the bleaching operation is carried out in the presence of a base. Similarly we have found that if the bleaching operation with hydrogen peroxide is carried out in the presence of a base improved desizing of the textile material may be obtained.

According to the present invention there is provided a process for the treatment of textile materials which comprises treating a textile material with hydrogen peroxide in the presence of a base, the hydrogen peroxide being applied as an emulsion of aqueous hydrogen peroxide in a hydrocarbon or halogenated hydrocarbon solvent.

Textile materials made of either natural or synthetic fibres or blends thereof are in general readily wetted by hydrocarbon and halogenated hydrocarbon solvents and consequently application of the hydrogen peroxide emulsion is a rapid and simple manner. The emulsion can be applied, for example, by immersion of the fabric therein, or by spraying, padding or licking. The temperature of the emulsion during application to the textile material conveniently may be room temperature so that solvent losses during the application are minimised.

Impregnation of the textile material with the emulsion will usually be under conditions such that any solvent-soluble substances in the fibres remain in association with the impregnated material. If the textile material is impregnated by immersion in a bath of emulsion, the use of a short immersion time is advantageous to avoid contamination of emulsion in the bath.

After impregnation of the textile material with the emulsion, the hydrocarbon or halogenated hydrocarbon solvent may conveniently be removed from the textile material. This removal may take place before, during or after the reaction of hydrogen peroxide in the presence of base on the textile material.

If it is desired to incorporate the process in a conventional solvent scouring process then the emulsion can be applied to the wet textile material as it leaves the solvent scouring vessel.

The base may be applied simultaneously with the emulsion of hydrogen peroxide, conveniently by incorporating the base in the emulsion and according to one aspect of the present invention there is therefore provided a bleaching composition comprising an emulsion of hydrogen peroxide in a hydrocarbon or halogenated hydrocarbon solvent which emulsion additionally contains a base.

Alternatively, the base may be applied to the textile material before or after (preferably after) impregnation of the textile material with the emulsion. Which-

ever sequence is adopted, the base may be applied to the textile material in a variety of ways. Thus the textile material may be passed into a bath containing the base; or the base may be sprayed onto the textile material, preferably as a solution, suspension or emulsion in a suitable solvent, for example water or a hydrocarbon or halogenated hydrocarbon; or the textile material may be passed into a basic atmosphere, for example an atmosphere containing the vapour of a volatile base. This last procedure has the advantage that acidic vapours which may be produced by attack of peroxide on the solvent of the emulsion are neutralised by the atmosphere.

The bleaching will usually take place at a pH in the range 9 to 13, with pH values in the range 10 to 12.5, for example about 12, being preferred.

The pH at which bleaching takes place is, of course, the pH of the aqueous solution of hydrogen peroxide during (or at least at the start of) the bleaching operation. Since this aqueous solution is emulsified at least partly in the hydrocarbon or halogenated hydrocarbon solvent, however, it is difficult to determine its exact pH. We have therefore devised procedures for estimating the pH of the aqueous solution depending upon whether the base is incorporated in the emulsion prior to application of the emulsion to the textile material or whether it is applied to the textile material subsequent to application of the emulsion. In the case where the base is incorporated in the emulsion of pH may be estimated by shaking the emulsion with an equal volume of water, allowing the mixture to stand and then measuring its pH; if on standing the emulsion breaks and phase separation occurs the pH of the aqueous phase is determined. In the case where the base is applied separately from the emulsion either as an aqueous solution of the base or as a vapour, then we regard the pH at which bleaching takes place as equal to the pH of the solution of the base or the apparent pH of the basic atmosphere as determined using wet indicator paper. In the case where the base is applied separately from the emulsion as a solution in a non-aqueous solvent, then the pH can be estimated by mixing the emulsion of hydrogen peroxide with the solution of the base and estimating the pH as described above in respect of the pH of emulsions.

Examples of bases which may be used are ammonia, alkali metal hydroxides for example sodium hydroxide and potassium hydroxide; metal carbonates for example sodium carbonate; alkali metal alkoxides, especially those in which the alkoxide group contains one to four carbon atoms, for example the methoxides and ethoxides of sodium and potassium; and primary, secondary and tertiary amines, for example monoethanolamine, diethylamine and cyclohexylamine.

For example, we have obtained good bleaching results using a process in accordance with the invention in which a textile material is treated with an emulsion in trichloroethylene containing 2% by weight of aqueous 35% hydrogen peroxide and 0.5% by weight of aqueous 50% caustic soda. By way of further example, advantageous results have been obtained by a process according to the invention in which a textile material impregnated with an emulsion of aqueous hydrogen peroxide is passed through a bath containing a 10% by weight solution of monoethanolamine or diethylamine in trichloroethylene. Similarly, spraying the impregnated textile material with a 10% by weight solution of

monoethanolamine or diethylamine in trichloroethylene has resulted in a successful and rapid bleaching operation in accordance with the invention.

The hydrogen peroxide may be introduced into the emulsion in the form of its aqueous solution. It may conveniently be used in the form of the commercially available aqueous 35% solution, although aqueous solutions of concentrations less than 35% or up to 70%, for example about 50%, may be employed.

The emulsion will normally contain an emulsifying agent and advantageously this may also be a surface-active agent to facilitate washing of the textile material subsequent to removal of the solvent. In the case where the emulsifying agent is not itself a surface-active (or wetting) agent, then a surface-active agent will usually be incorporated in addition to the emulsifying agent. Anionic, cationic or non-ionic surface-active agents may be employed as may mixtures thereof and example of suitable compounds are condensates of alkyl phenols (for example nonyl phenol) with ethylene oxide; salts of alkyl aryl sulphonic acids, for example amine salts of dodecyl benzene sulphonic acid; coconut oil diethanolamide; salts of the monosulphonic acid derivative of diesters of a succinic acid, for example sodium di(methyl amyl) sulphosuccinate; and salts of sulphated fatty alcohols. Also suitable are agents which increase the viscosity of the solvent. In selecting a particular emulsifying agent or combination of emulsifying agents for use it should be remembered that the emulsion may be subjected to basic conditions and a surface-active agent whose activity will not be unduly affected by the base should be chosen.

A wide range of hydrocarbons or halogenated hydrocarbons (particularly halogenated aliphatic hydrocarbons) may be employed, for example white spirit, trichloroethylene, perchloroethylene, 1,1,2-trichloro-1,2,2-trifluoroethane and 1,1,1-trichloroethane. Mixtures of solvents may be employed, if desired.

The concentration of hydrogen peroxide in the emulsion may vary within wide limits but will usually be at least 0.5% by weight based on the total weight of the emulsion and may be conveniently the same as is used in conventional aqueous processes. For most practical bleaching operations there is no advantage in employing a concentration of hydrogen peroxide greater than 5% by weight of the emulsion although higher concentrations may be employed, if desired. In general, the larger the concentration of hydrogen peroxide the greater will be the amount of emulsifying agent required to form the emulsion. We have found that increasing the concentration of the emulsifying agent results in a thickening of the emulsion and we prefer to employ a thin emulsion.

The amount of aqueous hydrogen peroxide employed depends on its concentration and is selected so as to produce the desired concentration of hydrogen peroxide in the emulsion. Thus, for example, the concentration of aqueous 35% hydrogen peroxide is preferably from 1.5% to 10% by weight of the emulsion so that the concentration of the hydrogen peroxide is from about 0.5% to about 3.5%.

The concentration of the emulsifying agent which as explained hereinbefore is advantageously also a wetting agent for the textile material need not be significantly greater than that required just to emulsify the hydrogen peroxide. The concentration of the emulsifying agent will usually be from 0.25% to 5% by weight of the emul-

sion, preferably about 1% to 2% by weight of the emulsion. In the case where there is present both an emulsifying agent and a separate surface-active agent, the amount of each agent may be from 0.25% to 5% by weight of the emulsion.

We prefer to apply the emulsion to the textile material at room temperature. Higher application temperatures may be used, although it should be remembered that hydrogen peroxide becomes increasingly unstable and solvent loss is increased as the temperature increases.

Subsequent to impregnating the textile material with the emulsion of hydrogen peroxide, the hydrocarbon or halogenated hydrocarbon solvent is removed. A variety of methods can be used for removing the solvent, for example air-drying especially using hot air. We prefer that the removal be rapid, for example by causing rapid vaporisation (or flash-off) of the solvent. The resulting solvent vapours may be condensed to recover the solvent for re-use. We prefer to pass the impregnated textile material directly into steam in a known manner to flash-off the solvent. Advantageously the steam is caused to flow essentially counter to the direction of movement of the textile material.

The time for which the textile material is maintained in contact with steam or hot air should be sufficient to remove substantially the whole of the solvent from the material and also to promote any chemical reaction involved in bleaching the material. In general times of 20 seconds to 120 seconds are sufficient for these purposes although if desired shorter or longer periods for example 10 seconds to several minutes may be effective in some cases. After removal of the solvent and bleaching, the textile material can be washed immediately, for example with an alkaline aqueous solution. However, it is not essential that the textile material be washed immediately after solvent removal and if desired a further treatment, for example a further bleach, may be effected between the steps of solvent removal and washing.

The first wash will usually but not necessarily be in a dilute alkaline solution, for example a dilute aqueous solution of sodium carbonate. Any base used in producing the required pH conditions may at least assist in providing alkaline conditions in the first wash. Subsequent washes, of which there may be a number, may be hot or cold and may be in dilute alkali, soap solution or clear water.

The machine in which the process is carried out preferably incorporates means for recovery of the solvent, especially from the solvent removal chamber. The whole machine should preferably be closed to prevent escape of solvent vapour to the atmosphere. Recovery of solvent vapours from the solvent removal zone (and other zones if desired) can be by conventional means for example condensation and, if desired, adsorption. A water separator is normally provided for separation of condensed solvent from liquid water. Recovered solvent can then be returned to a stock tank, after cooling if necessary, where it can be formulated for re-use.

The process of the present invention may be carried out as a continuous operation in a manner similar to that described in the said co-pending Application. The present invention enables an improved bleaching action to be obtained without resorting to the additional bleaching step suggested in the said co-pending Application although additional bleaching steps may be in-

cluded if desired, for example if a full white finish is required.

Like the process of the said copending Application, the process of the present invention may be used for the treatment of materials in a variety of forms, for example woven or knitted fabrics, felts and other sheet materials, or loose fibres carried on a suitable transport system such as an endless belt. Textile materials made of natural or man-made fibres may be treated as may blends of natural fibres and man-made fibres. The process is particularly suitable for the treatment of fabrics made of cotton fibres or of blends of polyester fibres with cotton fibres or regenerated cellulosic fibres, although fabrics made from other fibres or blends of fibres may also be treated. Woven or knitted fabrics are preferably treated in open width. Loomstate or desized fabrics may be treated as also may fabrics which have been singed and/or heat-set prior to treatment. The textile material treated need not be dry; stem damp fabrics containing for example 40% water have been successfully treated by the process of the invention.

The process is especially useful for treating loomstate woven fabric or grey knitted fabric since in this case in addition to at least a partial bleach there is achieved at least a partial dewax and at least a partial desize. Thus dewaxing, desizing and bleaching may be carried out simultaneously to yield in a very short treatment (for example 60 to 120 seconds including washing) a material having high and extremely uniform absorbency properties which is suitable directly for dyeing and for other finishing operations for example resin-finishing.

The invention is illustrated but not limited by the following Examples wherein the following procedures were employed for analysis:

The wax content (wax plus fats and grease) of the fabrics was determined by Soxhlet extraction; the solvent used was chloroform.

The starch equivalent value of the fabrics was determined according to the method recommended by the Cotton, Silk and Man-Made Fibres Research Association of The Shirley Institute in their Test Leaflet No. Chem. 5: "The material is digested with dilute sulphuric acid under such conditions that the starch is dissolved completely with the minimum degradation of the fibre consistent with this. The solution is then filtered, a suitable aliquot portion of the filtrate is digested with standard potassium dichromate and sulphuric acid, and the quantity of dichromate consumed is determined by titration with a standard solution of ferrous ammonium sulphate using phenyl anthranilic acid as indicator."

The blue reflectance of the fabric was determined using a Zeiss Elrephe Reflectometer and recording four readings of which two were recorded for each side of the fabric, one along the warp and the other along the weft. The figure recorded is the mean value of the four readings.

Absorbency was measured by the B.S. 4554 water drop test method and the results obtained assessed as follows:

instantaneous absorption	v. good
1 second to 3 seconds	good
3 seconds to 10 seconds	fair
more than 10 seconds	poor

EXAMPLE 1

An emulsion having the following composition was prepared:

Parts by Weight	
Trichloroethylene	96½
Hydrogen peroxide (aqueous 35%)	2
Surface-active agent mixture	1
Monethanolamine	½

The surface active agent mixture was a 50/50 w/w mixture of 'Lissapol' NX (a nonyl phenol/ethylene oxide condensate) and 'Nansa' 1146 (a mixture of isopropylamine dodecyl benzene sulphonate and coconut oil diethanolamide).

A small sample of loomstate cotton fabric (4 ounces/square yard) was impregnated by immersion in the emulsion to give approximately 100% pick-up, and the impregnated fabric was passed directly to a steam chamber where it was contacted with steam at 95°C to 100°C for a period of 30 seconds after which time the trichloroethylene had been substantially removed.

The fabric, essentially free of trichloroethylene, was washed for 1 minute in 3 g/l aqueous caustic soda at 90°C to 95°C and then for 1 minute in water at 90°C to 95°C. It was then rinsed for 5 minutes in cold water.

The fabric, after conditioning overnight, was examined and its residual water-soluble size content (starch equivalent value), wax content, absorbency and blue reflectance were determined. The results obtained were compared with the results obtained from a sample of the untreated fabric and also from a sample of fabric treated as above except that the emulsion with which it was treated did not contain monoethanolamine. The results are shown in Table 1:

Table 1

Sample	Wax Content	Starch Equivalent Value	Blue Reflectance	Absorbency
Untreated (grey)	0.89	7.8	54	Poor
Treated (no monoethanolamine)	0.26	1.6	66	Good
Treated (monoethanolamine present)	0.34	0.6	77	Good

EXAMPLE 2

An emulsion having the following composition was prepared:

Parts by Weight	
Trichloroethylene	97
Hydrogen peroxide (aqueous 35%)	2
Surface-active agent mixture	1

As in Example 1, the surface active agent mixture was a 50/50 w/w mixture of 'Lissapol' NX and 'Nansa' 1146.

A small sample of loomstate cotton cloth (4 ounces/square yard) was impregnated with the emulsion and mangled to approximately 100% pick-up. The impregnated sample was then steamed for 30 seconds in a

steam vessel into which sufficient 0.880 ammonia had been introduced to provide a saturated vapour of ammonia in steam. The fabric was then washed as in Example 1, and its properties determined and the results compared with the results obtained from the grey (untreated) cloth and from a sample of fabric which has been treated as above except that it had been steamed in the absence of ammonia. The results are shown in Table 2:

Table 2

Sample	Wax Content	Starch Equivalent Value	Blue Reflectance	Absorbency
Untreated (grey)	0.89	7.8	54	Poor
Treated (no ammonia)	0.26	1.6	66	Good
Treated (ammonia present)	0.7	0.3	76	Good

EXAMPLE 3

An emulsion having the following composition was prepared:

Parts by Weight

Trichloroethylene	97
Hydrogen peroxide (aqueous 35%)	2
Surface-active agent mixture (as in Example 1)	1

A small sample of loomstate cotton cloth (4 ounces/square yard) was impregnated with the emulsion and mangled to approximately 100% pick-up. The impregnated sample was then sprayed for 5 seconds with a 10% by weight solution of diethylamine in trichloroethylene.

The fabric was steamed for 30 seconds and washed off as in Example 1. The properties of the treated sample were determined and the results compared with the results obtained from the grey (untreated) cloth and from a sample of fabric which had been treated as above except that it had not been sprayed with a solution of diethylamine. The results are shown in Table 3:

Table 3

Sample	Wax Content	Starch Equivalent Value	Blue Reflectance	Absorbency
Untreated (grey)	0.89	7.8	54	Poor
Treated (not sprayed)	0.4	1.9	67	Good
Treated (sprayed with solution of diethylamine)	0.3	0.4	75	Good

EXAMPLE 4

An emulsion having the following composition was prepared:

Parts by Weight

Trichloroethylene	94
Hydrogen peroxide (aqueous 35%)	4
Caustic soda (100° Tw)	1
Surface-active agent mixture (as in Example 1)	1

The emulsion was applied by immersion to an open-width loomstate 100% cotton fabric of width 32 inches and dry weight 4 ounces per square yard on a continuous process pilot apparatus. A pick-up of from 160% to 200% was obtained. The impregnated fabric was passed directly into a steam chamber of inverted U-shape where it was contacted with steam at 95°C to 100°C to remove trichloroethylene. The residence time of the fabric in the steam chamber was 55 seconds.

The fabric, essentially free from trichloroethylene, was passed into a wash-box containing water at 80°C to 90°C (residence time approximately 120 seconds) and on emerging from the wash-box was sprayed with cold water.

A small sample of the wet fabric so obtained was washed in the laboratory, first in hot water and then in cold water and this sequence was repeated four times. The washed sample was dried with hot air and allowed to condition overnight.

The properties of the sample were then determined and the results obtained compared with the results obtained from a sample of the untreated (grey) cloth and from a sample of cloth which had been treated as above except that the peroxide emulsion with which it was impregnated did not contain caustic soda. The results are shown in Table 4:

Table 4

Sample	Wax Content	Starch Equivalent Value	Blue Reflectance	Absorbency
Untreated cloth	0.8	7	47	Poor
Treated (no caustic)	0.65	1.8	55	Good
Treated (caustic)	0.4	1.2	73	V. Good

EXAMPLE 5

An emulsion having the following composition was prepared:

Parts by Weight

Trichloroethylene	95½
Hydrogen peroxide (aqueous 35%)	2
Sodium methoxide (25% by weight in methanol)	1½
Surface-active agent mixture (as in Example 1)	1

A small sample of loomstate cotton fabric (4 ounces/square yard) was impregnated by immersion in the emulsion to give approximately 100% pick-up, and the impregnated fabric was passed directly to a steam chamber wherein it was contacted with steam at 95°C to 100°C for a period of 60 seconds after which time the trichloroethylene had been substantially removed.

The fabric, essentially free of trichloroethylene was washed for one minute in water at 95°C and for 5 minutes in cold water.

The fabric, after conditioning overnight, was examined and its absorbency and blue reflectance determined. The results were compared with those results obtained from an example of untreated fabric and also from a sample treated as above except that the emulsion used did not contain sodium methoxide. The results are shown in Table 5:

Table 5

Sample	Absorbency	Blue Reflectance
Untreated (grey)	Poor	63.5
Treated (no methoxide)	Very good	73.5
Treated (methoxide present)	Very good	81.1

EXAMPLE 6

An emulsion having the following composition was prepared:

	Parts by Weight
Trichloroethylene	95
Hydrogen peroxide (aqueous 35%)	2
Sodium ethoxide (12% by weight in ethanol)	2
Surface-active agent mixture (as in Example 1)	1

The procedure of Example 5 was repeated using this emulsion to treat a small sample of loomstate cotton fabric (4 ounces/square yard). The results are shown in Table 6:

Table 6

Sample	Absorbency	Blue Reflectance
Untreated (grey)	Poor	49
Treated (no ethoxide)	Good	55
Treated (ethoxide present)	Very good	74

EXAMPLE 7

An emulsion having the following composition was prepared:

	Parts by weight
Perchloroethylene	95½
Hydrogen peroxide (aqueous 35%)	2
Sodium methoxide (25% by weight in methanol)	1½
Surface-active agent mixture (as in Example 1)	1

The procedure of Example 5 was repeated using this emulsion to treat a small sample of loomstate cotton fabric (4 ounces/square yard). The results are shown in Table 7:

Table 7

Sample	Absorbency	Blue Reflectance
Untreated (grey)	Poor	60.2
Treated (no methoxide)	Very good	73.0

Table 7-Continued

Sample	Absorbency	Blue Reflectance
Treated (methoxide present)	Very good	84.3

EXAMPLE 8

An emulsion having the following composition was prepared:

	Parts by weight
White spirit	95
Hydrogen peroxide (aqueous 35%)	2
Sodium methoxide (25% by weight in methanol)	1
Surface-active agent mixture (as in Example 1)	2

The procedure of Example 5 was repeated using this emulsion to treat a small sample of loomstate cotton fabric (6 ounces/square yard). The results are shown in Table 8:

Table 8

Sample	Absorbency	Blue Reflectance
Untreated (grey)	Poor	47
Treated (no methoxide)	Very good	54
Treated (methoxide present)	Very good	67

EXAMPLE 9

An emulsion having the following composition was prepared:

	Parts by weight
Trichloroethylene	94½
Hydrogen peroxide (aqueous 35%)	2
Sodium methoxide (25% by weight in methanol)	1½
Surface-active agent mixture (as in Example 1)	2

A small sample of a loomstate polyester/polynosic fabric (4 ounces/square yard) was impregnated by immersion in the emulsion and mangled to give approximately 100% pick-up. The impregnated fabric was passed to a steam chamber and treated as described in Example 5.

The results are shown in Table 9:

Table 9

Sample	Absorbency	Blue Reflectance
Untreated (grey)	Poor	81
Treated (no methoxide)	Very good	87
Treated (methoxide present)	Very good	94

EXAMPLE 10

An emulsion having the following composition was prepared:

	Parts by weight
Trichloroethylene	94½
Hydrogen peroxide (aqueous 35%)	2
Sodium methoxide (25% by weight in methanol)	1½
Surface-active agent mixture (as in Example 1)	2

The procedure of Example 5 was repeated using this emulsion to treat a small sample of loomstate polyester/cotton fabric (7 ounces/square yard). The results are shown in Table 10:

Table 10

Sample	Absorbency	Blue Reflectance
Untreated (grey)	Poor	63.5
Treated (no methoxide)	Good	73.4
Treated (methoxide present)	Very good	78.5

EXAMPLE 11

An emulsion having the following composition was prepared:

	Parts by weight
Perchloroethylene	94½
Hydrogen peroxide (aqueous 35%)	2
Sodium methoxide (25% by weight in methanol)	1½
Surface-active agent mixture (as in Example 1)	2

The procedure of Example 5 was repeated using this emulsion to treat a sample of loomstate polyester/cotton fabric (7 ounces/square yard). The results are shown in Table 11:

Table 11

Sample	Absorbency	Blue Reflectance
Untreated (grey)	Poor	63.5
Treated (methoxide present)	Good	74.5
Treated (no methoxide)	Very good	79.4

What we claim is:

1. In a process for the treatment of a textile material by impregnating the textile with a dispersion of a bleaching agent in hydrocarbon or halogenated hydrocarbon solvent, removing the solvent from the impregnated textile material and washing the textile material, and wherein said impregnation in the dispersion is for such a length of time that any solvent-soluble substances in the fibers remains in association with the impregnated textile, the improvement consisting essentially of applying as bleaching agent an aqueous emulsion of hydrogen peroxide in the said solvent and bleaching is carried out in the presence of a base selected from the group consisting of an alkali metal hydroxide or alkoxide.

2. A process as claimed in claim 1 wherein the alkali metal hydroxide is sodium hydroxide or potassium hydroxide.

3. A process as claimed in claim 1 wherein the alkox-

ide group contains one to four carbon atoms.

4. A process as claimed in claim 1 wherein the alkali metal is sodium or potassium.

5. A process as claimed in claim 1 wherein the bleaching takes place at a pH in the range 9 to 13.

6. A process as claimed in claim 1 wherein the concentration of hydrogen peroxide in the emulsion is from 0.5% to 5% by weight.

7. A process as claimed in claim 1 wherein the solvent is trichloroethylene.

8. A process as claimed in claim 1 wherein the solvent is perchloroethylene.

9. A process as claimed in claim 1 wherein the solvent is white spirit.

10. A process as claimed in claim 1 wherein the emulsion contains 0.25% to 5% by weight of emulsifying agent.

11. A process as claimed in claim 1 wherein the solvent of the emulsion is removed from the textile material after application of the emulsion to the textile material.

12. A process as claimed in claim 1 wherein the textile material treated contains cotton fibres.

13. A process as claimed in claim 1 wherein the textile material treated contains polyester fibres.

14. A process as claimed in claim 1 wherein the textile material treated contains regenerated cellulose fibres.

15. A process as claimed in claim 1 wherein the textile material is treated in open width.

16. A process as claimed in claim 1 wherein the emulsion is applied to a wet textile material which has been subjected to a solvent scouring process.

17. A process as claimed in claim 3 wherein the alkoxide group is a methoxide or ethoxide group.

18. A process as claimed in claim 5 wherein the bleaching takes place at a pH in the range 10 to 12.5.

19. A process as claimed in claim 10 wherein the emulsion contains 1% to 2% by weight of emulsifying agent.

20. A process as claimed in claim 10 wherein the emulsifying agent is a condensate of an alkyl phenol with ethylene oxide.

21. A process as claimed in claim 10 wherein the emulsifying agent is a salt of an alkyl aryl sulphonic acid.

22. A process as claimed in claim 10 wherein the emulsifying agent is coconut oil diethanolamide.

23. A process as claimed in claim 21 wherein the emulsifying agent is an amine salt of dodecyl benzene sulphonic acid.

24. A process as claimed in claim 11 wherein the solvent is removed by passing the textile material into steam.

25. A process as claimed in claim 11 wherein the textile material is washed after removal of the solvent.

26. A process as claimed in claim 24 wherein the textile material is passed through a solvent flash-off vessel in which steam flows essentially counter to the direction of movement of the textile material.

27. A process as claimed in claim 25 in which the washing of the textile material is in a dilute alkaline solution.

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