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STRIPPING DYED TEXTILES

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Dyeings of the so-called azoic colours of the Brenthol AS type, that is, of those azo dyestuffs produced by combination of a 2:3-hydroxynaphthoic arylamide on the fibre with suitable diazo compounds, are as is well known, generally fast, and many are extremely fast to bleaching agencies. The outstanding fastness to kier-boiling and chlorine of such dyeings, is evidence of this. It often becomes necessary, nevertheless, to remove the dyestuff from the fabric because of faults in the dyeing, or for other reasons, and, although this removal, or discharge, is comparatively easily carried out locally, as in discharge printing processes, it is carried out only with difficulty, and at a prohibitive cost (due to the necessity of using excessive amounts of stripping agents), when a solid shade is to be entirely removed.

In United States Patent No. 2,003,928 there is described an invention which has for its object the provision of a technically advantageous, economical process of stripping particularly adapted to the entire removal of solid shades produced by azoic colours as above defined.

This object is accomplished according to that invention by treating textile material dyed with azoic colours in a chemically reducing liquor (which may be acid, alkaline or neutral) containing an amine or amine salt, preferably a quarternary ammonium salt, one radical in which comprises a straight or branched carbon chain of not less than 10 carbon atoms.

The liquor may be either weakly alkaline, neutral or weakly acid, but is preferably acid when the amine is not a quaternary ammonium salt. Further while azoic dyeings as above defined on wool or silk or other animal fibre can be stripped satisfactorily in an alkaline bath, a certain risk is incurred owing to the possibility of injury to the fibre on account of the alkali present, it is therefore preferable to treat such fibres in a faintly acid bath. If desired vegetable fibre can be treated in the same manner. The acidity may be produced by means of mineral or organic acid. The fibre is stripped white or slightly tinged. In the latter case, for vegetable fibre, a supplementary chlorine or chemick treatment may be applied further to improve the ground. In the case of animal fibre a supplementary peroxide treatment is sometimes beneficial.

Suitable amines or amine salts are for example β-diethylaminoethyloleyl amide or its acetate or hydrochloride, heptadecylamine or its hydrochloride, (Hoffmann, Berichte, 1882, 15,774) and suitable quaternary ammonium salts, are for example octadecylpyridinium bromide, cetylpyridinium bromide, (cf. United States Appln. No. 611,236), cetyl pyridinium chloride (cf. British Patent No. 392,763), octadecyltrimethylammonium (from octadecyl iodide and trimethylamine), cetyltrimethylammonium bromide, cetyltriethylammonium bromide, cetyltrimethylammonium iodide, p-stearoamidophenyltrimethylammonium sulphate, β-stearoamidoethyldiethylamine methosulphate (cf. British Patent No. 294,582), or β-hydroxyethyl-N-octadecyl morpholinium bromide (prepared by heating together equimolecular proportions of β-hydroxyethylmorpholine and octadecyl bromide at 140–145° C.).

According to the present invention which is an improvement in or modification of that described in the aforesaid specification, a small proportion of anthraquinone or hydroxy, amino, halogen or alkyl substituted anthraquinone is added in the stripping process already mentioned.

In carrying the invention into practical effect there is applied to the dyed material a hot dilute aqueous solution of a reducing agent, for example sodium hydrosulphite, containing a small proportion of the quaternary ammonium salt and the anthraquinone or anthraquinone derivative.

The textile material is then found to be colourless, or at most to have but a light tinge. It may be made white or but slightly tinged by a further treatment, if necessary, in a weak solution of sodium hypochlorite or other bleaching liquor.

The present process possesses various advantages over the process described in United States Patent No. 2,003,928. The process generally speaking can be carried out at a lower temperature than when the addition of anthraquinone to the bath is omitted, and the time necessary for effective stripping action to be effective is frequently reduced. Further it facilitates the stripping of certain azoic colours which by known processes are difficult to remove from the fibre. Finally it is of particular interest in the stripping of azoic colours from natural silk, dyeings on this fibre being more resistant to stripping agents than are the corresponding dyeings on cotton.

The invention also includes new preparations for stripping textile fibres, which comprise an amine or amine salt as already described and anthraquinone or an anthraquinone derivative, with, if desired, a soluble hydrosulphite.

The following examples in which parts are by weight illustrate but do not limit the invention.

Example 1

Cotton yarn dyed a full shade by means of Brenthol AT (diacetoacetictoluidide) coupled with diazotized 4 - chloro - 2 - aminotoluene hydrochloride, is treated for 30 minutes at 85–90° C. in 40 times its weight of an aqueous solution prepared by adding 1.25 parts of caustic soda, 1.25 parts sodium hydrosulphite (conc. powder) and 0.5 part of trimethylcetylammonium bromide to 1000 parts of water, in which is dispersed 0.5 part of finely powdered anthraquinone.

This treatment reduces the colour of the yarn to a pale yellow shade which may be stripped to a white by treatment for 30 minutes in sodium hypochlorite solution (¼° Tw.).

Example 2

Cotton yarn dyed a full shade by means of Brenthol AS (anilide of 2:3-hydroxynaphthoic acid) coupled with diazotized 5-chloro-2-aminotoluene is heated for 30 minutes at 50° C. in 40 times its weight of an aqueous solution prepared by adding 2.5 parts of caustic soda, 4 parts of sodium hydrosulphite (concentrated powder) and 0.5 part of trimethylcetylammonium bromide to 1000 parts of water in which is dispersed 0.5 part of finely powdered anthraquinone. The colour is discharged. A treatment in cold solution of sodium hypochlorite (½° Tw.) clears the residual stains and a white yarn is produced.

A corresponding treatment omitting anthraquinone strips the colour to a pale red shade whilst a treatment omitting both anthraquinone and trimethylcetylammonium bromide leaves the colour almost unchanged.

Example 3

Cotton yarn dyed a full shade by means of Brenthol BT (2-hydroxycarboazol-3-carboxylic acid p-chloroanilide) coupled with diazotized 5-nitro-o-anisidine is treated for 16 hours at 20° C. in 40 times its weight of an aqueous solution having the same composition as that described in Example 2. The yarn is then rinsed and transferred to a cold solution of sodium hypochlorite (½° Tw.) for ½ hour. It is then scoured by immersion in dilute hydrochloric acid for a few minutes, rinsed and dried. The colour of the yarn is a pale brown tint.

By treating the dyed yarn in a corresponding manner, omitting the addition of anthraquinone, the yarn is stripped to a light brown shade whilst a treatment omitting both anthraquinone and trimethylcetylammonium bromide exerts practically no stripping action.

Example 4

A treatment of yarn dyed a full shade by means of Brenthol AT (diacetoacetictoluidide) coupled with diazotized 5-nitro-o-anisidine by the same method and using a solution having the same composition as employed in Example 3, strips the colour to a pale orange.

A corresponding treatment omitting anthraquinone reduces the colour to a medium orange yellow shade, whilst a treatment omitting both anthraquinone and trimethylcetylammonium bromide has practically no stripping effect.

Example 5

A treatment of cotton yarn dyed a full shade by means of Brenthol BA (4-bromo-o-anisidide of 2:3-hydroxynaphthoic acid) coupled with tetrazotized dianisidine by the same method and using a solution having the same composition as employed in Example 3 strips the colour to pale greyish tint.

A corresponding treatment omitting anthraquinone reduces the shade to a pale dull shade whilst a treatment omitting anthraquinone and trimethylammonium bromide produces scarcely any change in the original heavy navy blue shade.

Example 6

Pure silk yarn dyed a full shade by means of Brenthol BA coupled with diazotized fast red KB base is heated at the boil in 40 times its weight of an aqueous solution prepared by adding 1 part of 30% acetic acid, 2 parts Formosol and 0.5 part trimethylcetylammonium bromide, to 1000 parts water in which is dispersed 0.5 part finely powdered anthraquinone. The colour is discharged after 30 minutes after which the yarn is rinsed and may be given an after-treatment with hydrogen peroxide (1 volume) at 85–90° C. for 1 hour in order to remove yellowish stains due to decomposition products.

Treatment with a corresponding solution omitting the anthraquinone requires to be carried out for one hour before the colour is discharged.

Example 7

A treatment of pure silk yarn dyed in full shade by means of Brenthol CT (5-chloro-o-toluidide of 2:3-hydroxynaphthoic acid) coupled with diazotized 5-chloro-2-aminotoluene by the same method using a solution having the same composition as in Example 6 discharges the colour after 30 minutes.

A corresponding treatment omitting anthraquinone produces very slight stripping after 30 minutes and requires to be carried out for 2½ hours in order to completely discharge the colour.

Example 8

Pure silk yarn dyed a full shade by means of Brenthol BA coupled with diazotized 4-nitro-o-anisidine is heated at the boil in 40 times its weight of a solution prepared by dissolving 2 parts of 30% acetic acid, 4 parts Formosol and 0.5 part trimethyldodecylammonium bromide in 1000 parts of water and adding 0.5 part of finely divided anthraquinone. The colour is discharged after heating for 40 minutes.

A treatment for the same time using a similar solution except that the anthraquinone is omitted, only strips the yarn to a light pink shade.

I claim:

1. A stripping bath containing trimethylcetylammonium bromide and finely powdered anthraquinone.

2. A composition of matter useful in stripping the color from materials dyed with azo dyes, comprising a dilute aqueous solution of sodium hydrosulfite, one of a group of compounds consisting of an amine having a straight or branch chain of at least ten carbon atoms and an amine salt having a straight or branch chain of at least ten carbon atoms, and one of a group of compounds consisting of anthraquinone, hydroanthraquinone, aminoanthraquinone, halogenoanthraquinone, and alkylanthroquinone.

3. A composition of matter useful in stripping the color from materials dyed with azo dyes, comprising a dilute aqueous solution of a reducing agent of the hydrosulfite type, one of a group of compounds consisting of an amine having a straight or branch chain of at least ten carbon atoms and an amine salt having a straight or branch chain of at least ten carbon atoms, and

one of a group of compounds consisting of anthraquinone, hydroanthraquinone, aminoanthraquinone, halogenoanthraquinone, and alkylanthraquinone.

4. A composition of matter useful in stripping the color from materials dyed with azo dyes comprising, a solution of a reducing agent, one of a group of compounds consisting of an amine having a straight or branch chain of at least ten carbon atoms and an amine salt having a straight or branch chain of at least ten carbon atoms, and one of a group of compounds consisting of anthraquinone, hydroanthraquinone, aminoanthraquinone, halogenoanthraquinone, and alkylanthraquinone.

5. A composition of matter useful in stripping the color from materials dyed with azo dyes, comprising water, one of a group of compounds consisting of an amine having a straight or branch chain of at least ten carbon atoms and an amine salt having a straight or branch chain of at least ten carbon atoms, and one of a group of compounds consisting of anthraquinone, hydroanthraquinone, aminoanthraquinone, halogenoanthraquinone, and alkylanthraquinone.

6. A composition of matter useful in stripping the color from materials dyed with azo dyes comprising water, an amine having a straight or branch chain of at least 10 carbon atoms and one of a group of compounds consisting of anthraquinone, hydroanthraquinone, aminoanthraquinone, halogenoanthraquinone, and alkylanthraquinone.

7. A composition of matter useful in stripping the color from materials dyed with azo dyes, comprising water, an amine salt having a straight or branch chain of at least ten carbon atoms, and one of a group of compounds consisting of anthraquinone, hydroanthraquinone, aminoanthraquinone, halogenoanthraquinone, and alkylanthraquinone.

8. A composition of matter useful in stripping the color from materials dyed with azo dyes, comprising water, a tertiary amine having a straight or branch chain of at least ten carbon atoms and one of a group of compounds consisting of anthraquinone, hydroanthraquinone, aminoanthraquinone, halogenoanthraquinone, and alkylanthraquinone.

9. A composition of matter useful in stripping the color from materials dyed with azo dyes, comprising water, a tertiary amine having a straight or branch chain of at least ten carbon atoms and one of a group of compounds consisting of anthraquinone, hydroanthraquinone, aminoanthraquinone, halogenoanthraquinone, and alkylanthraquinone, the anthraquinone ingredient being present in a weight about .05% of that of the bath.

10. A composition of matter useful in stripping the color from materials dyed with azo dyes, comprising trimethylcetylammonium bromide and one of a group of compounds consisting of anthraquinone, hydroanthraquinone, aminoanthraquinone, halogenoanthraquinone, and alkylanthraquinone.

11. A composition of matter useful in stripping the color from materials dyed with azo dyes, comprising trimethylcetylammonium bromide and anthraquinone.

12. The method of stripping materials dyed with azo dyes which comprises acting on the materials with a bath containing the ingredients of claim 2.

13. The process of stripping materials dyed with azo dyes which comprises acting on the dyed materials with a bath containing the ingredients of claim 3.

14. The process of stripping materials dyed with azo dyes which comprises acting on the dyed materials with a bath containing the ingredients of claim 4.

15. The process of stripping materials dyed with azo dyes which comprises acting on the dyed materials with a bath containing the ingredients of claim 5.

16. The process of stripping materials dyed with azo dyes which comprises acting on the dyed materials with a bath containing the ingredients of claim 6.

17. The process of stripping materials dyed with azo dyes which comprises acting on the dyed materials with a bath containing the ingredients of claim 7.

18. The process of stripping materials dyed with azo dyes which comprises acting on the dyed materials with a bath containing the ingredients of claim 8.

19. The process of stripping materials dyed with azo dyes which comprises acting on the dyed materials with a bath containing the ingredients of claim 9.

20. The process of stripping materials dyed with azo dyes which comprises acting on the dyed materials with a bath containing the ingredients of claim 10.

21. The process of stripping materials dyed with azo dyes which comprises acting on the dyed materials with a bath containing the ingredients of claim 11.

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