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PROCESS OF INHIBITING ACID FADING AND THE PRODUCTS THEREOF

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This invention relates to the treatment of textile materials and relates more particularly to the treatment of dyed textile materials with agents which inhibit the tendency of said dyed textile materials to fade or undergo other undesirable color changes when exposed to acid fumes.

An object of this invention is to provide an improved process for the treatment of colored cellulose acetate or other organic derivative of cellulose textile materials dyed with colors which are not ordinarily fast to acid fumes whereby the resistance of said dyed textile materials to acid fading is substantially improved.

Another object of this invention is the provision of a process for the treatment of cellulose acetate or other organic derivative of cellulose textile materials with acid fading inhibiting agents while said textile materials are being dyed so as to impart an appreciable resistance to acid fading to said textile materials simultaneously with their coloration.

Another object of this invention is the provision of dyed cellulose acetate or other organic derivative of cellulose textile materials which are highly resistant to acid fading.

Yet another object of this invention is the provision of a novel acid fading inhibiting agent having a substantive affinity for cellulose acetate or other organic derivative of cellulose materials so that the materials treated therewith may be washed without excessive loss of protection against acid fading.

A further object of this invention is the treatment of dyed cellulose acetate or other organic derivative of cellulose textile materials with non-discoloring protective agents which inhibit the acid fading of said dyed materials.

Other objects of this invention will appear from the following detailed description.

In the production of dyed textile materials it is important that the color on the material be as fast as possible to various agencies such as light, washing and acid fumes. While the colorations on many dyed textile materials having a basis of an organic derivative of cellulose are fast to washing and to light, they are frequently observed to undergo undesirable color changes when exposed to acid fumes such as those formed as the products of the combustion of coal, gas, etc. This change in shade, known as acid or gas fading, may result in a dulling of the original shade or may actually result in a pronounced change in color. The undesirable acid fading of dyed cellulose acetate or other organic derivative of cellulose textile materials is frequently encountered in connection with many anthraquinone dyes which dye said materials in valuable blue colors. When fabrics dyed with these colors are exposed to acid fumes the colors change from a pure blue shade to one having a reddish cast. Upon being exposed for a further period to said acid fumes, the blue color may even change to a pink color. Such uncontrolled changes in shade are, obviously, very undesirable and methods of increasing

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the resistance of the dyed textile materials to acid fading are of great commercial importance.

We have now found that the acid fading resistance of dyed cellulose acetate or other organic derivative of cellulose textile materials colored with dyestuffs which are not ordinarily fast to the action of acid fumes may be substantially improved if there is applied to said materials a compound selected from the group consisting of 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5 and 2,4-dianilino-6-amino-s-triazine-1:3:5. Each of said triazine compounds has a pronounced substantive affinity for cellulose acetate or other organic derivative of cellulose textile materials and, when incorporated in the dyebath employed, may be applied to said cellulose acetate or other organic derivative of cellulose materials simultaneously with the dyeing operation.

The application of said acid fading inhibitors by a co-dyeing technique wherein the inhibitor is incorporated in the dyebath and is applied to the textile material as the latter is being dyed, is the preferred method of applying said inhibitors. However, emulsion methods or solution methods of applying the inhibitor are also satisfactory.

When solution methods are employed, the acid fading inhibiting agent is dissolved in a solvent which does not have an undesirable solvent action on the organic derivative of cellulose material, such as an aqueous 70% solution of ethyl alcohol, or an aqueous 30% solution of butyl "Carbitol." The textile material to be treated is then padded with the solution, the nip of the pad being adjusted to permit the desired amount of the solution to remain on the textile material, and the solvent is then evaporated.

When the inhibiting agent is applied in the form of an emulsion, padding methods are also suitable. In preparing emulsions of the inhibiting agent the latter may be dissolved in a water-insoluble organic solvent, such as toluene, and this organic solution then dispersed in water, employing a suitable dispersing agent. In these emulsions the organic solvent solution of the inhibiting agent comprises the disperse phase of the emulsion and the water forms the continuous phase. Advantageously from 1 to 2% of the inhibiting agent, based on the weight of the textile material, is applied in order to obtain suitable protection. As dispersing agents which may be employed in forming the emulsion there may be mentioned sulfated ricinoleic ester, hydroxy amine condensates with long chain fatty acids and sulfated lauryl alcohol.

In order further to illustrate our invention, but without being limited thereto, the following examples are given:

Example I

A dyebath composition is prepared by incorporating .03 parts by weight of 1-4-bis-methylamino anthraquinone, 0.14 parts by weight of soap, 0.36 parts by weight of tetrapotassium pyrophosphate and 2.85 parts by weight of sulfated ricinoleic ester in 200 parts by weight of hot water held at a temperature of about 80° C. A solution of inhibiting agent is formed by dissolving 0.2 part by weight of 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5 in 3 parts by weight of acetone and the solution thus obtained is added to the dyebath with stirring. The volume of the dyebath is adjusted to the desired concentration by the addition of 600 parts by weight of hot water. A cellulose acetate satin fabric in a quantity equal to 10 parts by weight is immersed in the dyebath and dyed for one hour at 80° C. The dyed fabric is then dried. A portion of the fabric is separated and is scoured for ½ hour at 50° C. in a 5

gram per liter soap solution. Both scoured and unscoured samples of the dyed fabric are then tested by being exposed to 1 and 2 units of exposure in accordance with the standard A. A. T. C. C. test for gas fading. Both the scoured and unscoured samples show a pronounced resistance to changes in shade. The scoured sample is found to offer a considerably better degree of protection to gas fading than codyed fabric dyed in the manner described above but where the commercial inhibiting agent diphenylacetamidine is employed to protect the fabric from acid fading.

Example II

The codeyeing process of Example I is carried on a cellulose acetate fabric with the exception that 2,4-dianilino-6-amino-s-triazine-1:3:5 is added to the dyebath in place of the inhibiting agent mentioned. A portion of the dyed fabric obtained is scoured as described in Example I and samples of both scoured and unscoured fabric subjected to 2 units of exposure to combustion gases in accordance with the standard A. A. T. C. C. tests. A pronounced degree of protection against color changes due to gas fading is found to be imparted to the dyed fabric by said treatment. As in Example I, the scoured fabric is found to show a better resistance to color changes due to gas fading than a fabric similarly dyed and scoured but wherein diphenylacetamidine is employed as the acid fading inhibitor. The resistance of the dyed fabric to gas fading color changes even after scouring shows the very desirable substantivity which these specific gas fading inhibitors have for cellulose acetate and other organic derivative of cellulose textile materials.

Example III

The particular inhibiting agent employed in the process described in Example I, namely, 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5, is a novel compound. It may be obtained by the following process.

6 parts by weight of 2-anilino-4- β -6-dichloro-s-triazine-1:3:5 are dissolved in 100 parts by weight of acetone and the solution added to a suitable reaction vessel equipped with a condenser, stirrer means and an inlet for the addition of other reactants. A solution of 4.4 parts by weight of β -ethoxyethylamine in 50 parts by weight of acetone is gradually added to the solution in the reaction vessel, the mixture being maintained at room temperature. When the addition is completed, the mixture obtained is refluxed for 4 hours. After this period the reaction mixture is then poured into ice water and crude 2-anilino-4- β -ethoxyethylamino-6-chloro-s-triazine-1:3:5 is obtained. The latter may be recrystallized from dilute acetone. The chlorine group of the above intermediate compound is replaced by an amino group by adding the intermediate to 100 parts by weight of alcohol which is saturated with ammonia and then reacting the mixture obtained in a pressure vessel at 120° C. for about 5 hours. The chloro group is replaced by an amino group and this reaction yields 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5, which may be separated by acetone extraction. This compound has a melting point of 100-103° C.

It is to be understood that the foregoing detailed description is given merely by way of illustration and that many variations may be made therein without departing from the spirit of our invention.

Having described our invention, what we desire to secure by Letters Patent is:

1. Process for improving the fastness to acid fading of colorations on dyed organic derivative of cellulose textile material, which comprises treating the dyed organic derivative of cellulose textile material with an inhibitor selected from the group consisting of 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5 and 2,4-dianilino-6-amino-s-triazine-1:3:5.

2. Process for improving the fastness to acid fading of colorations on dyed cellulose acetate textile material, which comprises treating the dyed cellulose acetate textile material with an inhibitor selected from the group consisting of 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5 and 2,4-dianilino-6-amino-s-triazine-1:3:5,

3. Process for the production of dyed organic derivative of cellulose textile materials resistant to acid fading, which comprises dyeing the organic derivative of cellulose textile material with a dyebath containing a dispersed dyestuff for said organic derivative of cellulose textile material and an acid fading inhibiting agent selected from the group consisting of 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5 and 2,4-dianilino-6-amino-s-triazine-1:3:5.

4. Process for the production of dyed cellulose acetate textile materials resistant to acid fading, which comprises dyeing the cellulose acetate textile material with a dyebath containing a dispersed dyestuff for said cellulose acetate textile material and an acid fading inhibiting agent selected from the group consisting of 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5 and 2,4-dianilino-6-amino-s-triazine-1:3:5.

5. Process for improving the fastness to acid fading of colorations on dyed organic derivative of cellulose textile material, which comprises treating the dyed organic derivative of cellulose textile material with 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5.

6. Process for improving the fastness to acid fading of colorations on dyed organic derivative of cellulose textile material, which comprises treating the dyed organic derivative of cellulose textile material with 2,4-dianilino-6-amino-s-triazine-1:3:5.

7. Process for improving the fastness to acid fading of colorations on dyed cellulose acetate textile material, which comprises treating the dyed cellulose acetate textile material with 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5.

8. Process for improving the fastness to acid fading of colorations on dyed cellulose acetate textile material, which comprises treating the dyed cellulose acetate textile material with 2,4-dianilino-6-amino-s-triazine-1:3:5.

9. Process for the production of dyed organic derivative of cellulose textile materials resistant to acid fading, which comprises dyeing the organic derivative of cellulose textile materials with a dyebath containing a dispersed dyestuff for said organic derivative of cellulose textile material and 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5.

10. Process for the production of dyed organic derivative of cellulose textile materials resistant to acid fading, which comprises dyeing the organic derivative of cellulose textile material with a dyebath containing a dispersed dyestuff for said organic derivative of cellulose textile material and 2,4-dianilino-6-amino-s-triazine-1:3:5.

11. Process for the production of dyed cellulose acetate textile materials resistant to acid fading, which comprises dyeing the cellulose acetate textile material with a dyebath containing a dispersed dyestuff for said cellulose acetate textile material and 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5.

12. Process for the production of dyed cellulose acetate textile materials resistant to acid fading, which comprises dyeing the cellulose acetate textile material with a dyebath containing a dispersed dyestuff for said cellulose acetate textile material and 2,4-dianilino-6-amino-s-triazine-1:3:5.

13. Dyed organic derivative of cellulose textile material having 2-anilino-4- β -ethoxyethylamino-6-amino-s-triazine-1:3:5 incorporated therein.

14. Dyed cellulose acetate textile material having 2-

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anilino - 4 - β - ethoxyethylamino - 6 - amino - s - triazine-1:3:5 incorporated therein.

15. Dyed organic derivative of cellulose textile material having 2,4-dianilino-6-amino-s-triazine-1:3:5 incorporated therein.

16. Dyed cellulose acetate textile material having 2,4-dianilino-6-amino-s-triazine-1:3:5 incorporated therein.

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