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DYED TEXTILE MATERIALS AND METHOD OF MAKING

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This invention relates to dyed textile materials and relates more particularly to dyed textile materials having an improved resistance to gas fading.

An important object of this invention is the preparation of dyed textile materials that exhibit an improved resistance to gas fading.

A further object of this invention is to provide dyed textile materials of improved resistance to gas fading having applied thereto a polymeric dialkyl-amino-alkyl-acrylate.

Other objects of this invention will be apparent from the following detailed description and claims.

In the coloration of textile materials it is very desirable that the colors obtained be as fast as possible to light, washing and other agencies, such as acid fumes. It has been found that on certain types of textile materials including organic acid esters of cellulose, such as cellulose acetate, and linear polyesters, such as polyethylene glycol terephthalate, many dyestuffs yield colors that are fast to light and washing, but these colors suffer from a lack of fastness to acid fumes. When textile materials to which these dyestuffs have been applied are exposed to acid fumes, such as, for example, the products of combustion of coal, gas, etc., the color undergoes a change in shade. This change is usually referred to as gas fading. The change which occurs may be a dulling of the brightness of the shade in some instances and in others there may be a definite change in color. These undesirable effects are frequently observed in the case of many anthraquinone dyestuffs which yield valuable blue colors on these textile materials. When textile materials dyed with these colors are exposed to acid fumes the colors change from a pure blue shade to one having a reddish cast. On continued exposure to the acid fumes the blue color may even change to a pink color. Such changes obviously restrict the range of usefulness of these dyestuffs. Accordingly, methods of increasing the resistance of these dyes to gas fading are of great commercial importance.

We have now found that the gas fading characteristics of dyed textile materials that exhibit a tendency to gas fading may be substantially improved if there is applied to said textile materials a polymeric dialkyl-amino-alkyl-acrylate whose alkyl and alkylene groups contain up to 6 carbon atoms. The salts of the polymeric material, such as the acetates and the like, are soluble in water and may be applied to the textile material from aqueous solution, reducing the expense of such application to a minimum. The polymeric material may also be applied to the textile material from solution in an organic solvent or as an emulsion. Following the application of the polymeric material, the textile materials may be air dried. In this case, the polymeric material will improve the resistance to gas fading of the dyed textile material, but such improvement will not be fast to washing. To make the improvement in gas fading resistance fast to washing, the textile material having the polymer applied thereto should be baked at an elevated temperature of at least about 100°

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C. for a period of at least about 5 minutes. The higher the temperature of baking the shorter the baking period needed to render the resistance to gas fading fast to washing. For example, the improvement in wash-fastness obtained by baking in 5 minutes at 160° C. is similar to that obtained in 30 minutes at 110° C., while a 10 minute baking at 160° C. yields results which are even better than those obtained in one hour at 110° C.

Examples of suitable polymeric dialkyl-amino-alkyl-acrylates that may be employed in carrying out this invention include, for example, polymeric dimethylaminoethylmethacrylate, polymeric diethylaminoethylmethacrylate, polydimethylaminoethylacrylate, polydiethylaminoethylacrylate, polymeric dimethylaminomethylacrylate, and the like. The quantity of polymeric materials applied may range from about 0.5 to 5.0 percent by weight based on the weight of the textile material. The polymeric materials are themselves strongly resistant to discoloration during exposure to acid fumes so that they will not cause an undesirable change in the coloration of the dyed textile materials. Thus, when a white satin fabric formed of cellulose acetate yarns is padded with 1 percent of its weight of the acetate salt of polydimethylaminoethylmethacrylate, and then dried and baked for 1 hour at a temperature of 110° C., the fabric shows substantially no discoloration when exposed to gas-fading conditions.

The following examples are given to illustrate this invention further:

Example I

A satin fabric formed of cellulose acetate yarns dyed with .2% by weight on the weight of the fabric of 1-4 dialkylamino anthraquinone is padded with 1 percent by weight on the weight of the fabric of the acetate salt of polydimethylaminoethylmethacrylate and dried. The dried fabric retained its color substantially unchanged on exposure to 3 units of gas fading according to the standard A. A. T. C. C. gas-fading test and showed only a slight reddening on exposure of 4 units of gas fading.

Example II

A dyed fabric treated in the manner set forth in Example I is baked for 1 hour at a temperature of 110° C. and scoured. On exposure in a gas fading apparatus, the fabric exhibits substantially the same resistance to gas fading as exhibited by the fabric in Example I. However, if the fabric is scoured without baking it loses substantially all of its resistance to gas fading.

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 resistance to gas fading of a dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas-fading on said material, which comprises applying a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms to the said dyed textile material.

2. Process for improving the resistance to gas fading of a dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas-fading on said material, which comprises applying from about 0.5 to 5.0 percent by weight of a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkyl-

ene groups contain at most 6 carbon atoms to the said dyed textile material.

3. Process for improving the resistance to gas fading of a dyed cellulose acetate textile material dyed with a blue anthraquinone dye exhibiting a tendency to gas fading, which comprises applying a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms to the said dyed textile material.

4. Process for improving the resistance to gas fading of a dyed cellulose acetate textile material dyed with a blue anthraquinone dye exhibiting a tendency to gas fading, which comprises applying polymeric dimethylaminoethylmethacrylate to the said dyed textile material.

5. Process for improving the resistance to gas fading of a dyed cellulose acetate textile material dyed with a blue anthraquinone dye exhibiting a tendency to gas fading, which comprises applying from about 0.5 to 5.0 percent by weight of polymeric dimethylaminoethylmethacrylate to the said dyed textile material.

6. Process for improving the resistance to gas fading of a dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas-fading on said material, which comprises applying a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms to the said dyed textile material, and baking the textile material at an elevated temperature.

7. Process for improving the resistance to gas fading of a dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas-fading on said material, which comprises applying a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms to the said dyed textile material, and baking the textile material at a temperature of at least about 100° C. for a period of at least about 5 minutes.

8. Process for improving the resistance to gas fading of a dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas-fading on said material, which comprises applying a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms to the said dyed textile material, and baking the textile material at a temperature of about 160° C. for a period of about 10 minutes.

9. Process for improving the resistance to gas fading of a dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas-fading on said material, which comprises applying a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms to the said dyed textile material, and baking the textile material at a temperature of about 110° C. for a period of about one hour.

10. A dyed textile material having a basis of an ester

selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas fading on said material, said dyed textile material having applied thereto a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms.

11. A dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas fading on said material, said dyed textile material having applied thereto from about 0.5 to 5.0 percent of a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms.

12. A dyed cellulose acetate textile material dyed with a blue anthraquinone dye which normally exhibits a tendency to gas-fading on said material, said textile material having applied thereto a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms.

13. A dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas fading on said material, said dyed textile material having applied thereto polymeric dimethylaminoethylmethacrylate.

14. A dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas fading on said material, said dyed textile material having applied thereto from about 0.5 to 5.0 percent of polymeric dimethylaminoethylmethacrylate to improve its resistance to gas fading.

15. A dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas fading on said material, said dyed textile material having applied thereto a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms which has been baked at an elevated temperature.

16. A dyed textile material having a basis of an ester selected from the group consisting of cellulose acetate and polyethylene terephthalate and dyed with a blue anthraquinone dye which exhibits a tendency to gas fading on said material, said dyed textile material having applied thereto a polymeric dialkyl-amino-alkyl-acrylate wherein the alkyl and alkylene groups contain at most 6 carbon atoms which has been baked at a temperature of about 160° C. for a period of about 10 minutes.

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