

UNITED STATES PATENT OFFICE

CAMILLE DREYFUS, OF NEW YORK, N. Y., AND HERBERT PLATT, OF CUMBERLAND, MARYLAND, ASSIGNORS TO CELANESE CORPORATION OF AMERICA, A CORPORATION OF DELAWARE

DYEING OF TEXTILE MATERIAL WITH VAT DYES

No Drawing.

Application filed July 2, 1929. Serial No. 375,571.

This invention relates to a process of dyeing textile materials made of or containing organic derivatives of cellulose, particularly cellulose acetate, utilizing vat colors to obtain good fast dyeings.

An object of our invention is to utilize vat dyestuffs for the dyeing of cellulose esters and cellulose ethers, specifically cellulose acetate.

Another object of this invention is to devise a process for the dyeing of organic derivatives of cellulose with vat dyes without first subjecting the derivatives of cellulose to saponification. Other objects and advantages will appear from the following detailed description.

It is well known that the application of the so-called vat colors to certain types of materials has been difficult when it has not been altogether impossible. This difficulty was due to the presence of large amounts of caustic alkali which has a deleterious effect upon fibres made of or containing organic esters of cellulose and also upon animal fibres such as wool and silk. The caustic alkali effects a degradation of the animal fibres with a consequent loss in strength and contraction of the fibres and with the cellulose acetate or other cellulose esters not only results in a progressive loss in weight and some loss in lustre and strength but also affects the dyeing properties of the cellulose esters.

According to the present invention the vat dyes are employed but their application is effected in such a manner that the use of caustic alkali is entirely or almost entirely dispensed with. This modification precludes the usual degradation or saponification or at least reduces the same to unobjectionable proportions. This variation of the process of applying vat colors to organic derivatives of cellulose gives colorings which are bright and permanent in nature, being fast to light and washing.

In accordance with our invention the vat dyes are applied to material containing cellulose derivatives in the manner in which they are customarily applied with the exception that little or no caustic alkali is added to the dyeing bath and the amount of hydrosul-

phite usually employed is increased. The absence of alkali or its presence in very small quantities permits the dyeing of cellulose esters, for example, cellulose acetate, to be effected without the usual objectionable saponification. The cellulosic material thus retains all of its desirable qualities such as lustre, strength and hand.

The process consists essentially in treating material containing cellulose acetate in a bath containing, in addition to the vat color, hydrosulphite and soda ash in varying amounts, depending upon the depth of color desired and the particular dyestuff employed. Excellent dyeings are obtained by this method if the dyeing operation is carried out at approximately 75° C. for about one-half to one hour or until the desired shade is obtained. The material is then rinsed and subsequently oxidized by exposure to the atmosphere or preferably by treating the same for about 15 minutes at 60° C. in a bath containing 2 grams per litre of sodium perborate. The oxidation with perborate results in brighter dyeings. The material can then advantageously be subjected to a light soap-

In order to illustrate our invention but with no intention of limiting ourselves thereto, the following specific examples are given.

Example I

A cellulose acetate fabric was scoured in the usual manner and then dyed with 5% Anthrene Jade green C. I. 1101 in a 40:1 bath containing 5 to 10 grams of hydrosulphite per litre and 0.5 grams soda ash per litre. The fabric was dyed for one hour at 75° C. and was then oxidized in a 2 grams per litre sodium perborate solution at 60° C. for about 15 minutes. A full level dyeing, washable and very fast to light, was obtained.

Example II

A cellulose acetate fabric was treated as outlined in Example I except that no soda ash was added to the bath. The fabric was dyed in full shade and its fastness properties were fully as good as under Example I.

Example III

A fabric containing methyl cellulose was treated with 5% Anthrene blue green B C. I. 1102 in a 40:1 bath containing 10 grams hydrosulphite per litre and 2 grams soda ash per litre. The fabric was dyed for one hour at 75° C. and was then oxidized as outlined under Example I. A full level blue green was obtained on the fabric, the coloring possessing very good fastness to light and washing.

Example IV

A fabric containing cellulose acetate was treated with 5% Anthrene blue green B in a 40:1 bath containing 5 to 10 grams of hydrosulphite per litre, and 0.5 grams per litre soda ash. The fabric was dyed for one hour at 75° C. and was then oxidized in a 2 grams per litre sodium perborate solution at 60° C. for about 15 minutes. The fabric was dyed a medium greenish blue fast to light and washing.

Example V

A cellulose acetate fabric was treated with 5% Ponsol violet RRD C. I. 1104 in a 40:1 bath containing 5 to 10 grams hydrosulphite per litre and 0.5 grams soda ash per litre for one hour at 75° C. The fabric was then removed from the bath, rinsed and treated for about 15 minutes at 60° C. in a bath containing 2 grams per litre sodium perborate. The fabric was dyed a full violet, level and was fast to light and washing.

Example VI

A cellulose propionate fabric was scoured in the usual manner and then dyed with 5% Anthrene Jade green in a 40:1 bath containing 5 to 10 grams of hydrosulphite per litre and 0.5 grams soda ash per litre. The fabric was dyed for one hour at 75° C. and was then oxidized in a 2 grams per litre sodium perborate solution at 60° C. for about 15 minutes. A full level dyeing, washable and very fast to light was obtained.

Example VII

A cellulose acetate fabric was treated with 7% Ciba yellow G C. I. 1196 in a 40:1 bath containing 10 grams per litre hydrosulphite and 2 grams per litre of soda ash for ½ hour at 75° C. The fabric was then rinsed and subsequently treated in a 2 grams per litre sodium perborate solution for about 15 minutes at 60° C. The fabric was levelly dyed a full greenish yellow which was fast to light and washing.

Example VIII

A cellulose acetate fabric was scoured in the normal manner and then dyed with 5% Ciba yellow G in a 40:1 bath containing 5 to

10 grams of hydrosulphite per litre and 0.5 grams soda ash per litre. The fabric was dyed for one hour at 75° C. and was then oxidized in a 2 grams per litre sodium perborate solution at 60° C. for about 15 minutes. The fabric was dyed a full level medium pure yellow which was fast to light and washing.

Example IX

A fabric containing cellulose acetate was treated with 13% Anthrene blue green B in a 40:1 bath containing 4% Ciba yellow G, 0.5% Ponsol violet RRD, 10 grams per litre of sodium hydrosulphite and 0.5 grams per litre soda ash for ½ to 1 hour at 75° C. The fabric was then rinsed and oxidized in a 2 grams per litre sodium perborate solution for 15 minutes at 60° C. The fabric was dyed gooseberry which was very fast to washing and light.

Example X

A fabric containing cellulose acetate was dyed with 1% Anthrene blue green B, 0.2% Ponsol violet RRD in a 40:1 bath containing 10 grams per litre of sodium hydrosulphite and 0.5 grams per litre soda ash for ½ to 1 hour at 75° C. The fabric was then rinsed and oxidized in a 2 grams per litre sodium perborate solution for 15 minutes at 60° C. The fabric was dyed sky blue and was fast to washing and light.

In none of the above examples was there any appreciable saponification of the cellulose esters. The dyeings obtained by the processes outlined in the above examples were extremely fast to light and in most instances were unaffected after exposure in a fadeometer for 75 hours plus. The oxidation with sodium perborate may be omitted where desired and the oxidation effected by exposure to the atmosphere but where bright shades are desired the perborate treatment is recommended.

Where it is desired to employ a shading agent with the vat colors enumerated Newport Indanthrene Direct Black RB Paste may be employed.

The above examples are merely given by way of illustration and the invention is not to be considered as limited to the particular dyestuffs enumerated. Any of the so-called vat dyes which have an affinity for cellulose esters or ethers may be employed. In addition to the dyes named in the examples, the following are given as further typical examples of suitable dyestuffs: Ciba blue G C. I. 1185, Algol yellow R C. I. 1132, Anthrene brown BB C. I. 1120, Ponsol green BN C. I. 1102.

In like manner the process is not limited to fabrics made wholly of organic derivatives of cellulose but is applicable to fabrics containing cellulose esters in conjunction with wool, and/or silk, and/or cotton and/or

artificial silk of the reconstituted cellulose type. By a proper selection of dyes it is possible to obtain either solid even dyeings or dyeings wherein various components of the fabric are dyed different shades as desired. The process is also applicable to materials made of or containing cellulose esters which have been iron-proofed or partially saponified.

gram per litre sodium perborate solution at 60° C. for about 15 minutes.

In testimony whereof, we have hereunto subscribed our names.

CAMILLE DREYFUS.
HERBERT PLATT.

10 Having described our invention what we claim and desire to secure by Letters Patent is:

1. Process of dyeing textile materials which comprises treating said material in a dye bath containing a vat dye, comparatively large amounts of hydrosulphite and small amounts of soda ash.

2. Process of dyeing textile materials containing organic derivatives of cellulose which comprises treating said material in a dye bath containing a vat dye, comparatively large amounts of hydrosulphite and small amounts of soda ash.

3. Process of dyeing textile materials containing cellulose acetate which comprises treating said material in a dye bath containing a vat dye, comparatively large amounts of hydrosulphite and small amounts of soda ash.

4. Process of dyeing textile materials containing organic esters of cellulose which comprises treating said material in a dye bath containing 5% Anthrene Jade green, 5 to 10 grams per litre of hydrosulphite and 0.5 grams per litre of soda ash for one half to one hour at 75° C., rinsing the thus treated material and then subjecting the same to an oxidizing action.

5. Process of dyeing textile materials containing organic esters of cellulose which comprises treating said material in a dye bath containing 5% Anthrene Jade green, 5 to 10 grams per litre of hydrosulphite and 0.5 grams per litre of soda ash for one half to one hour at 75° C., rinsing the thus treated material and then subjecting the same to the action of a two gram per litre sodium perborate solution at 60° C. for about 15 minutes.

6. Process of dyeing textile materials containing cellulose acetate which comprises treating said material in a dye bath containing 5% Anthrene Jade green, 10 grams per litre of hydrosulphite and 0.5 grams per litre of soda ash for one half to one hour at 75° C., rinsing the thus treated material and then subjecting the same to an oxidizing action.

7. Process of dyeing textile materials containing cellulose acetate which comprises treating said material in a dye bath containing 5% Anthrene Jade green, 10 grams per litre of hydrosulphite and 0.5 grams per litre of soda ash for one half to one hour at 75° C., rinsing the thus treated material and then subjecting the same to the action of a two

75

80

85

90

95

100

105

110

115

120

125

130