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MANUFACTURE OF MIXED FABRICS COMPOSED OF CELLULOSE DERIVATIVES

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A known method of obtaining mixed fabrics showing particular effects in the piece-dyeing consists in weaving together threads of natural or regenerated cellulose and threads of a cellulose ester, in the form of acetate silk or so-called effect threads.

It has now been found that mixed fabrics having particular affinities for the most various dyestuffs may also be obtained by piece-esterification, provided such fabrics are being used whose components consist of at least two different cellulosic materials.

For example, if a mixed fabric consisting of cotton and viscose is treated with acylating agents, there is obtained according to the choice of the acylating agents a fabric whose viscose component surprisingly is at one time completely reserved by direct dyeing dyestuffs, at another time deeply dyed by such dyestuffs, whereas its cotton component in dyeing behaves just contrary to the viscose component.

For example, if a fabric consisting of cotton and viscose is treated with acetic acid anhydride until the viscose has become an acetyl-cellulose which fully reserves direct dyeing dyestuffs, the cotton will also be acetylated but in considerably lower degree. The original mixed fabric, in which, when it is dyed with direct dyestuffs, the viscose is generally more strongly dyed than the cotton, is by this invention changed into a fabric in which only the cotton is dyed with direct dyestuffs. On the other hand, with insoluble dyes for acetate silk dyeings of the same shade but of different deepness are obtained, because here the affinity of the acetylated regenerated cellulose for the acetate silk dyes is far stronger than that of the acetylated cotton.

However, if a cotton-viscose fabric is treated in known manner, for example with benzoyl chloride and little pyridine, there is obtained a mixed fabric wherein the viscose is strongly dyed with substantive cotton dyestuffs, whereas cotton remains undyed. By a suitable choice of the acylating agent it is therefore possible to produce mixed fabrics at one's option which, when subsequently dyed with any suitable dyestuffs, show the most various effects.

As starting materials there may be used mixed fabrics which, on the one part, consist of cellulosic materials from native cellulose, such as, for example, cotton, ramie, linen, jute, or the like, and, on the other part, of cellulosic materials from regenerated cellulose, such as, for example, viscose artificial silk, Chardonnet artificial silk, copper artificial silk, or the like. Effects are also to be obtained on fabrics consisting merely of native cellulose of different origin or differently pre-treated, for example, ordinary and mercerized cotton, or merely regenerated cellulose of different origin, such as ordinary viscose, Lilienfeld artificial silk or copper artificial silk.

As already stated the mixed fabrics must consist of different, that is to say at least two, cellulosic materials. As a matter of course they may also consist of more than two different cellulosic materials.

The mixed fabric can be esterified by means of any desired acylating agent, for example an acid anhydride, for instance, acetic anhydride, propionic anhydride, butyric anhydride, valerianic anhydride, isovalerianic anhydride, monochloracetic anhydride, phthalic anhydride; or an acid chloride, for instance, acetyl chloride, propionyl chloride, butyryl chloride, palmityl chloride, stearyl chloride, benzoyl chloride, para-toluolsulfo chloride, in presence of an alkaline catalyst, for instance sodium acetate or potassium acetate, or of an acid catalyst, for instance sulfuric acid, zinc chloride or copper sulfate, or in presence or absence of a solvent or diluent, for instance benzene, xylene, chlorobenzene, perchlorethylene or pyridine, and with or without preliminary swelling of the material, for instance by treating it with a base, an acid or a concentrated salt solution, provided that the structure of the original material remains unaltered.

According to the choice of the acylating process there are obtained products which are insoluble or soluble in the normal solvents, such as acetone, chloroform or the like. In the latter case care must be taken that, due to the solubility of the end products, the structure of the original starting material remains unaltered during esterification, by observing suitable working conditions, for example by using suitable diluents which do not dissolve the end products, or by esterifying by means of gaseous acylating agents.

The mixed fabric is advantageously esterified by a continuous process.

The new mixed fabrics obtained according to this process are characterized in that they consist of at least two different cellulosic materials which are partially esterified, each showing a dyeing affinity which is different, with regard to the dyestuff used, from that of the other.

As already stated, effects can be obtained by the use of either acetate silk dyes or direct dyestuffs. It is also possible, however, to obtain beautiful effects with acid dyestuffs if the mixed fabric is dyed in a swollen condition (compare

British Patent No. 381,943). Multi-colored effects can be obtained in one operation by using the direct-dyeing dyestuff together with the acetate silk dye. It is also possible to start with a mixed fabric in the manufacture of which previously dyed threads have been interwoven, provided that the dyestuff used resists the acylating operation. The fabric itself may also be dyed with a suitable dyestuff before the acylation.

Like effects are obtained if the fabric is made by interweaving acylcellulose of different affinity towards the same dyestuff and dyeing this fabric. This procedure is, however, essentially more costly and tedious than that in which the finished fabric is acylated.

The following examples illustrate the invention:—

Example 1

A mixed fabric consisting of cotton and discose is impregnated with an aqueous solution of potassium acetate of 50 per cent. strength, dried and acetylated with a solution of about 30 per cent. strength of acetic anhydride in chlorobenzene, the temperature being about 95° C. and the operation lasting for 30 minutes. There is obtained a mixed fabric consisting of acetylated artificial silk having an acetyl content of about 26 per cent. and an esterified cotton having an acetyl content of about 13 per cent.

By maintaining a higher temperature the duration of the acetylation may be diminished to a few minutes.

Similar results are obtained when starting from mixed fabrics consisting of linen and viscose.

Example 2

10 grams of a mixed fabric consisting of cotton and viscose are thoroughly dried and introduced into a mixture of 75 ccm. of toluene, 25 ccm. of anhydrous pyridine and 5 ccm. of benzoyl chloride heated to 40° C. Within about 20 minutes the temperature of the benzoylating mixture is brought to 90–95° C. while moving the material. At this temperature the mixed fabric is left for a further 40 minutes, whereupon it is separated from the reaction liquid, rinsed and dried. In this manner mixed fabric are obtained whose cotton components are reserved by substantive cotton dyestuffs, whereas the viscose components are strongly dyed by the same.

Example 3

The mixed fabric obtained as described in Example 1 is dyed in the usual manner with Direct Sky Blue green shade (Schultz, Farbstofftabellen, 7th Edition, No. 510). The artificial silk portion of the fabric is reserved while the cotton portion is dyed blue.

However, if the mixed fabric obtained according to Example 2 is dyed in the usual manner with Direct Sky Blue green shade (l. c.), or with Direct Fast Orange SE (Schultz, Farbstofftabellen, 7th Edition, No. 305), the cotton component is reserved, whereas the artificial silk component is dyed blue or orange, respectively.

Example 4

The mixed fabric made as described in Example 1 is dyed in the manner usual for dyeing acetate silk with 4-nitro-4'-diethylaminoazobenzene or with 1:4-diaminoanthraquinone or with 1:4:5:8-tetraminoanthraquinone. Beautiful red, violet or blue effects of the same shade but of different deepness are obtained, since the artificial silk portion is dyed considerably more deeply than the cotton portion of the fabric. By cross-dyeing with a suitable direct dyestuff, for instance Direct Sky Blue green shade (l. c.), or by addition of this to the first dye-bath, a two-color effect is obtained.

Example 5

The mixed fabric obtained as described in Example 1 is swollen with acetic acid of 50 per cent. strength; then washed with water and dyed in the cold, and with addition of Glaubers salt, with Orange II (Schultz, Farbstofftabellen, 7th edition, No. 189). There is obtained an effect of the same shade, but of different deepness, since the artificial silk portion of the fabric is dyed considerably darker than the cotton portion.

Here also multi-colored effects may be obtained by cross-dyeing with suitable direct-dyeing dyestuffs or acetate silk dyes.

What I claim is:—

1. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed of vegetable fibres, whose components show a different reactivity towards acylating agents under the same conditions, with organic acylating agents, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

2. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed of vegetable fibres, whose components show a different reactivity towards acylating agents under the same conditions, with aliphatic acylating agents, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

3. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed of vegetable fibres, whose components show a different reactivity towards acylating agents under the same conditions, with anhydrides of organic acids and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

4. Process for the manufacture of mixed fabrics comprising treating mixed fabrics composed of vegetable fibres, whose components show a different reactivity towards acylating agents under the same conditions, with anhydrides of aliphatic acids, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

5. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed of vegetable fibres, whose components show a different reactivity towards acylating agents under the same conditions, with acetic acid anhydride, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

6. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed of vegetable fibres, whose components show a different reactivity towards acylating agents under the same conditions, with aromatic acylat-

ing agents, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

7. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed of vegetable fibres, whose components show a different reactivity towards acylating agents under the same conditions, with benzoyl chloride, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

8. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed on the one part of a native cellulosic material, and, on the other part, of a regenerated cellulosic material, with organic acylating agents, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

9. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed on the one part of cotton, and, on the other part, of a regenerated cellulosic material, with organic acylating agents, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

10. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed on the one part of cotton, and, on the other part, of a regenerated cellulosic material, with aliphatic acylating agents, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

11. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed on the one part of cotton, and, on the other part, of a regenerated cellulosic material, with anhydrides of organic acids, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

12. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed on the one part of cotton, and, on the other part, of a regenerated cellulosic material, with anhydrides of aliphatic acids, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

13. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed on the one part of cotton, and, on the other part, of a regenerated cellulosic material, with acetic acid anhydride, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

14. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed on the one part of cotton, and, on the other part, of a regenerated cellulosic material, with aromatic acylating agents, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

15. Process for the manufacture of mixed fabrics, comprising treating mixed fabrics composed on the one part of cotton, and, on the other part, of a regenerated cellulosic material, with benzoyl chloride, and subsequently dyeing said fabrics with direct dyeing dyestuffs having affinity for the lower esterified component, whereby colored effects on a substantially white background are produced.

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