

UNITED STATES PATENT OFFICE

2,375,124

PROCESS FOR MODIFYING THE DYEING
AND OTHER PROPERTIES OF CELLULOSIC
TEXTILE MATERIALSJames Hutchison MacGregor, Bocking, Braintree,
England, assignor to Courtaulds Limited,
London, England, a British companyNo Drawing. Application January 23, 1942, Serial
No. 428,013. In Great Britain December 24,
1940

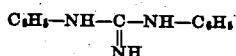
5 Claims. (Cl. 8—100)

This invention relates to the treatment of cellulosic textile material for the purpose of imparting to it wool-dyeing properties, and at the same time giving it a softer silkier handle and appearance.

It is well known that wool-dyeing properties can be imparted to cellulosic material by applying to it a soluble condensate of formaldehyde and urea or thiourea or related compounds such as cyanamide, guanidine, dicyandiamide, dicyandiamidine, biguanide, methylurea, or the mixture of urea, biuret, guanidine and cyanuric acid obtained by decomposing urea by heat at about 160° centigrade, and then heating the material to a temperature of for instance 130° to 160° centigrade until the soluble condensate is converted into an insoluble condensate. Instead of employing the soluble condensate of formaldehyde and urea or related compound, a mixture of these two compounds can be used, although it may be difficult to distinguish clearly between a solution containing the two ingredients, and one containing more or less of the soluble condensate, since it is believed that as soon as the formaldehyde and urea are put together in aqueous solution, reaction commences with at least some formation of the soluble condensate.

I have now found that the affinity of cellulosic textile material for those dyestuffs used for dyeing wool and the like animal fibres can be increased and at the same time a softer silkier handle and appearance can be imparted to the said cellulosic textile material by treating the said material with a solution containing formaldehyde and an arylguanidine, either as such or more probably in the form of their watersoluble condensate, and then converting the mixture or the soluble condensate into an insoluble condensate, for instance by heating to a temperature of 140° centigrade in the presence of an acid catalyst.

As an example of an arylguanidine which can be used according to this invention I mention diphenylguanidine



The process according to this invention can, if desired, be carried out in the presence of other watersoluble condensates, such for instance as urea-formaldehyde, thiourea-formaldehyde and melamine-formaldehyde, and it will be found that the presence of the arylguanidine formaldehyde compound improves both the wool-dyeing properties of the cellulosic textile material and also its handle; the fastness to light of the dyed

cellulosic textile material is also improved. When the process of this invention is carried out by using a weak acid salt of an arylguanidine in the presence of a watersoluble urea-formaldehyde condensate, a further advantage is obtained in that a stabilising effect is exerted on the said urea-formaldehyde condensate on the addition of an acid catalyst.

When carrying out the process of the present invention I have found that it is desirable to avoid the use of a large excess of formaldehyde.

The following examples illustrate the invention but they are not to be considered as limiting it in any way.

Example 1

30 grams of diphenylguanidine are dissolved by warming with 30 cubic centimetres of 80 per cent acetic acid. 160 cubic centimetres of 40 per cent formaldehyde are added with sufficient distilled water to make 1 litre of solution. A sample of an all viscose satin fabric is immersed therein and after saturation the fabric is removed from the solution and is squeezed evenly so that it contains from 90 to 110 per cent of its own weight of the liquor. The fabric is then placed on a pin stenter frame so that it retains its original dimensions, and is dried at just under 100° centigrade. The fabric is heated at 140° centigrade for 15 minutes to effect the formation of the insoluble condensation product from the diphenylguanidine and the formaldehyde. The resultant fabric is then dyed at the boil for 15 minutes with 1 per cent Azo Geranine 2GS (Colour Index No. 31) and 2 per cent formic acid based on the weight of the fabric, in a bath containing a fabric to liquor ratio of 1 to 40. The fabric is dyed a full shade of red comparable to that obtained with wool. The fabric has a soft silky handle and appearance and the dyed material has an improved fastness to light.

Example 2

30 grams of triphenylguanidine hydrochloride and 200 cubic centimetres of 40 per cent formaldehyde are dissolved in sufficient distilled water to make 1 litre of solution. A sample of an all viscose satin fabric is soaked in this solution. The fabric is removed from the solution, squeezed evenly and dried at just under 100° centigrade and finally heated at 140° centigrade for 15 minutes to form the insoluble condensation product. The resultant fabric is dyed as in Example 1 and a full shade of red obtained. The fabric has a soft silky handle and appearance.

Example 3

A water-soluble urea-formaldehyde condensate is made by mixing together 135 grams of urea, 312 cubic centimetres of 40 per cent formaldehyde and 19 cubic centimetres of methanol, the pH of the solution is adjusted to 9.5 and the solution is boiled under reflux for 5 minutes, after which it is cooled as rapidly as possible.

30 grams of diphenylguanidine are dissolved in 30 cubic centimetres of 80 per cent acetic acid and this solution is added to 100 grams of the urea-formaldehyde condensate prepared above and mixed with sufficient distilled water to make 1 litre of solution. A sample of an all viscose satin fabric is immersed therein and after soaking the fabric is removed from the solution and squeezed evenly so that it contains from 90 to 110 per cent of its own weight of solution. The fabric is then placed on a pin stenter frame and dried at just under 100° centigrade. During the heating, a part of the formaldehyde is split off from the urea-formaldehyde condensate and combines with the diphenylguanidine. The formation of the insoluble condensation product is effected by heating the fabric at 140° centigrade for 15 minutes. The fabric is dyed at the boil for 20 minutes with 1 per cent Coomassie Violet RS (Colour Index No. 698) and 2 per cent formic acid based on the weight of the fabric in a bath containing a fabric to liquor ratio of 1 to 40. The fabric is dyed a full shade of violet. The material is crease-resistant and possesses a superior handle compared with fabric which has been impregnated with urea-formaldehyde alone.

If desired, a watersoluble diphenylguanidine-formaldehyde condensate may be substituted for the diphenylguanidine in this example.

What I claim is:

1. The process of increasing the affinity of cellulosic textile material for those dyestuffs used for dyeing wool and the like animal fibers, and imparting a soft silky handle thereto, by treating

the said material before dyeing with an aqueous solution containing a watersoluble condensate of formaldehyde and an arylguanidine and then converting the soluble condensate into an insoluble condensate, by drying and heating in the presence of an acid catalyst.

2. The process of increasing the affinity of cellulosic textile material for those dyestuffs used for dyeing wool and the like animal fibers, and imparting a soft silky handle thereto, by treating the said material before dyeing with an aqueous solution containing formaldehyde and an arylguanidine and then converting the mixture into an insoluble condensate, by drying and heating in the presence of an acid catalyst.

3. As a new article of manufacture, cellulosic textile material which has been treated with a solution containing a watersoluble condensate of formaldehyde and an arylguanidine, said watersoluble condensate thereafter being converted into an insoluble condensate, by drying and heating in the presence of an acid catalyst.

4. As a new article of manufacture, cellulosic textile material which has been treated with a solution containing formaldehyde and an arylguanidine, said mixture thereafter being converted into an insoluble condensate, by drying and heating in the presence of an acid catalyst.

5. The process of increasing the affinity of cellulosic textile materials for those dyestuffs used for dyeing wool and the like animal fibres, and imparting a soft, silky handle thereto, including treating the material before dyeing with an aqueous solution selected from the group consisting of a solution of formaldehyde and an arylguanidine, and a solution of a water-soluble condensate of formaldehyde and an arylguanidine, and thereafter converting the formaldehyde and arylguanidine into the water-insoluble condensation product by drying and heating the impregnated material in presence of an acid catalyst.

JAS. H. MacGREGOR.

CERTIFICATE OF CORRECTION.

Patent No. 2,375,124.

May 1, 1945.

JAMES HUTCHISON MacGREGOR.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 17, claim 3, and line 24, claim 4, for "with a" read --with an aqueous--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of August, A. D. 1945.

Leslie Frazer

(Seal)

Acting Commissioner of Patents.

Example 3

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2. The process of increasing the affinity of cellulosic textile material for those dyestuffs used for dyeing wool and the like animal fibers, and imparting a soft silky handle thereto, by treating the said material before dyeing with an aqueous solution containing formaldehyde and an arylguanidine and then converting the mixture into an insoluble condensate, by drying and heating in the presence of an acid catalyst.

3. As a new article of manufacture, cellulosic textile material which has been treated with a solution containing a watersoluble condensate of formaldehyde and an arylguanidine, said watersoluble condensate thereafter being converted into an insoluble condensate, by drying and heating in the presence of an acid catalyst.

4. As a new article of manufacture, cellulosic textile material which has been treated with a solution containing formaldehyde and an arylguanidine, said mixture thereafter being converted into an insoluble condensate, by drying and heating in the presence of an acid catalyst.

5. The process of increasing the affinity of cellulosic textile materials for those dyestuffs used for dyeing wool and the like animal fibres, and imparting a soft, silky handle thereto, including treating the material before dyeing with an aqueous solution selected from the group consisting of a solution of formaldehyde and an arylguanidine, and a solution of a water-soluble condensate of formaldehyde and an arylguanidine, and thereafter converting the formaldehyde and arylguanidine into the water-insoluble condensation product by drying and heating the impregnated material in presence of an acid catalyst.

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