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AFTERTREATMENT OF DYED TEXTILE FIBERS

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The present invention relates to a process of improving dyeings on textile fibers and similar material. This is a division of our copending application Ser. No. 143,726, filed May 20, 1937, Patent No. 2,190,848, February 20, 1940.

It is known that in many cases dyeings of organic dyestuffs, especially such as contain free carboxylic or sulfonic acid groups, can be improved by causing the said dyestuffs to interact on the dyed material with organic bases like amines, quaternary ammonium compounds or soluble salts thereof. By such processes the dyestuffs are more solidly fixed on the dyed material so that the dyeings will be of better fastness to water, to washing and the like. The said treatment has been carried out either by aftertreating the dyed material or by pretreating the material and thereafter dyeing it with direct or acid dyestuffs.

We have now found that still better results are obtained by employing for the said purpose a compound of the urea group being selected from the group consisting of thiourea and the biguanides which compound has combined therewith a metal in complex form but is still capable of forming salts with acids. By our new process, for instance, in many cases the fastness of the dyeings to water will be materially increased whilst in these and other cases the treated dyeings will be much faster to the action of light. The process of our invention has proved to be especially suitable for improving dyeings of substantive dyestuffs on cellulosic textile fibers like cotton or artificial silk from regenerated cellulose. These and other objects and results of our invention will be more fully illustrated by the following description thereof.

As examples of metal complex compounds to be used according to our invention we may mention the metal complex compounds of biguanide or guanidino guanidine, of substituted biguanides and of thiourea. The metals suitable for preparing the compounds to be used according to our invention are of the type which easily forms complex compounds with organic bases, for instance, chromium, iron and especially copper.

The process of our invention may be carried out by aftertreating the dyed fibers with an aqueous solution of one of the said complex metal compounds; if desired, the solution may be weakly acid or alkaline. In another modification of our process forming of the metal complex compound and aftertreating of the dyeing is performed in one and the same bath. Our invention will be apparent in more detail from the fol-

lowing examples without, however, being limited thereto.

Example 1

Cotton yarn is dyed in the usual manner with 6% of Direct Deep Black EW extra (comp. Col. Ind. 1st edition, No. 581) washed and aftertreated with an aqueous solution of the sulfate of 1.1'-dimethyl-biguanide-copper at 30° C. for half an hour, again washed and dried.

The fastness to water and to washing of the dyeings thus treated are, in comparison with the non-treated dyeings, essentially improved.

If a 2% dyeing of Congo Red (comp. Col. Ind., No. 370) is treated in the same manner, the shade becomes somewhat bluer and the fastness to water and to washing is at the same time increased. The aftertreatment can also be performed in a warm bath.

The sulfate of 1.1'-dimethyl-biguanide-copper is obtainable by causing cupric sulfate, an aqueous solution prepared from dimethylamine and dicyanidiamide to react together at an elevated temperature and under superatmospheric pressure. The substance is soluble in water on adding sodium chloride or another neutral salt, if necessary with the addition of a small quantity of sodium carbonate.

Example 2

Cotton yarn is dyed in the usual manner with 2% of the dyestuff described in U. S. specification 903,284, Example 3, and aftertreated with a solution of the sulfate prepared from 1-monoethyl-biguanide-copper for half an hour at 30° C. The dyeing exhibits good fastness to water. The product used for the aftertreatment and its solution are obtainable in an analogous manner to that indicated in Example 1.

Similar results are obtained when using salts of biguanide-copper, 1-monomethylbiguanide-copper, 1.1'-diethyl-biguanide-copper and similarly constituted compounds.

Example 3

On aftertreating dyeings on cotton of Direct Deep Black EW extra in the usual manner with the solution of the complex salt prepared from 1 mol cuprous chloride and 3 mols thiourea, the fastness to water and to light increases.

We claim:

1. In the process of improving dyeings of organic dyestuffs containing free acid groups on textile fibers the modification which comprises causing the dyed fibers to interact with a complex metal compound of a compound of the urea group

being selected from the group consisting of thiourea and the biguanides, which metal compound is capable of forming salts with acids.

2. In the process of improving dyeings of organic dyestuffs containing free acid groups on textile fibers the modification which comprises causing the dyed fibers to interact with a complex copper compound of a compound of the urea group being selected from the group consisting of thiourea and the biguanides, which copper compound is capable of forming salts with acids.

3. In the process of improving dyeings of organic dyestuffs containing free acid groups on cellulosic fibers the modification which comprises causing the dyed fibers to interact with a complex copper compound of a compound of the urea group being selected from the group consisting of thiourea and the biguanides, which copper compound is capable of forming salts with acids.

4. Textile fibers dyed with organic dyestuffs containing free acid groups, said dyed fibers being combined with a complex metal compound of a compound of the urea group being selected from the group consisting of thiourea and the biguanides, which metal compound is capable of forming salts with acids.

5. Cellulosic textile fibers dyed with organic dyestuffs containing free acid groups, said dyed fibers being combined with a complex copper compound of a compound of the urea group being selected from the group consisting of thiourea and the biguanides, which copper compound is capable of forming salts with acids.

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