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TREATMENT OF WOOL AND WOOLEN MATERIALS

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This invention relates to the dyeing of wool and more particularly to improving the level dyeing properties of loose wool, and other wool and woolen materials which have been subjected to unequal atmospheric exposure.

In the dyeing of loose wool with acid and chrome dyestuffs, the parts of the wool which have formed the tips in the fleece are nearly always found to be dyed a different strength and a different hue from the parts which have formed the roots. This difference is dependent, at least in part, upon the fact that the tips and roots of the fleece have been subjected to different degrees of atmospheric exposure before shearing. Again in the dyeing of worn woolen garments with acid and chrome dyestuffs the parts which have been the most exposed to light are usually found to dye differently afterwards. This applies whether it is a case of a worn undyed article being subsequently dyed or whether it is a case of a worn dyed article being redyed after either partially or completely removing the original dyestuff by a stripping treatment. Other kinds of unequal exposure of wool and woolen materials to atmospheric influences, if sufficiently prolonged also affect the wool so that its level dyeing properties deteriorate.

This invention has an object to devise a method whereby the level dyeing properties of wool can be improved. A further object is to devise a method whereby wool which has been unevenly exposed to atmospheric influences can be treated so that it will give level dyeings. Further objects will appear hereinafter. These objects are accomplished by the following invention.

We have now found that if we treat loose wool or other wool or woolen materials, which have been subjected to unequal atmospheric exposure, with a warm aqueous solution of a water-soluble basic chromium acetate and acetic acid, the material is obtained in such a condition that if it is subsequently dyed with an acid or chrome dyestuff in the usual way then level results are obtained. With loose wool for instance the tips and roots are found to be dyed the same. The treatment is simple and inexpensive. For most purposes all that is needed is treatment of the wool in about 50 per cent of its weight of water with about 3 per cent of its weight of basic chromium acetate and about 4 times its weight of acetic acid. The treatment is carried out warm, and the treated goods, after rinsing, are ready for dyeing. In fact, it is inadvisable to dry them before dyeing. The length of time and other circumstances necessary for treatment

depend to some extent upon the basic chromium acetate which is used. Basic chromium acetates, of which the compositions correspond approximately to 1 part of chromium to 2 parts of acetic acid are especially suitable. With these latter a treatment for about half an hour at about 40° C., is usually sufficient to make the wool satisfactory. A small proportion of a soluble dichromate can also be added to the bath, especially with basic chromium acetates which do not otherwise act so quickly or effectively as those having the composition mentioned above. The treatment is applicable to dyed woolen garments after stripping if necessary.

The following examples in which parts are by weight illustrate, but do not limit, the invention.

Example 1

100 parts of loose wool are scoured and put wet into a warm chromium acetate solution, which has been prepared by adding 3 parts of basic chromium acetate ($C_2H_4O_2:Cr=1.65:1$) and 4 parts of glacial acetic acid to 5000 parts of water. The temperature is adjusted to 40° C., and then kept at 40° C., for half an hour. The wool is then removed from the solution and rinsed with water. It is then ready for dyeing.

Example 2

Undyed woolen piece-goods which because of exposure to draughts and a moist atmosphere, give unlevel results upon dyeing are treated as follows:

100 parts of the piece-goods are well scoured and rinsed and then put into a bath containing 5000 parts of water, 15 parts of a chromium acetate liquor which has been made as described below, and 12 parts of 30% acetic acid. The wool is treated in this bath for half an hour at 40° C., then removed and rinsed.

The wet rinsed wool is then in suitable condition for dyeing.

The effect of the treatment can be illustrated by dyeing a portion with Solway Green G (Colour Index No. 1078) by the usual process and comparing the result with that which is obtained when the untreated wool-piece is dyed by the same process. The dyeings of the treated wool-piece will be found to be level while those of the untreated piece will be unlevel, the differences in the latter being most marked at the folds and the parts exposed to the atmosphere.

The basic chromium acetate liquor, which is mentioned above is made as follows:

100 parts of chrome alum are dissolved in 400

parts of water and 103.2 parts of 10% ammonia are added. The precipitated chromium hydroxide is filtered off, washed with water to remove ammonia, pressed well and then without drying
 5 ground with 24.0 parts of glacial acetic acid. Sufficient water is added to make a solution which contains as much chromium as does a 20% solution of chromium triacetate. The resulting mixture is allowed to stand for at least 6 hours and
 10 warmed for 10 minutes at 40° C., before use.

Alternatively it may be made, as below.

100 parts of chrome alum are dissolved in 400 parts of water and 103.2 parts of 10% ammonia are added. The precipitated chromium hydroxide is filtered off, washed with water to remove
 15 ammonia, pressed well, and then without drying, ground with 36.0 parts of glacial acetic acid. The resulting chromium triacetate is dissolved in 189.3 parts of water and 40.1 parts of 20% aqueous
 20 sodium hydroxide are added. The resulting solution contains a basic chromium acetate, in which the ratio of chromium to acetate is 1:2. The solution contains as much chromium as does a
 25 20% solution of chromium triacetate. The solution is preferably allowed to stand for about 6 hours and warmed for 10 minutes at 40° C., before use.

Example 3

30 Undyed woolen cloth which after scouring, rinsing and drying has been stored in a folded condition for 6 months and which therefore when dyed gives uneven results is corrected by treatment in a bath containing acetic acid and basic
 35 chromium acetate as described in Example 2. After treatment, the cloth is rinsed in water and then dyed immediately, for instance with Solochrome Brown MG (Colour Index No. 101). A satisfactory level shade is obtained, as distinct
 40 from the unlevel shade which is obtained upon dyeing the stored material without the above chromium acetate treatment.

Example 4

15 100 parts of New Zealand Romney loose wool are scoured and then put into a warm chromium acetate solution, which has been prepared by adding 3 parts of basic chromium acetate ($C_2H_4O_2:Cr=2.86:1$), 0.05 part of potassium
 20 dichromate and 4 parts of glacial acetic acid in 5000 parts of water. The loose wool is then

worked in this dye bath for half an hour at 40° C., the wool being kept immersed in the liquid during treatment. The wool is then rinsed and entered
 5 wet into the dye bath. When dyed with an acid dyestuff, for example Solochrome Black PV (Colour Index No. 170) and afterchromed, the tips of the wool staples are found to be dyed to the same depth of shade as are the roots.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.

We claim:

1. Process for improving the level-dyeing properties of loose wool and other unmixed wool and woolen materials which have been subjected to unequal atmospheric exposure, which comprises treating them with a warm aqueous solution of a water-soluble basic chromium acetate and acetic acid.

2. Process as claimed in claim 1, according to which a soluble bichromate is also included in the said aqueous solution.

3. Process as claimed in claim 1, according to which the basic chromium acetate has a composition corresponding to 1 part of chromium to 2 parts of acetic acid.

4. Process as claimed in claim 1 according to which a previously dyed woolen material, which has been subjected to unequal atmospheric exposure, is treated, after being partially or completely stripped of its colouring matter, with the said aqueous solution.

5. A process for uniformly dyeing loose wool and other unmixed wool and woolen materials which do not have level-dyeing properties because of uneven exposure to atmospheric influences which comprises treating said wool and woolen materials with a warm aqueous solution containing a water-soluble basic chromium acetate and acetic acid and then dyeing the so treated wool and woolen materials with a dyestuff selected from the group consisting of acid and chrome dyestuffs.

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