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CELLULOSIC MATERIALS AND PROCESSES
FOR PREPARING SAME

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This invention relates to the manufacture of artificial cellulosic materials, such as artificial threads, filaments, films, or the like, and more particularly it relates to a method for the produc-
5 tion of materials composed of regenerated cellulose, prepared from viscose, which have an improved affinity for direct dyes.

Regenerated cellulose threads, filaments, films, and the like, produced by the viscose process, have been dyed with direct dyes for a considerable period of time with more or less success. Nevertheless it is often desirable to increase the affinity of such materials for direct dyes and many attempts have been made in the past to
15 increase their affinity for these dyes.

It has been suggested heretofore to increase the affinity for direct dyes of regenerated cellulose produced from viscose, by applying certain substances to the finished product prior to the dyeing thereof. This previously suggested method involves an appreciable added expense to the cost of the product, and in some cases fails to increase the affinity of the product for direct dyes to an extent commensurate with the additional expense
25 involved.

It has also been proposed heretofore to add certain substances to the viscose solution to improve the dyeing characteristics thereof. These former proposals were objectionable for various reasons, such as, for example, inefficiency of the substances added to produce the desired effect, the impartation of inferior physical characteristics to the product, lack of uniformity, expense of the raw materials, and so forth.

It is therefore an object of this invention to produce regenerated cellulose threads, filaments, films and the like, by the viscose process, which materials have an improved affinity for direct dyes.

It is another object of this invention to provide a method of imparting an increased affinity for direct dyes to regenerated cellulose articles, produced by the viscose process, without materially increasing the cost of producing said articles, and without producing any change in the physical characteristics of said articles.

Other objects of the invention will appear hereinafter.

The objects of this invention are accomplished, in general, by the preparation of a viscose solution having incorporated therein a small quantity of an alkali metal sulfoantimoniate, and producing regenerated cellulose articles therefrom in a
50 conventional manner.

By the term "alkali metal sulfoantimoniate" as used throughout the specification and claims, we intend to include ammonium, lithium, potassium, and sodium sulfoantimoniates.

The alkali metal sulfoantimoniate may be added to the viscose in any stage of the preparation thereof. For example, it may be added during the treatment of the cellulosic material with caustic alkali, during the xanthogenation of the cellulosic material or during any other stage of the preparation of the viscose. It is, however, preferred to add the sulfoantimoniate to the viscose after it is fully ripened and just prior to the use thereof in the spinning of artificial threads, or in the production of films or pellicles there-
15 from. The substance may advantageously be added to the viscose in the pipe-line just prior to the extrusion thereof through a spinneret or hopper lip in the production of filaments or films.

If the alkali metal sulfoantimoniate is added to the viscose during the preparation thereof or before the ripening thereof, there may be certain variations necessary in the time of ripening of the viscose. This variation in the ripening period of the viscose will, of course, differ in accordance with the amount of alkali metal sulfoantimoniate added. The variation in the period of the ripening can easily be ascertained by anyone skilled in the art by well-known tests, and the ripening period adjusted accordingly.

The alkali metal sulfoantimoniate, for example, sodium sulfoantimoniate, may be added to the viscose in widely varying quantities whereby to obtain a distinct improvement in the affinity of the resulting regenerated cellulose articles for direct dyes. Based on the weight of the viscose solution, the sodium sulfoantimoniate may be present in quantities of 0.1%—7%, depending upon the increase in the affinity for direct dyes desired; however, it is usually preferable to add the sulfoantimoniate in quantities between
40 0.25%—5%.

In order to compensate for any additional quantity of sulphur which may be contained in the final product after coagulation and/or regeneration thereof, the strength of the subsequent desulfuring bath may be increased, or the period during which the desulfuring operation is carried out may be increased.

For the purpose of more clearly illustrating the present invention, reference is made to the following specific example, it being understood that the invention is in no way to be limited thereby:

Examples

To a fully ripened viscose solution containing 7.8% cellulose and 6.8% sodium hydroxide, is added 0.3% sodium sulfoantimoniate. After the addition of the sodium sulfoantimoniate, the mass is thoroughly agitated to form a homogeneous mixture. The viscose solution is then spun in a known manner through a conventional rayon spinneret into a bath containing 125 grams sulfuric acid per liter, 225 grams sodium sulfate per liter, and 15 grams zinc sulfate per liter, to produce a thread having approximately 150 denier. The spinning is preferably accomplished by the so-called stretch-spinning process to increase the tenacity of the thread. The thread obtained is then spun into a centrifugal bucket and desulfured, bleached and washed in a conventional manner, the desulfuring operation, however, being carried out for a somewhat extended period of time.

The rayon thread obtained in this manner is subjected to dyeing with direct blue 2B (Rowe Color Index No. 406) and shows a depth of tone approximately $2\frac{1}{2}$ times that imparted to rayon produced from viscose not containing sulfoantimoniate, under similar conditions.

Threads, filaments, films, and the like, obtained from a viscose solution containing a small quantity of sodium sulfoantimoniate have been found to possess a distinctly greater affinity, and in some cases double and even triple the affinity, for direct dyestuffs than products obtained from viscose which does not contain the sulfoantimoniate. The physical properties of artificial threads, films, filaments, or the like, which have been produced from viscose containing sulfoantimoniate are in no way inferior to those of the same products obtained without the use of a sulfoantimoniate.

The application of the present invention has particular utility in the production of viscose rayon by the so-called stretch-spinning process, in which, in order to obtain an increased tenacity, the thread is stretched during the spinning thereof. Thread which has been produced by the stretch-spinning process has been found

to possess a smaller affinity for direct dyestuff than threads which have not been stretched during the spinning thereof and this decrease in their affinity can be conveniently compensated by the use of an alkali metal sulfoantimoniate.

It will be obvious that many variations and modifications can be made in the process as above disclosed, and it will therefore be understood that the invention is not to be limited thereto except as set forth in the appended claims.

We claim:

1. The method which comprises mixing an alkali metal sulfoantimoniate with a viscose solution, and forming a regenerated cellulose article from said viscose.

2. The method which comprises preparing a viscose solution containing an alkali metal sulfoantimoniate, and forming a regenerated cellulose article from said viscose.

3. The method which comprises preparing a viscose solution containing 0.25-5% of an alkali sulfoantimoniate, and forming a regenerated cellulose article from said viscose.

4. The method which comprises preparing a viscose solution containing 0.25-5% of sodium sulfoantimoniate, and forming a regenerated cellulose article from said viscose.

5. The method which comprises preparing a viscose solution containing 0.25-5% of an alkali sulfoantimoniate, and stretch-spinning an artificial thread from said viscose.

6. The method which comprises preparing a viscose solution containing 0.25-5% of sodium sulfoantimoniate, and stretch-spinning an artificial thread from said viscose.

7. A viscose solution containing as an essential ingredient thereof an alkali metal sulfoantimoniate.

8. A viscose solution containing as an essential ingredient thereof sodium sulfoantimoniate.

9. A viscose solution containing 0.25% to 5% of an alkali metal sulfoantimoniate.

10. A viscose solution containing 0.25% to 5% sodium sulfoantimoniate.

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