

ALIEN PROPERTY CUSTODIAN

PRODUCTION OF THREADS

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When viscose is spun in an acid bath, gaseous substances, namely CO₂, H₂S, SO₂, CS₂, are evolved in considerable quantities.

Under the conditions which are usually maintained in the manufacture of artificial silk or cellular wool in order to obtain smooth and glossy threads, these volatile substances, which originate from the disintegration of substances contained in the viscose, in particular Na₂CO₃, NaSO₃, Na₂S, Na₂CS₃, and xanthogenate itself (which is split up into CS₂ and cellulose mass), are evolved relatively slowly and furthermore a tubular thread is formed in the first phase of the coagulation, through the still soft and plastic walls of which the gases diffuse out from the inside so that the thread is quite free from them when it has become solid.

In lengthy experiments, which have been carried out partly in the laboratory and partly on a semi-industrial scale, it has now been found that when the acid content is concentrated so that a sufficiently rapid formation and simultaneous fixing and hardening of the threads is obtained, by reason of which the gaseous products evolved remain enclosed in the precipitated solid substance, the phenomenon occurs that these gaseous products remain uniformly distributed in the interior of the threads in the form of microscopically small bubbles each of which forms a small hollow space after drying. Owing to the contraction of the swollen mass in the transverse direction and owing to the presence of the bubbles, there result projections and irregularities when such threads dry, and this gives the threads a somewhat wrinkled character on the surface. By reason of this property and the heat insulating effect, which is to be attributed to the internal structure being interspersed with numerous hollow spaces, a special character similar to that of natural wool is imparted to the thread produced.

A product having the above described characteristics is obtained if the viscose which is prepared in the normal manner for the production of artificial silk or cellular wool and which thus contains 8-10% cellulose and 6-8% Na OH is spun in baths which have an acid content exceeding 13% H₂SO₄. The acid content may be regulated in accordance with the fineness and the quantity of the hollow spaces desired to be distributed in the thread material. As baths suitable for the above purpose, the following are given by way of example:

	(1)	Grams
	H ₂ SO ₄ of 66° Be.....	230
	Na ₂ SO ₄ anhydrous	220
5	Water	550
	Total bath liquid.....	1000
	(2)	Grams
10	H ₂ SO ₄	150
	Na ₂ SO ₄	220
	ZnSO ₄	18
	Water	612
15	Total bath liquid.....	1000

In the baths Na₂SO₄ may be replaced by MgSO₄ and further, in order to obtain the maximum possible acceleration of the complete coagulation of the thread, 10-50 grams of ZnSO₄ may be added.

The thread formation is preferably effected with stretching during spinning, the threads being guided over a pair of rollers running at a different speed before being wound on to spools or before being laid in spinning pots or before being united into bundles of threads.

Should an increased gas development be desired during the thread formation, there may be added to the viscose a certain quantity of Na₂CO₃ (for example 10% of the alpha-cellulose content) or other substances which pass into vapour at a spinning temperature of 45-50° C. However, in the case of this increased gas development there is a danger of obtaining threads which are partially tubular, which jeopardises the uniformity of the product, in particular with respect to subsequent dyeing properties.

By means of an addition of solutions of protein-like substances to the viscose used, products which can be dyed with acid dyestuffs can be obtained. This is obtained for example by adding to the viscose 5-10% of an alkaline solution of casein or of other natural proteins or similar synthetic substances containing nitrogen or containing sulphur. In this manner the new thread receives a very special resemblance to wool as well as the external and internal structure described and in spite of its softness and fullness.

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