

## NOTE ON DENITRATION OF PYROXYLIN.

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An interesting reaction, but one which seems to be considered of little practical importance is that described in the brief references herewith given.

“Some nitrogenous substances, as albumen and pyroxylin, are reduced to a less complex form by certain deoxidizing agents, as ammonium sulphide, ferrous chloride, sulphurous acid, and others, the change consisting in the loss of  $\text{NO}_2$ .”—(*Gmelin, Handbook, Vol. XVIII.*)

“A solution of potassium sulphhydrate, especially if mixed with alcohol, reproduces the original cotton (from pyroxylin) with formation of  $\text{KNO}_3$  and a little ammonia.”—(*Watts' Dict. IV., 778.*)

“By the action of reducing agents, such as ferrous chloride or acetate, or potassium sulphhydrate, the cellulosic nitrates are converted into cellulose even by digestion at the ordinary temperature. By boiling with a solution of stannous oxide in  $\text{KHO}$ , the nitro-celluloses are dissolved, with conversion into cellulose, which is precipitated in flocks on neutralizing the liquid.”—(*Allen Com. Org. Anal. 1., 327.*)

Samples of ordinary photographic collodion film and thin sheets of celluloid free from coloring or mineral matter, were reduced in a bath of ammonium sulphide.

It is necessary to dilute the reducing agent somewhat and keep the bath cooled by immersion in water during the early stages, or the reduction takes place with such rapidity that a very considerable rise of temperature results, accompanied by a deposit, in and on the material, of finely divided sulphur which can be removed only by solvents. A too rapid reduction and consequent rise of temperature is also not without seriously injurious effect on the tenacity of the resulting cellulose film.

After washing for several hours in running water, the material is dried and will now burn quietly like wood or paper. Analysis

of the material so obtained gave the following result, a parallel analysis of ash-free filter paper being made at the same time for comparison.

	Denitrated Pyroxylin.			Cellulose from Ash-free Paper.
C	41.86	42.03	41.76	44.00
H	6.14	6.18	6.07	6.32
O	50.68	50.47	50.85	49.68
S	.60	—	—	
Ash	.72	—	—	
	100.00			100.00

The sheets of cellulose obtained by the denitrating process are very much reduced in area and increased somewhat in thickness, as compared with the original sheet of pyroxylin.

Measurements were made of a number of sheets before and after treatment to obtain figures expressing the approximate amount of shrinkage.

The average measures were :

	Length.	Breadth.	Thickness.
Before treatment	15.0 ins.	10.0 ins.	.0057 in.
After treatment	11.76 ins.	7.5 ins.	.007 in.

The percentage decrease of area and volume (approx.) were as follows :

	Area Decrease.	Volume Decrease.
No. 1	35%	21%
No. 5	40%	37%
No. 7	47%	29%
No. 8	46%	22%
No. 9	48%	34%
No. 10	45%	28%
No. 11	45%	33%

The decrease in volume can only be considered a rough approximation.

The material is slightly hygroscopic, quite strong, elastic, becoming somewhat brittle when very dry, and is translucent or

transparent according to the purity of materials used in manufacture and thickness of the sheet. *Sp. Gr.*, 1.545.

One of its most interesting practical applications has been the preparation from it, of incandescent electric lamp filaments, its homogeneity of structure, when carefully prepared, rendering it a promising substance for this purpose. As the reducing action will not penetrate beyond a few thousandths of an inch, the process can be successfully operated only on thin sheets of pyroxylin.