32. On the Characteristic Features of the Rayons and Rayon Fabrics treated by the New Plastic Aftertreatment

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It has already been reported that through the new method of aftertreatment with the combined plastics the pronounced conspicuous results can be obtained, which showed that the so treated fibers were thoroughly converted from both the practical and the rheological standpoints of view. (Commem. Vol. Silver Jubilee, this Institute, p. 128, 1951)

The new feature of the treated fiber could first be recognized in the improved higher knot elongation with a higher wet strength of the fiber, which could not so easily be obtained in the case of otherwise treated fiber. The second feature was the increased strength of the high tenacity rayon yarn or cord under higher twists, and the third was the increased crease recovery as well as pile recovery to a much higher degree. These the author had postulated as dued to the fact that the different plastics were most suitably set, not so much on and in the skin layer as in the core of the fiber through the thickest layer of the former, so as to cause to invert the relative degree of compactness of the skin and the core in the fiber. And this was shown by the staining process both by an acidic dye and the silver-nitrate solution as well as by the micrographs of the sections of the fibers.

The author selected some of those samples that were recognized to be successfully treated from the singular data, staining process, and further by micrographs of the sections, and subjected them to the strength-elongation tester constructed by Prof. Fujino, which was of the recycling type. From the hysterisis curves obtained, the degrees of resilience against elongations for various fibers were calculated, and they are given as follows:

High Tenacity Rayon for Tire Cord (wet)	Untreated, Elong. % Degree of Resilience	E.	6.5	11	15	22	26	
		D.R.	23.3	17.5	15	12	9.5	
	Treated	E.	7	9	10	11	15	18
		D.R.	40	31.5	26	21.5	18	16.5
High Tenacity Rayon for Tire Cord (dry)	Untreated	E.	5.5	12.5	16	24		
		D.R.	23.0	17.5	15.5	12.4		
	Treated	E.	4	5	6.5	8	9.5	16.5
		D.R.	28.7	45.5	30.0	23.6	22.0	18.3

Staple Fibers for Carpets (wet)	Untreated	E.	6	9	11.5	16	19	21.5
		D R.	16	20	23.7	26.3	12.7	11.3
	Treated A	E.	6	9	13	19		
		D.R.	25.4	30	23	20		
	Treated B	E.	5	5.5	13			
		D.R.	33	29.5	28			
Ordinary Rayon Yarn (dry)	Unteated	E.	—	10.5	16.2	20		
		D.R.	—	17.7	13.7	12		
	Treated (with other than radio heater)	E.	3	5	8.5	11		
		D.R.	43	37	27.0	25.5		
Crimped Rayon Staple (dry)	Untreated	E.	5	9.5	14	19.3		
		D.R.	25.2	106	15.5	16.5		
	Treated	E.	5.5	7.5	12.0	16	19.5	
		D.R.	37.5	25.0	18.9	20	19.5	

The conversion of the fiber are thus evident from the table.

The resin contents of the treated rayon fabrics of various kinds were measured, and the crease recovery of the fabrics was tested. Those showing exceedingly high crease recovery were found to have more resin set in the core than on/in the outer layer, presenting by far the higher ratio (e.g. 11–6.8–4.4) of *Resin in the Core* to *the Resin on/in the Skin Layer* than those usually obtainable with the treated fabrics on the market (e.g. 2.31–1.84), notwithstanding the fact that the total resin contents in % of the fibers were substantially the same in both samples compared in respective cases.