61. A New Plastic Treatment of Rayon with Cation-active-Surface-Reagents and the Joint Colloidal Plastics. (II)

On the High Tenacity Rayon Yarn.

Narao Saito.

Considering from the trend of the world, the importance of rayon and its staples as used for tire cords and blends, the author tried to apply the plastic treatment upon a high tenacity rayon yarn with the view to improve their properties after the method which he had found successful with ordinary rayon yarn.

The main characteristic of this method consists in that the thermoplastic- as well as thermosetting-plastics were applied together with some cation-active-surface-reagents under such a condition as to make the former set on the outer portion (skin layer) of the fiber, and the latter in the inner part (core) of it respectively. Thus the relative relation in the state of configuration in the microstructure of the fiber is reversed as compared with that of viscose rayon in general, and thereby contributing to a greater improvement in its properties.

The high tenacity rayon tow of about 1230 denier was first subjected to the treatment and after being twisted to 0—700/M the specimens were tested by Schopper testing machine for strength and elongation.

It has been found so far that (1) the urea-formaldehyde resin showed to give somewhat lower breaking strength, especially under higher twist, than the untreated sample under same twist, while (2) with vinyl resin the elongation was much enhanced, hence stronger under middle twist, and (3) the combined resin of urea-formaldehyde, vinyl and melamine showed to impart a larger strength under low and higher twist in dry condition, and a maximum under 250/M in wet condition; being the highest of the 4 kinds with higher knot strength and elongation.

It is now being studied how the wet strength of the tow could further be enhanced which would also show an improved dry strength in parallel with other useful properties.

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62. Studies on Application of Ketone Resins. (VI)

Application of Acetone Formalin Resin as Adhesives. (5).

Yasuaki Kōzai.

In the present work, adhesive conditions—especially from a practical point of view—which were obtained by the methods similar to those described in the previous paper are summarized.

1) The experimental results—relations between temperature and time—under the condition of non-pressure are as follows.

Adhesive strength 60—80 Kg/cm² and Wet adhesive strength 25—30 Kg/cm²	
temperature. C⁰	time. (hour and minute)
10—20	24 h.
20—30	5
30—40	3
40—50	60 min.
50—60	30
60—70	20
80—90	10
100—110	5

2) The following conditions are preferable.

i) For hardening reagent, a high concentration of NaOH solution.

ii) For adhesion surfaces of wood, cleaning and drying.

3) Acetone-formalin resin adhesive has a moderate resistance against hot and boiling water, dilute mineral acids, dilute alkalies and organic solvents.

This research work was performed in cooperation with Ryozo Goto (assistant professor, the Wood Research Institute, Kyoto University). I want to thank Professor R. Nozu for his continuous help and encouragement in the course of this work. The testing machine employed was kindly lent me by Professor K. Fujino (Institute of Fibre Chemistry, Kyoto University). I wish to express my appreciation for his kind cooperation.

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63. Studies on the Rate of Copolymerization.

Seizo Okamura and *Tsutou Murata.*

The over-all rate of copolymerization[1] will be,

$$-\frac{d([X]+[Y])}{dt}$$

$$=\frac{V_{AXY}^{1/2}\left\{k_{XY}k_{YX}[X]^2+2k_{XY}k_{YX}[X][Y]+k_{YY}k_{XY}[Y]^2\right\}}{\left\{k_{cXX}k^2_{YX}[X]^2+2k_{cXY}k_{XY}k_{YX}[X][Y]+k_{cYY}k^2_{XY}[Y]^2\right\}^{1/2}} \cdots\cdots\cdots (1)$$

where V_{AXY} is the rate of chain initiation reaction in copolymerization. The most conventional treatments to compare these equations with experimental