25. On the Plastic Aftertreatment on the High Tenacity Rayons. (III)

Narao Saito.

In continuation of the research into the plastic aftertreatment on the high tenacity rayon fibers, the author tried to elucidate the mechanism of the treatment in respect with the microstructure of the fibers, applying the method that was found optimum for ordinary one bath rayon yarn to those rayons of different microstructures, i. e. (1), (2) rayon yarns and staples, prepared by the two bath stretch-fixing method, and by the " low alkali-,low acid-, low-temperature-bath method ", and (3) fibers of specially thick skin, and also (4) other cellulosic fiber as Bemberg yarn.

An interesting series of results of a stepwise range of effects as revealed in the increments of wet strengths versus knot elongations at break was obtained, independent of the slight differences of applied plastics and curing methods.

This is supposed to be due to the difference in the penetrating degree of the treating liquid in each sample. The place where and how the plastic sets in the microstructure of the fiber is of primary importance, which will be discussed later. A lately adopted method seems to produce a better result in this respect, which will be shown fully on other occasion.

---

26. Studies on Silicone Resins. (V)

On the Molding Products.

Kiyoshi Abe, Minoru Toyoda and *Yoshinao Iida.*

This (V) and the next (VI) reports are both on the methylethyl silicone resins which are manufactured on trial at the Laboratory in Shimadzu Mfg. Co. Kyoto.

Glass fiber is used as the filler for our molding products, and as catalysers ethyl-borate, benzoic-peroxide and etc. are used chiefly. These mixtures with silicone resins are pressed at about 250°C. We find that our silicone resin molding products have a considerable heat-resistance and good electrical properties, and that they are able to drill and file.

(a) The insulating resistance is about 10^{11} Ω -cm. at 220°C and 10^{15} Ω -cm. at room temperature. And the characteristics between resistance and temperature show the interesting inclination.

(b) The arc resistance of our samples according to A. S. T. M. Standard shows 360 sec., while the bakelite shows only 15 sec.

(c) The dielectric strength measured in transformer oil is 40 kV at 4 mm. thickness.

(d) The relation between dielectric loss angle and frequency varies with the kind and percentage of catalyser, molding temperature, etc. At radio frequency·its max. valus is 0.0060 and min. value 0.0020. By heating after molding, loss angle becomes smaller.

(e) The relations between mechanical strain and temperature under a constant load were measured. These results show that we can use them at 250°C. The tensile strength, however, is a little smaller.

So we are now studying to get stronger tensile strength. At the same time we are trying to make the silicone resin laminated products, because it is an evident facts that laminated one has stronger tensile strength than molded one on account of their construction.

---

27. Studies on Silicone Resins. (VI)

On the Silicone Resin Coated Wire.

Kiyoshi Abe, Minoru Toyoda and *Akira Ono.*

(A) The mechanical properties of our sillicone resin coated wire which was reported in last year report were not satisfactory. Since then, we have been studying to get better results.

The silicone resins, monomer or a little condensed, are previously heated at lower temperature than that for curing resins on wire, and diluted by solvents so that they are convenient to coat on wire.

By this first treatment the order of poly-condensation of the silicone resin film on wire would become larger, and, on the other hand, the vaporizing water at curing would decrease. From these reasons we expected that the mechanical properties would be improved, pin-holes would not grow and the curing time would become much shorter. These ideas were proved by our experiments. For instance, hitherto, the silicone resin coated wire which was cured over about 140°C had many pin-holes, so we had to cure it under 140°C. By above mentioned treatment, however, we can now cure it at 220°C without pin-holes with less curing time within 30 sec. with the mechanical properties which passes JES standard.

(B) The adhering strength of the silicone resin to copper and alminum plate was studied. The results are as follows.

(a) The adhering strength to oxidized copper is larger than that to non-oxidized copper. This may be due to the reason that resins have mechanical anchor ground in rough film of oxidized copper.

(b) The adhering strength to alminium plate is smaller than that to copper.

(c) The silicone resins show about five times adhering strength compared to W-41 varnish which are generally used for enameled wire.