

## CORRECTION

In the article of Kh. N. Musaev et al., "Introduction of New Instrumental Methods of Analysis of Raw Material in the Manufacture of Acetate and Triacetate Yarns," published in No. 6 (1989).

On page 514, second line from the bottom there is printed: with a viscometer. The article should read: with a dosimeter. dosimeter.

### A FIBROUS SULFONATED CATION EXCHANGE RESIN FOR PURIFYING WASTE-WATER FROM ELECTROPLATING FROM CHROMIUM (III) IONS

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The preparation of sulfonated cation exchange resins based on various types of fibres presents particular interest, since the assortment of fibrous cation exchange resins, which operate over a wide pH range, is extremely limited, while granulated ion exchange resins of this type, for example KU-8 and KU-2-8, are produced on an industrial scale. Mainly, recommendations on the preparation of fibres with strongly acid properties are based either on sulfonation of the fibres with such aggressive reagents as oleum, or sulfuric or chlorosulfonic acid [1, 2], or on treatment with sulfites or bisulfites of the alkali metals, which do not ensure good exchange capacity [3]. Moreover, the use of direct sulfonation methods is not applicable to all carbochain fibres. In particular, as applicable to polyacrylonitrile (PAN) fibres, it appeared advisable to study the possibility of grafting vinyl monomers to them — sodium or potassium *p*-styrenesulfonate (NASS or KSS). Along with this, there was sense in making an attempt also to solve an important accompanying problem: to evaluate the possibility of strengthening PAN fibre which had been subjected to graft polymerization.

The result of studies in this area was the development of a method of preparing a fibrous sulfonated cation exchange resin [4] PAN-T<sub>gr</sub>PSSNA, which had the following properties: static exchange capacity SEC<sub>NaCl</sub> 2.2 ± 0.1 mmole/g, SEC<sub>NaOH</sub> 3.3 ± 0.2 mmole/g, degree of swelling 130 ± 10%, breaking strength 16.2 ± 0.2 cN/tex, and moisture absorption 11.5 ± 1.5%.

It is to be noted that realization of such exchange values with respect to sulfonic acid groups is possible when the graft copolymerization is carried out on preliminarily thermally "cross-linked" (after activation) PAN fibre [4].

We used the method of potentiometric titration [5] to evaluate the ionic strength of the functional groups of the sorbent obtained. Titration of the investigated fibres, taken in the H-form (All-Union State Standard (GOST) 10896-72), was carried out with potassium hydroxide having a concentration of 0.5 mole/liter in a background of potassium chloride solution of the same concentration. The potentiometric titration curve of PAN-T<sub>gr</sub>PSSNA (Fig. 1) has two inflections, which indicate the presence of two types of acid groups in the ion exchange resin: strongly acid groups — sulfonic acid groups — and weakly acidic groups — carboxyl groups, in distinction from PAN-T<sub>carb</sub>-T (curve 2), which is a partially hydrolyzed PAN fibre (SEC<sub>NaOH</sub> 2 mmole/g), which is used as a starting material in the graft copolymerization of the *p*-styrene sulfonates. The apparent ionization constants  $\bar{p}K_{\alpha}$  of the acidic groups of the sulfonated cation exchange resin and the point of half-neutralization were determined using the Henderson—Hasselbach equation. It should be noted that because of the specifics of the polymeric nature of the ion exchange resin the  $\bar{p}K_{\alpha}$  of its functional groups changes during the titration process. With increase in the degree of neutralization, the density of the charge along the polymer chain increases, which hinders replacement of the protonic hydrogen of the remaining acid groups. To obtain a constant nominal value of  $\bar{p}K_{\alpha}$  a coefficient *m* is introduced into the Henderson—Hasselbach equation, which characterizes the strength of the electrostatic interaction of the functional groups in the polymer [6]: