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PROSPECTS OF IONIC POLYMERS WITH TYPICAL PROPERTIES

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The modern development of science and technology requires the creation of ion-exchange polymers with high performance characteristics, as well as the development of scientific fundamentals for controlling the properties of natural and synthetic polymers used as the main raw material in the synthesis of ion exchangers.

In recent years, the use of ion-exchange polymers has been widely used in various fields of science and industry. English chemists Adams and Holmes are the founders of the synthesis and application of ion-exchange synthetic resins in production. Ionites are used in various areas of hydrometallurgy for extraction of metal ions, softening and demineralization of water, in the nuclear industry, etc.

However, not all ion-exchange polymers satisfy consumers, due to low values of such important properties as exchange capacity kinetic, selective properties, as well as thermo-chemical resistance and mechanical strength. Consequently, in the processes of ion-exchange separation, separation and purification of complex mixtures of organic substances and ions of many metals, a careful selection of ion exchangers with good kinetic properties, high mechanical strength, thermo-chemical resistance and selective ability of ions of the corresponding substances and metals is a necessary condition.

At present, the synthesis of ion exchangers develops in three main directions, each of which has its advantages and limitations:

1. Introduction of ionogenic groups in the polymeric framework by the method of polymer-analogous transformations;
2. Polymerization of monomers containing ionogenic groups;
3. Polycondensation of monomers containing ionogenic groups

The industry produces polymerization and polycondensation ion exchangers.

Polycondensation cation exchangers are high-molecular, solid, insoluble polyacids containing acidic groups: sulfo-, nitro-, carboxyl, phosphoric acid, etc. Cationites containing carboxyl groups are of great interest. The functional group of the carboxyl cation exchanger remains in the undissociated state in the acidic medium, which sharply reduces the ability of the carboxyl cation exchangers to ion exchange under such conditions; therefore, they are recommended for the treatment of a solution with a pH > 7. When the carboxyl group is dissociated, small, mobile and ionic exchange cations.

In particular, carboxyl-containing ionites, unlike sulphocathionites, have selective properties, the latter are enhanced with an increase in the concentration of ionic groups in the ion-exchange structure due to the sharp difference in the

absorptivity of hydrogen, single and multiply charged ions. It is noted that with increasing amount of unsaturated acid used in the synthesis, the capacity and swelling of the resulting ion exchanger increase.

Some cation exchangers containing carboxyl groups, due to their selectivity, are used to separate amino acids.

For each type of cation exchanger, rows of cations are established for the energy of their displacement. For example, for the strongly acidic sulphocathionite KU-2: $H^+ < Na^+ < NH^{4+} < Mg^{2+} < Zn^{2+} < Co^{2+} < Cu^{2+} < Cd^{2+} < Ni^{2+} < Ca^{2+} < Sr^{2+} < Pb^{2+} < Ba^{2+}$, for the carboxylic cation exchanger KB-4: $Mg^{2+} < Ca^{2+} < Ni^{2+} < Co^{2+} < Cu^{2+}$.

Carboxylic cation exchangers with a "head-to-head" type of elementary units have a greater selectivity to divalent metal ions than cation-like "head-to-tail" type cations.

Polymerization carboxylation cation exchangers based on methacrylic acid and acrylamide derivatives based on maleic anhydride, styrene and divinylbenzene are also described in the literature. Cation exchangers obtained by copolymerization of itaconic acid and its derivatives (mono- and di-esters) and divinylbenzene have a high complexing power.

From this it can be concluded that the production of carboxyl cation exchangers has been given great attention, in view of the growing importance of the materials obtained in various fields of science and the national economy, to reflect in sufficient amounts of ion exchangers makes it an optimal and important replacement for expensive and scarce individual chemical compounds that are, The main raw material for the production of ion exchangers by cheap available monomers is very effective, in this respect the use of production waste is especially but gin-cleaning furfural, representing the base.

References

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