

SYNTHESIS OF A COPOLYMER BASED ON (POLY(ETHYLENE GLYCOL) FUMARATE) WITH METHACRYLIC ACID

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The development of science and technology raises issues of obtaining new polymer materials with a given set of properties at the present stage. Polyesters occupy an important place among the various polymer products. In particular, unsaturated polyesters due to the simplicity of production, availability of raw materials are used increasingly in a variety of areas [1].

Suitable objects for the production of materials whose physico-chemical properties can be controlled are swollen polymers [2]. Polymer hydrogels are a unique class of high-molecular compounds with a three-dimensional structure.

(Poly(ethylene glycol) fumarate) ("unsaturated polyester") was obtained by polycondensation of ethylene glycol with fumaric acid in a nitrogen stream at 100 ° C for 7-8 hours, at 150-160 ° C - up to a given acid number.

To obtain a polymer hydrogel with a high degree of swelling, it is necessary to introduce vinyl comonomer units into the macromolecule forming it. One of these comonomers is a well-studied and already used in many areas methacrylic acid - vinyl monomer, which has a high activity in radical polymerization reactions.

As a result of copolymerization, we obtained insoluble polymers of the network structure in six different ratios 10:90; 15:85; 25:75; 50:50; 75:25; 90:10. The kinetics of the copolymerization rate, with high conversion degrees, without an induction period was studied. The yield was 46-87%, depending on the composition of the copolymer. The composition of the copolymers is proved by IR and NMR-spectroscopy. The degree of swelling varied in the range of 352-1450%, depending on the composition of the copolymer.

Thus, the presence of unsaturated double bonds in the (poly(ethylene glycol) fumarate) molecules makes it possible to use the latter as a polymer matrix for the preparation of spatially cross-linked polymers by copolymerization with methacrylic acid, at various ratios of the monomer mixture, in order to study the physico-chemical properties of the copolymers obtained.

References:

1. BENIG, G. 1968. *Unsaturated polyesters*. Moscow: Chemistry
2. NISHIYAMA, J., SATON, M. 2000. Solvent-end cation-specific swelling behaviors of poly (acryl acid) gels. *J.Polymer Sci. B.*, **38** (2), pp.2791-2800.