

SYNTHESIS OF COPOLYMERS BASED ON (POLY(ETHYLENE GLYCOL) FUMARATE) WITH ACRYLIC ACID

Kudaibergen G.K., Tazhbayev Ye.M., Tovstukha K.V., Oiratova A.,
Kazhmuratova A.T.

*Academician Ye.A. Buketov Karaganda State University,
Karaganda, Kazakhstan
gulshahar90@mail.ru*

Among the polyfunctional monomers of particular practical interest is a separate cluster compounds represented by unsaturated polyester resins due to their wide application in various fields. The search for new applications of unsaturated polyesters is an urgent task of modern scientific society [1].

(Poly(ethylene glycol) fumarate) (p-EGF) is one of the unsaturated polyesters, the product of polycondensation of fumaric acid with ethylene glycol. P-EGF was used by us to produce crosslinked copolymers capable of absorbing and retaining large amounts of water, which determines a wide range of their applications [2]. Introduction of (poly(ethylene glycol) fumarate) units containing carboxyl groups by copolymerization with acrylic acid should give the resulting copolymers with high sorption properties, besides varying the content of the latter, it allows to regulate the size of the spatial grid.

The results of investigation of the synthesis of copolymers of (poly(ethylene glycol) fumarate) with acrylic acid at different initial ratios of comonomers, and the properties of the obtained copolymers were established.

As a result of copolymerization we obtained insoluble polymers of the network structure in six different ratios such as 10:90; 15:85; 25:75; 50:50; 75:25; 90:10. The rate of kinetics of copolymerization without an induction period with high rates was studied. The synthesized copolymers swell in non-polar solvents. The ratios of 15: 85 and 10:90 show greatest and the smallest degree of swelling, respectively, that make up 1600% and 436%.

The properties of the cross-linked (poly(ethylene glycol) fumarate) with acrylic acid copolymers are primarily due to the presence of carboxyl groups in the gel structure. The presence of carboxyl groups provides the swelling process, and the polymer network tends to distribute the solvent-water throughout the volume.

References:

1. LOCH, K. P. 1995. Unsaturated polyester resins. *Ungesattigte Poliesterharra (UR) – Kunststoffe*, **85** (10), pp.1622-1630.
2. BENIG, G. V. 1968. *Unsaturated polyesters: structure and properties*. M.: Chemistry