

SYNTHESIS AND RESEARCH OF COPOLYMERS BASED ON POLYPROPYLENE GLYCOL MALEATE

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Extensive development of fundamental investigations in the field of radical copolymerization which allows to control the properties, structure and molecular mass of the polymers, and process rate opens new opportunities and new ways of obtaining the polymers with given properties. Considerable interest attracts the products on the basis of unsaturated polyester resins hardened with vinyl monomers which have specific physicochemical and physicomechanical properties. In this regard the reactions of radical copolymerization of polypropylene glycol maleate with acrylic acid in the solution were investigated in this work.

Radical copolymerization of polypropylene glycol maleate with acrylic acid has been performed for the first time. Molecular weight of polypropylene glycol maleate has been determined using light scattering and gel permeation chromatography. The composition of the copolymers has been found using gas chromatography. The kinetics of copolymerization reaction has been studied and copolymerization constants have been calculated. The possibility of controlling the properties of network copolymers of polypropylene glycol maleate by changing external factors (pH of medium, temperature, the presence of organic solvents and low molecular weight inorganic salts) has been studied. Swelling capacity of the copolymers investigated was studied using gravimetric method. It has been established that the hydrogels are sensitive to the change of pH of medium and the copolymers' samples undergo reversible swelling-collapse-swelling transfer. Basic factors which determine the swelling of the gels studied are electrostatic repulsion of similarly charged carboxylic groups and appearance of opposite charges on macrochains as a result of the hydrolysis of acrylic acid segments. It has been shown that the hydrogels of polypropyleneglycol maleate with acrylic acid are sensitive to the influence of temperature and the dependence of the swelling degree has extreme character. The sensitivity of the copolymers to the presence of low molecular salts has been established. Combined regimen of their behavior in the presence of salts is due to the hydrolysis of amide bond in the segments of the copolymer of polypropyleneglycol maleate.