

Experiment 2.

Requirements:

1. Detailed knowledge of experimental procedures and safety rules.
2. General characteristics of macromolecules. Molecular weight of polymers - number average molecular weight and weight average molecular weight.
3. Definitions: the degree of polymerization, polydispersity, polymer, homopolymer, copolymer, multipolymer. Macrostructure and microstructure of polymers. Methods of obtaining polymers with a specific microstructure.
4. Chain and step polymerizations - reaction mechanisms and examples of polymers obtained by these methods.
5. Crosslinking of polymers - a mechanism and examples.
6. Free-radical polymerization: the definition of a radical, reaction mechanism, kinetic description of polymerization. Initiators and inhibitors of radical polymerization. Reactivity of monomers.
7. General characteristics of the basic methods: solution polymerization, block polymerization, suspension and emulsion polymerization. Advantages and disadvantages of each method. Effect of the type of polymerization on the properties of obtained polymers.
8. Basic quantitative analysis: the acid-base titration. Calculation of percent and molar concentration, reaction stoichiometry.
9. The technique of working with organic solvents and mineral acids, safe operation of vacuum devices, pipetting, using of analytical balance.
10. Vinyl acetate: structure, properties, preparation and method of polymerization. Scheme of polymerization of vinyl acetate in solution (continuous method). Properties and uses of polyvinyl acetate.
11. Polyvinyl alcohol; the method of preparation, properties and applications.

Experiment Nr. 5

1. *The same requirements as described in points 1 - 9 (Experiment No. 2).*
2. Detailed knowledge of the bead (pearl) and emulsion polymerization.
3. Examples of application of emulsion and suspension polymerization in the industry; monomers polymerized in emulsion and suspension.
4. Properties and uses of emulsion and suspension polymerization products.
5. Styrene, maleic anhydride, benzoyl peroxide: structures, properties, reactions.
6. Polystyrene – properties and applications.