

Interpolyelectrolyte complexation of sulfonate-containing aromatic polyamides in aqueous solutions

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Abstract

Complexation of sulfonate-containing aromatic polyamides and poly-*N*-(2-aminoethylacrylamide) in aqueous solutions was studied. It has been established, that the quality of the products of macromolecular reactions are formed interpolyelectrolyte complexes are stabilized mainly by electrostatic forces. However, it is necessary to take into account the contribution of hydrophobic interactions and hydrogen bonds. It is shown that the equilibrium of complexation reactions in the under consideration systems is largely determined by the conditions of their implementation (pH, temperature, ionic strength of the solution), which creates additional opportunities for regulating of the degree of conversion and composition of the products formed. The values of effective binding constants are determined. The influence on the equilibrium state and kinetics interpolymeric reactions chemical structure and conformational state of macromolecules of polyamides. It has been established that poly-4,4'-(2,2'-disulfonate sodium)diphenyleneisophthalamide is characterized by a relatively higher ability to complexation in interpolymer reactions with poly-*N*-(2-aminoethylacrylamide) than poly-4,4'-(2,2'-disulfonate sodium)diphenyleneterephthalamide. In interpolymeric reactions involving poly-4,4'-(2,2'-disulfonate sodium)diphenyleneisophthalamide are realized a higher degree of conversion. Under optimal conditions of interpolyelectrolyte interaction, it is possible to obtain a rather narrow distribution of particles of interpolyelectrolyte complexes in size (from 20 to 90 nm), which indicates the realization of a rather ordered structure in them. It can be assumed that identification of regularities will be reflected in the properties of the emerging interpolyelectrolyte complexes, i.e. is actually possible the construction materials including membrane, at the molecular level.

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