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QUASI-HOMOGENOUS APPROXIMATION FOR DESCRIPTION OF THE PROPERTIES OF DISPERSED SYSTEMS. THE BASIC APPROACHES TO MODEL HARDENING PROCESSES IN NANODISPERSED SILICA SYSTEMS.

PART 1. STATICAL POLYMER METHOD

The paper deals with possibilities to use quasi-homogenous approximation for discription of properties of dispersed systems. The authors applied statistical polymer method based on consideration of average structures of all possible macromolecules of the same weight. The equiations which allow evaluating many additive parameters of macromolecules and the systems with them were deduced. Statistical polymer method makes it possible to model branched, cross-linked macromolecules and the systems with them which are in equilibrium or non-equilibrium state. Fractal analysis of statistical polymer allows modeling different types of random fractal and other objects examined with the mehods of fractal theory. The method of fractal polymer can be also applied not only to polymers but also to composites, gels, associates in polar liquids and other packaged systems. There is also a description of the states of colloid solutions of silica oxide from the point of view of statistical physics. This approach is based on the idea that colloid solution of silica dioxide – sol of silica dioxide – consists of enormous number of interacting particles which are always in move. The paper is devoted to the research of ideal system of colliding but not interacting particles of sol. The analysis of behavior of silica sol was performed according to distribution Maxwell-Boltzmann and free path length was calculated. Using this data the number of the particles which can overcome the potential barrier in collision was calculated. To model kinetics of sol-gel transition different approaches were studied.

Key words: quasi-homogenous approximation, dispersed systems, statistic polymer method, formation of crosslinkings, fractal method, colloid solution, silica, sol-gel transition, free path length.

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