POLYMERIZATION OF EPICHLORHYDRINE WITH THE
TRIPHENILPHOSPHIN

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Nowadays an Epichlorohydrine (ECG) is widely used for the polymers synthesis, and its high reaction ability made it possible to synthesis some epoxy polymers.

In this aspect the reaction of interaction ECG with trivalent phosphorus units, which is the same due to structure of trivalent nitrogen, is much more interesting for study. We have studied the reaction of interaction ECG with triphenylphosphin (TPP) which is less toxic.

The kinetic regularity of TPP and ECG interaction by dilatometrical method was received. It is proved, that effective inhibitors of the radical polymerization such as hydroquinone, air oxygen, stable emine oxide radicals, 2,2,6,6 - tetramethylpiperidine -1-oxide don’t influence the polymerization speed and that proves the non- radical character of the process. In EMR- spectrum of TPP and ECG system with different conditions the formation of radical is not seen. On the solvent influence the starting velocity of TPP and ECG interaction has been studied.

The investigations were made with the homogeneity of the medium. The results showed that the more solvent dielectric penetrability the more the reaction speed and that is connected with the increasing of Menshutkin reaction which is the first stage of the process.

On the basis of the solvent influence on the process velocity the further kinetic regularity was investigated within the temperature interval in ethanol (313-333 K).

The study of the temperature influence on the interaction velocity of TPP and ECG proves that the temperature which is more then 10 ° increases the interaction velocity in 3 times, and its dependence on the temperature is under the value in accordance with Arenius equation. The effective energy of activation due to in ethanol is 12.79 kkal/mol, that is the same with the activation energy according to Menshutkin reaction and is the 1-st stage of the process. Thus we may suppose that Menshutkin reaction is the limited stage of the process.

Thus the synthesized polymer is a powder of brown colour, stable to long storage with 428 K, the density determined by pycnometer is 1.388 g/cm³, it is solved in dimethylphormamid, ethanol, methanol, water and in the other polar solvents. The study of viscosity proved that is the typical polyelectrolyte and the dependence of c/n from C for water solvents of the synthesized polyelectrolytes is of linear character which proves that water solvents behaviour is described by Fuoss- Strauss equation.

The molecular mass of polymers was determined by the method of high-speed sedimentation using equation of Flory-Mandelkern which was equal to 51000.

Thus on the basis of kinetic, spectral and chemical methods the reaction of interaction ECG and TPP soas proposed polymerization process capable to receive the catione polyelectrolyte, contained in the side chains, the quarterized groups were shown.