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KINETIC CURVES OF THE COPOLYMERS OF ALLYL SALICYLATE WITH METHYL METHACRYLATE

The main goal of the presented work is to obtain plasticized polymethyl methacrylate by co-polymerization of methyl methacrylate (MMA) with a plasticizing co-monomer, the allyl ester of salicylic acid (AllSA) was used as a plasticizing co-monomer. At this time, one of the important conditions for using allylsalicylate ether is that the new elementary structural unit included in the macromolecular chain does not adversely affect the basic physical-chemical and mechanical properties of the polymer [1].

From this point of view, the study of co-polymerization reactions of allyl and vinyl ethers of acetylsalicylic acid with other vinyl monomers is of great interest. The study of this type of reactions is not only of practical importance, but also theoretically important. Thus, the study of the relative activity of monomers with functional groups during co-polymerization reveals its effect on the order of placement in the macromolecule and the required operational properties, enabling the purposeful acquisition of polymer materials with the necessary set of properties [2].

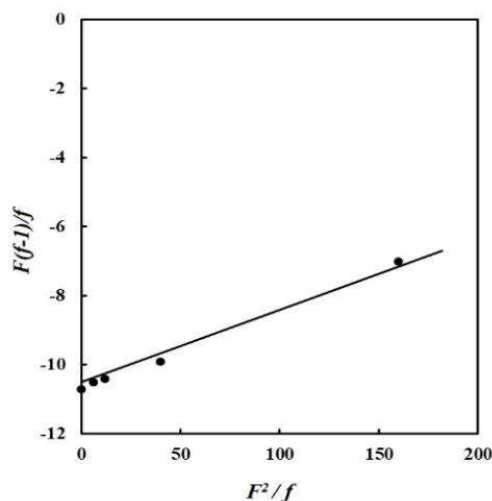


Figure 1 – Dependence of $F(f-1)/f$ and F^2/f to determine copolymerization constants for AllSt and methyl methacrylate system

Methyl methacrylate co-polymers containing the elemental member of allyl ester of salicylic acid in different proportions were synthesized, and the kinetic parameters of the co-polymerization reactions were studied - the values of the relative activity constants of the monomers ($r_1=0.01$ and

$r_2=10.5$), the co-polymerization constants were determined graphically by the Feyneman-Rass equation done (fig. 1).

Microstructure parameters of copolymers were calculated based on copolymerization constants. Table 1 shows the dependence of the copolymer composition on the composition of the initial monomer mixture in the copolymerization reaction of the allyl ether of salicylic acid ($[M_1]$) with methyl methacrylate ($[M_2]$).

Table 1 – The relative amount of monomers, the manganese content of the copolymers, the values of the copolymerization constants, and the microstructure parameters of the copolymers in the AII SA (M_1) and MMA (M_2) copolymerization reactions, (solvent-methylethylketone, in mass, $T=75-80^\circ\text{C}$, initiator-BP-0.2%, reaction time -4 hours)

| The initial monomer mixture | | Yield % | The amount of monomer in the copolymer mol% | | r_1 | r_2 | $r_1 \cdot r_2$ | Microstructure of copolymers | | |
|-----------------------------|-------|---------|---|--------|-------|-------|-----------------|------------------------------|-----------|--------|
| M_1 | M_2 | | m_1 | m_2 | | | | L_{M_1} | L_{M_2} | R |
| 10 | 90 | 10.7 | 1.088 | 98.912 | | | | 1.002 | 94.5 | 2.073 |
| 25 | 75 | 8.5 | 3.007 | 96.994 | | | | 1.004 | 32.5 | 33.504 |
| 50 | 50 | 6.6 | 8.089 | 91.912 | 0.01 | 10.5 | 0.105 | 1.01 | 11.5 | 15.988 |
| 75 | 25 | 5.8 | 18.633 | 81.367 | | | | 1.03 | 4.2 | 36.167 |
| 90 | 10 | 4.1 | 33.467 | 66.534 | | | | 1.09 | 2.112 | 62.461 |

L_{M_1} - Average length of microblocks composed of mangas m_1

L_{M_2} - Average length of microblocks composed of mangas m_2

R-Harvord's constant is the number of blocks of identical manga per - 100 manga. As can be seen from the table, the relative activity of methyl methacrylate monomer (M_2) during the co-polymerization of the mentioned monomers is significantly higher.

REFERENCES

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