We have previously showed that vinyl monomers under radical conditions is easily polymerized with maleic anhydride (MA) and form the alternating copolymers\(^1\). The alternative copolymers were also prepared in a case of copolymerization of electron-acceptor monomer \(\text{SO}_2\) with allyl monomers\(^2\). It has been also known that the copolymerization of vinyl ethers with MA in the presence of radical initiators proceeds with intermediate formation of complex using charge transfer and with formation of alternating copolymers\(^3\). In this work the radical copolymerization of ethyl ether of allyloxymethylcyclopropanecarboxylic acid (EACC) with MA both in solution and in mass in the presence of AIBN at 60°C has been realized. The availability of fact of copolymerization in the system of EACC-MA has been confirmed by data of elemental and spectral analyses. It has been shown that the process proceeds with complex formation between comonomers and is completed with initiation of copolymers of equimolar composition. The value of complex formation constant has been determined by the method of PMR-spectroscopy. It has been established that the forming complexes of donor-acceptor type may be concerned to the category of weak ones. Copolymers, prepared from equimolar composition of initial monomers were subjected to fractionation. The values of MM, \([\eta]\) and composition of copolymer for each separated fraction have been found. It has been established that IR-spectra of all fractions are identified and compositions of copolymers are almost the same. Copolymers prepared in this case have MM = 2000-4000, are softened at higher 250°C, are soluble in polar and are not dissolved in nonpolar solvents, are easily hydrolyzed to copolymers with links of maleic acid. On the basis of small value of \(K\) it may me assumed that in donor-acceptor interaction of EACC with MA \(\pi\)-complexes with charge transfer with highest occupied molecular orbital of allyl group with EACC to low vacancy orbital of MA is formed. It follows to consider a complex between comonomers as a single monomer with reactivity is considerably large than in initial monomers themselves.

References

