

Fullereneation of diallyl monomer

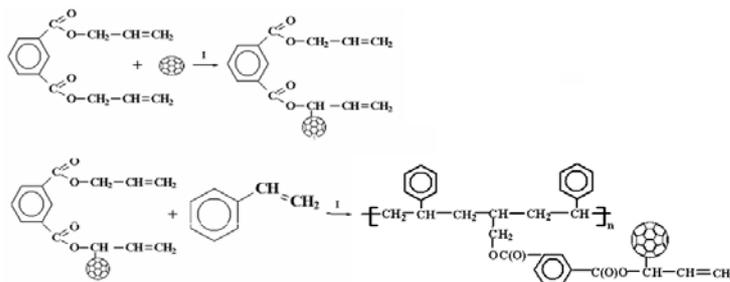
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Until now there is no evidence concerning the reactivity of vinyl or acetylene monomers for the synthesis of polymers with fullerene substituents in the side chains. We are carrying out the study to clarify the possibility for the use of diallyl compound for this purpose. The basis for the conclusion that in the presence of C₆₀ the allyl radical may interact with fullerene or fullerene radical was linear dependence of the amount of bonded fullerene C₆₀ on the content of allyl chain in the polymer [1]. That was revealed on polymerization of diallyl isophthalate (DAIP) with styrene. Therefore, it becomes possible fullereneation DAIP with its further participation in the reaction of copolymerization with vinyl monomers (see the scheme).



It is important to note that fullereneation of monomer with two unconjugated double bonds prevents subsequent polymer structuring and increases by an order the degree of functionalisation of the reaction products by fullerene.

The study of the process in this direction allows to obtaining some information in regard to the role of fullerene in macrochain formation that may beep in the study of polymerization mechanism in fullerene – containing systems.

To determine optimal conditions the reaction of direct fullereneation was carried out in the presence of radical initiator and/or UV – irradiation in a saturated solution of fullerene at molar ratio of DAIP:C₆₀ = 1:1 and 10:1. The products of interaction of DAIP with C₆₀ without their separation were introduced into the reaction with styrene and copolymers containing 20-40 wt% of fullerene were obtained.

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- [1] R.Kh. Yumagulova, N.A. Medvedeva, I.A. Ionova, V.P. Volodina, S.I. Kuznetsov, S.V. Kolesov. *Polymer Science*, B **52**, 459 (2010).