Homopolymerization and Copolymerization of α-Chlorostyrene By Free Radical Method

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ABSTRACT

α-Chlorostyrene α-Bromostyrene have been reported to be difficult to polymerize in bulk using free radical methods. Unfortunately there are no systematic studies on the homopolymerization and copolymerization behavior of these monomers. This paper is concerned with the behavior of α-halostyrenes in polymerization.

Homopolymerization of α-chlorostyrene was conducted by using AIBN as an initiator at 50~53 °C to get a polymer yield of less than 1 percent and molecular weight of 2,000. The structure of the polymer obtained was studied by ^{1}H- and ^{13}C-NMR, IR, and UV spectroscopies. The spectra were identical with that of trans-cisoidal poly(phenylacetylene), which suggest that substantial dehydrochlorination accompanies the polymerization.

Copolymerizations involving α-chlorostyrene with monomers such as methyl methacrylate and vinyl acetate were conducted. A small amount of α-chlorostyrene was found to decrease substantially both the yield and molecular weight of copolymer produced.

The possibility that enchainment of α-chlorostyrene unit in polymers leads to structures that inhibit vinyl polymerization was investigated by conducting studies on the capability of cumyl chloride to inhibit the polymerization of vinyl monomers. It was found that these materials were strong inhibitors for vinyl polymerization.