

Homogeneous and Heterogeneous Copolymerization of Styrene and Sulfur Dioxide Using the (CH₃)₂COOH/SO₂ Redox System

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ABSTRACT

Styrene (M) was copolymerized with SO₂ (S) in the presence of tert-Bu hydroperoxide under homogeneous and heterogeneous conditions. The rate of copolymer formation decreases in the order emulsion, suspension, org.-aq., and org. soln. The rate also depends on reaction time, temp., solvent, and initiator concn. Several phys. methods used to characterize these copolymers, including IR, ¹³C-NMR, elemental anal., viscosity, softening point, and isothermal aging. Anal. of the compn. of the resulting copolymers revealed that there are on the av. .apprx.2 mols. of styrene per SO₂ present on the copolymer chain. ¹³C-NMR suggests that these copolymers are made up mostly of the MSM, SMM, and MMS triad monomer sequences whereas the SMS and MMM are present in small amts. Characterization of polystyrene, shows that there is lack of stereoregularity in both homogeneous and heterogeneous polymn. systems. Thermal stability of the copolymer was also studied.