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Synthesis and Characterization of Amorphous-Liquid Crystalline Poly(Vinyl Ether) Block Copolymers

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Abstract: A new series of amorphous-liquid crystalline poly(vinyl ether) block copolymers was synthesized using living cationic polymerization and free-radical polymerization techniques. Vinyl ether monomer was polymerized using a trifluoromethane sulfonic acid and methyl trifluoromethanesulfonate/tetrahydrothiophene initiator system in dichloromethane at -18°C , and quantitatively terminated with labile azo compounds in order to obtain poly(vinyl ether) with well-defined molecular weight and end groups. This polymer was used in a subsequent blocking step in which azo groups were decomposed at 80°C in the presence of methyl methacrylate and styrene monomer. In both copolymers, blocks of different chemical composition were segregated in the solid and melt-phase transitions. The mesophase-transition temperatures of the liquid-crystalline blocks were found to be very similar to those of the corresponding homopolymers.

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