

Synthesis of hybrid dendritic-linear block copolymers with dendritic initiators prepared by convergent living anionic polymerization

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Abstract

Hybrid dendritic-linear block copolymers were made in one-pot by convergent living anionic polymerization. Dendritic polystyrene macroinitiators were synthesized by slowly adding a mixture of either vinylbenzyl chloride (VBC) or 4-(chlorodimethylsilyl)styrene (CDMSS) and styrene (1 : 10 molar ratio of coupling agent to styrene) to a solution of living polystyryllithium. The addition was ceased prior to the addition of a stoichiometric amount of coupling agent to retain a living chain end. To the living dendritically branched polystyrene was then added either styrene or isoprene to polymerize a linear block from the dendritic polystyrene. The resulting copolymers were characterized by gel permeation chromatography coupled with multiangle laser light scattering (GPC-MALLS), which clearly demonstrated the formation of diblock copolymers. The diblock copolymers were further characterized by ¹H NMR, which showed the presence of the two blocks in the case of dendritic polystyrene-*block*-linear polyisoprene. The measurement of intrinsic viscosity showed that the dilute solution properties of the block copolymers are greatly influenced by the dendritic portion. © 2000 John Wiley & Sons, Inc. J Polym Sci A: Polym Chem 39: 152-161, 2001

Keywords

hyperbranched; convergent living anionic polymerization; polystyrene; polyisoprene; dendritic; hybrid; block copolymers

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