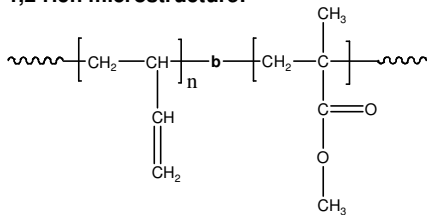


Sample Name: Poly(butadiene -b-methyl methacrylate)
Polybutadiene rich in 1,2 or 1,4 microstructure

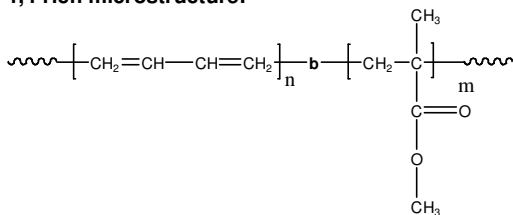
Sample #: P8513-BdMMA

Is rich in 1,4 microstructure for poly butadiene block:

1,2-rich microstructure:



1,4-rich microstructure:

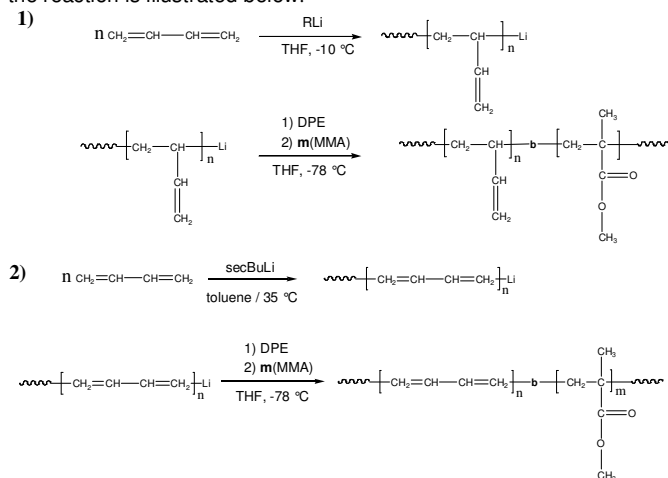


Composition:

Mn x 10 ³ Bd-b-MMA	PDI
45.0-b-440,0	1.35

Synthesis Procedure:

Poly(butadiene(1,4 or 1,2 addition)-b-methyl methacrylate) is prepared by living anionic polymerization with sequence addition of butadiene (Bd) followed by methyl methacrylate monomer (MMA). For 1,4 rich addition of Polybutadiene block, the polymerization of Bd monomer was carried out in toluene followed by changing the polarity of the medium by introduction of freshly distilled THF followed by addition of MMA monomer. Poly butadiene macroanions were end capped with a unit of diphenyl ethylene. Polymerization scheme of the reaction is illustrated below:



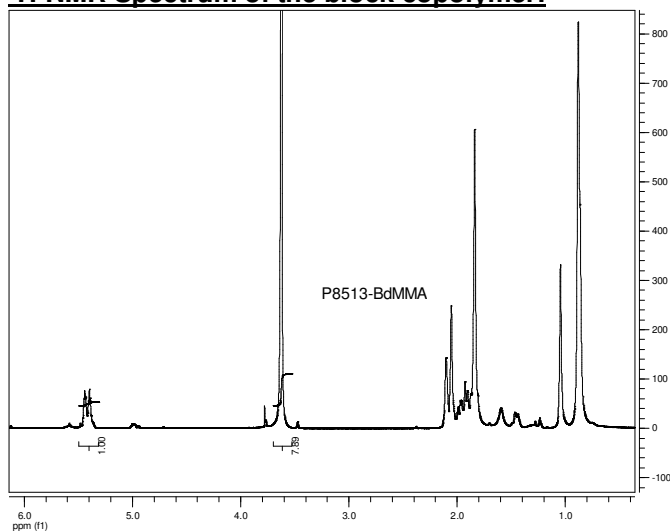
Characterization:

An aliquot of the anionic polybutadiene block was terminated before addition of methyl methacrylate and analyzed by size exclusion chromatography (SEC) with on line-triple detectors from Viscotek co. to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from ¹H-NMR spectroscopy by comparing the peak area of the vinylic butadiene protons between about 5.0-5.4 ppm with the methyl methacrylate protons at 3.6 ppm. Block copolymer PDI is determined by SEC. Note: The ¹H-NMR of 1,2-polybutadiene is composed of 1 proton signal at 5.4 ppm and 2 proton signals at 5.0 ppm. Signals due to vinylic 1,4-polybutadiene are also present at 5.4 ppm.

Solubility:

Poly(butadiene-b-methyl methacrylate) is soluble in THF, CHCl₃, toluene, dioxane. The polymer can be precipitate out in ethanol, methanol.

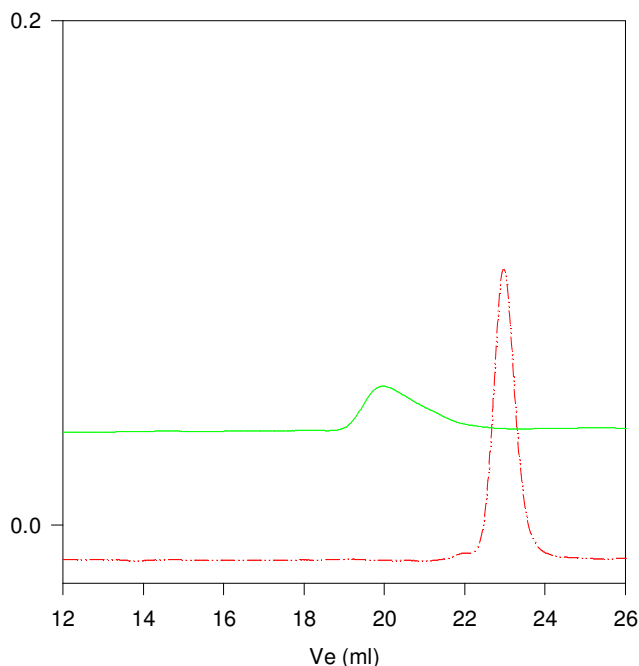
¹H-NMR Spectrum of the block copolymer:



SEC of the block copolymer:

P8513-BdMMA

Poly butadiene rich in 1,4 addition



SEC profile of the Block copolymer:

- Polybutadiene, M_n=45,000, M_w=47,700, PI=1.06
- Diblock Copolymer PBd(45,000)-b-PMMA(440,000), PI=1.35