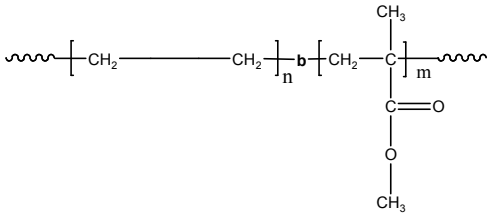
Sample Name: **Poly(ethylene -b-methyl methacrylate)**

Sample #: **P8432A-EMMA**

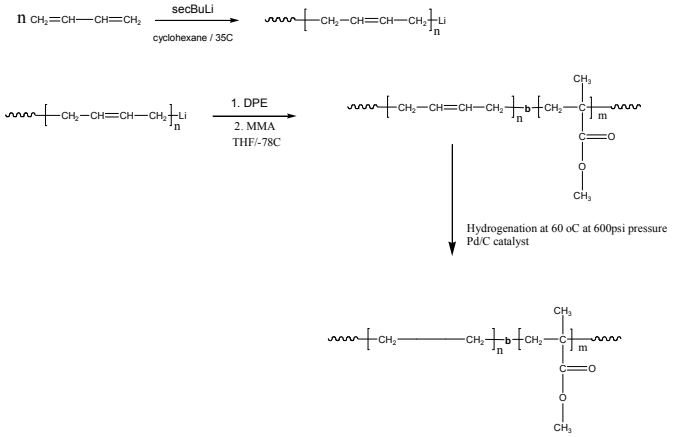


Composition:

Mn x 10^3 E-b-MMA	PDI
20.0-b-24.0	1.11

Synthesis Procedure:

Poly(butadiene(1,4 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. Polymerization scheme of the reaction is illustrated below:



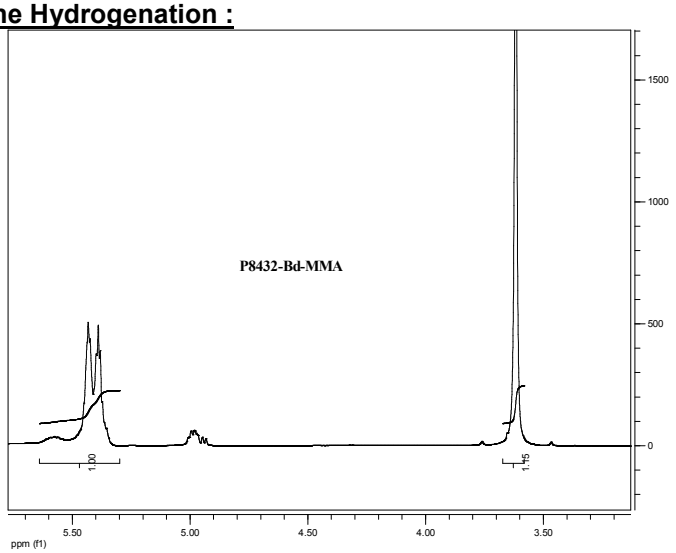
Characterization:

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 ^{1}H-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 ^{1}H-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(ethylene-b-methyl methacrylate) is soluble in hot THF, toluene, and the polymer can be precipitate out in ethanol, methanol.

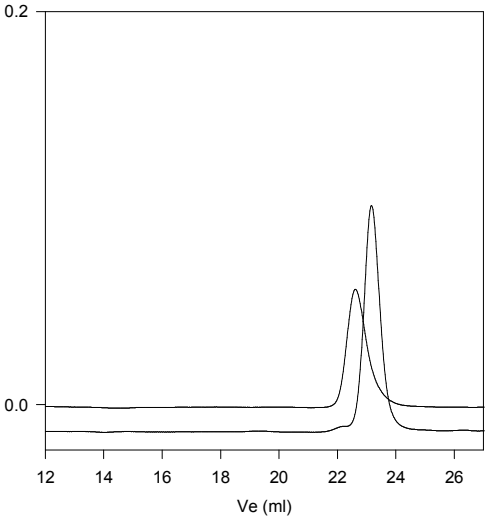
^{1}H-NMR Spectrum of the block copolymer used for the Hydrogenation :



SEC of the block copolymer:

P8432-BdMMA (precursor for P8432A-EMMA

Poly butadiene rich in 1,4 addition



SEC profile of the Block copolymer:

—— Polybutadiene, M_n=20,000, M_w=20800, PI=1.04

—— Diblock Copolymer PBd(20,000)-b-PMMA(24,000), PI=1.11
After the Hydrogenation : Poly ethtylene-b-MMA Mn: 21000-b-24000 Mw/Mn 1.11