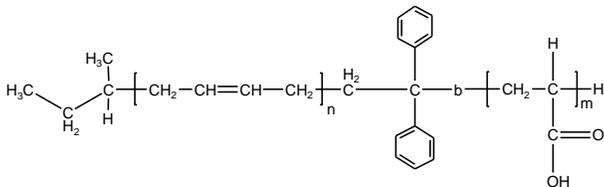


Sample Name: Poly (Butadiene-b-acrylic acid)

**Sample #: P10508A-BdAA (rich in 1, 4 addition)
1, 4 addition > 89%**

Structure:



Composition:

Mn x 10 ³ PBd-b-AA	PDI
0.9-b-2.6	1.3

Synthesis Procedure:

Poly (1,4-butadiene -b- acrylic acid) is prepared by living anionic polymerization with sequence addition of butadiene followed by t-butyl acrylate and hydrolysis of the t-butyl group. The solvents for the polymerization selected to get the polybutadiene with microstructure rich in 1,4 addition or 1,2 addition.

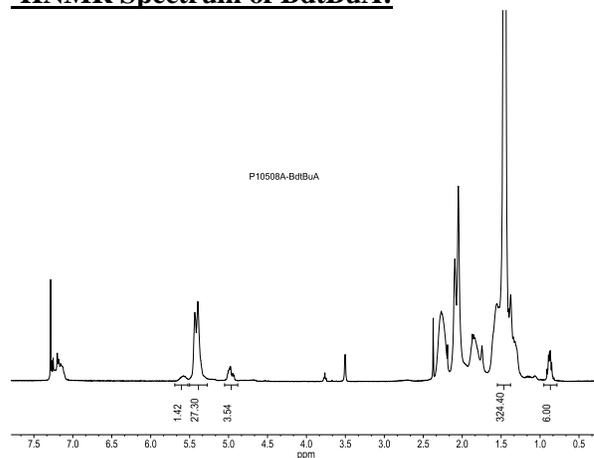
Characterization:

An aliquot of the anionic poly(butadiene) block was terminated before addition of t-butyl acrylate and analyzed by size exclusion chromatography (SEC) 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 t-butyl acrylate protons at 1.43 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 present at 5.4 ppm. Hydrolysis of the ester was followed by FTIR for the disappearance of ter-butyl ester at 1362cm⁻¹.

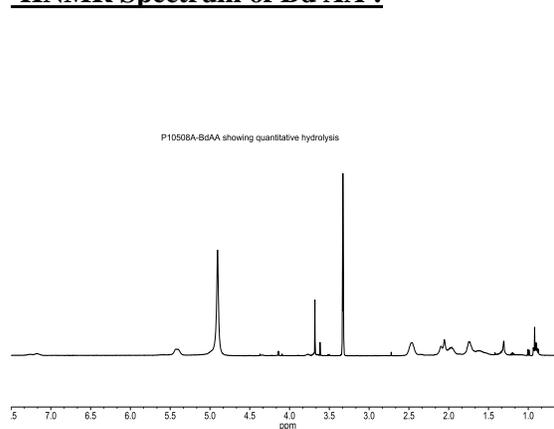
Purification of the polymer:

After the Hydrolysis the solvent was removed under vacuum and the obtained polymer was dissolved in THF and neutralized with NaHCO₃ to get pH around 6. The product was filtered and the filtrate was treated for 2 days with mixed bed exchange resin, IONA NM - 60 H⁺/OH⁻ form (16-50 mesh). The product was filtered and the clear solution was passed through a column packed with basic Al₂O₃. The Filtrate was concentrated under vacuum and dried at room temperature.

1H-NMR Spectrum of BdtBuA:

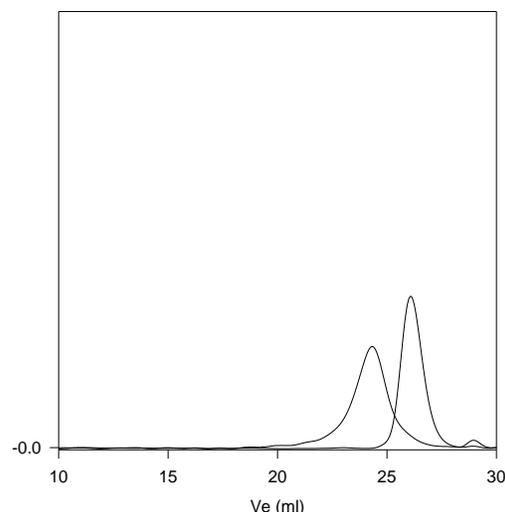


1H-NMR Spectrum of Bd AA :



SEC of the block copolymer:

**P10508A-BdtBuA precursor for
P(Butadiene-b-Acrylic acid)**



— SEC profile of Poly(Butadiene _{1,4 addition} -b- tert. butylacrylate):
— Polybutadiene, M_n=900 PI=1.09
— Block Copolymer PBd(900)-b-PtBuA(4,600), PI=1.3
After hydrolysis: PBd(900)-b-AA(2,600), PI=1.3