

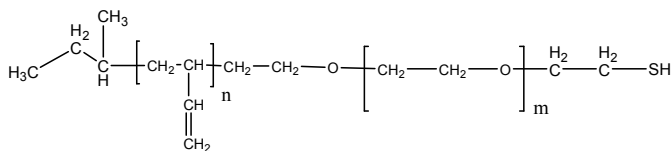
**Sample Name: Thiol terminated Poly(butadiene-b-ethylene oxide)**

*Poly butadiene rich in 1,2 or 1,4 microstructure*

**Sample #: P10809A-BdEOSH**

*(poly butadiene block rich in 1,2 microstructure)*

**Structure of 1,2-rich microstructure about 95%:**



**Composition:**

Mn x 10 <sup>3</sup> Bd-b-EO	Mw/Mn (PDI)	% 1,2 addition Butadiene
2.5-b-1.3	1.09	95%

**Synthesis Procedure:**

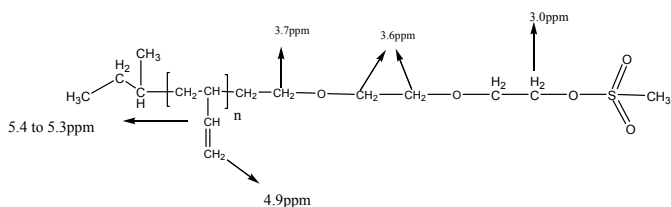
Poly(butadiene(1,4 addition or 1,2 addition)-b-ethylene oxide) can be prepared by the different routes as reported in the literature (ref: *Macromolecules* 1996, 29, 6994). The direct synthesis of diblock copolymer using lithium counter ion in the presence of **Phosphazene Base t-BuP<sub>4</sub>** is interesting as reported in *Macromolecules*, **32** (8), 2783 -2785, 1999. These polymers can also be successfully synthesized using the different end functionalized polymers as investigated in our lab. These methodologies are proprietary. Terminal OH modified to mesylate group then to thiol.

**Characterization:**

Polymer was analyzed by size exclusion chromatography (SEC) to obtain the molecular weight and polydispersity index (PDI). The final block copolymer composition was calculated from <sup>1</sup>H-NMR spectroscopy by comparing the peak area of the vinylic butadiene protons between about 5.0-5.4 ppm with the ethylene oxide protons at 3.6 ppm. Block copolymer PDI is determined by SEC. **Note:** The <sup>1</sup>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.

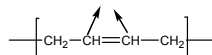
**Solubility:**

Polymer is soluble in THF, CHCl<sub>3</sub>, and toluene. The polymer has variable solubility in hexane, methanol, ethanol and water depending on its composition.

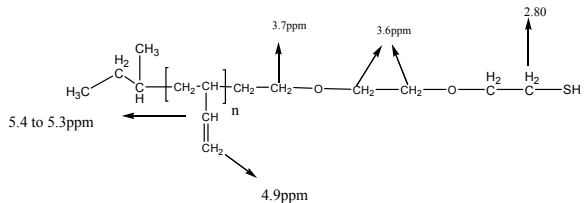


Chemical Shifts

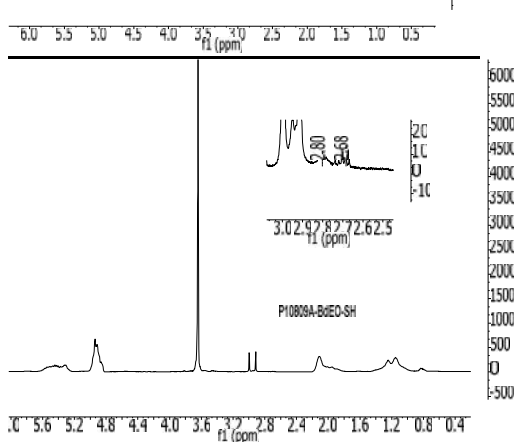
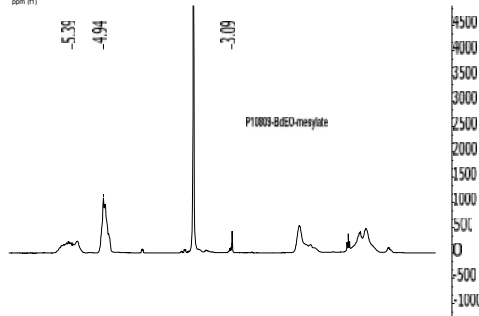
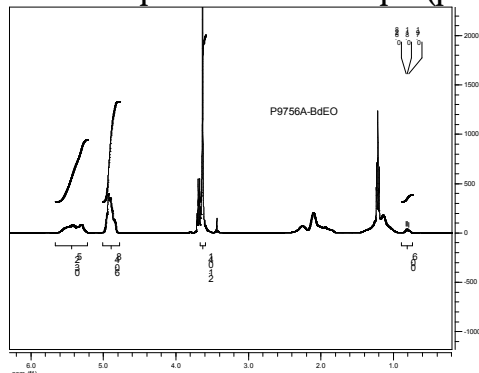
5.0 to 5.3 ppm



1,4 fractions in 1,2 microstructure

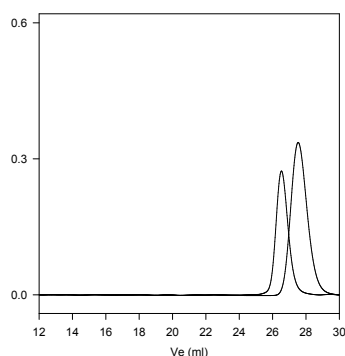


**<sup>1</sup>H NMR spectrum of the sample (precursor)**



**SEC Profile:**

**P10809-BdEO mesylate**



Size Exclusion Chromatogram of Poly(butadiene-b-ethylene oxide)

— Polybutadiene: M<sub>n</sub>=2500, M<sub>w</sub>=2700, M<sub>w</sub>/M<sub>n</sub>=1.07

— PBd-b-PEO: M<sub>n</sub> PBd(2500)-PEO(1300), M<sub>w</sub>/M<sub>n</sub>=1.07

The Mn of PEO is calculated from NMR results,