

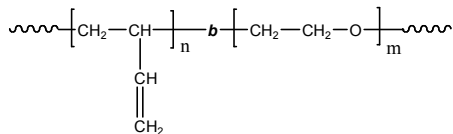
Sample Name: **Poly(butadiene-b-ethylene oxide)**

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

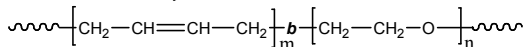
Sample #: **P10948-BdEO**

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

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



**Structure of 1,4-rich microstructure:**



**Composition:**

Mn x 10 <sup>3</sup> Bd-b-EO	Mw/Mn (PDI)	% 1,2 addition Butadiene
1.4-b-1.0	1.15	95%
Dp: of each block: 26-b-23		

### 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.

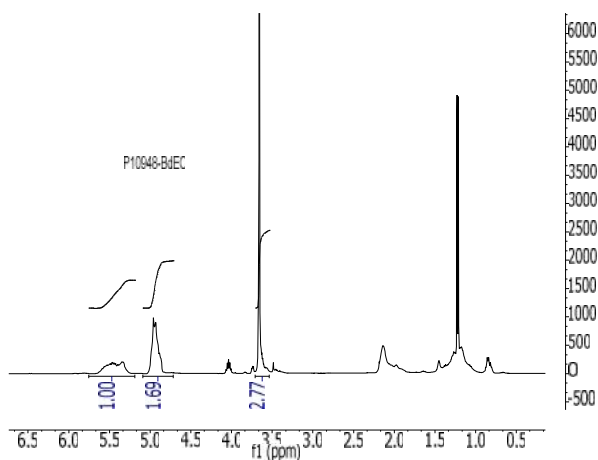
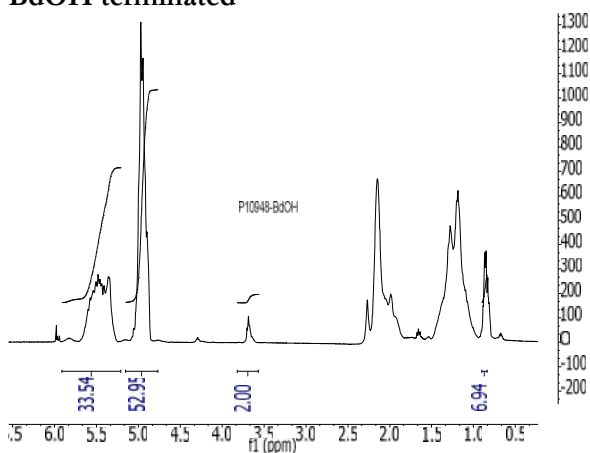
### Characterization:

OH terminated polybutadiene 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.

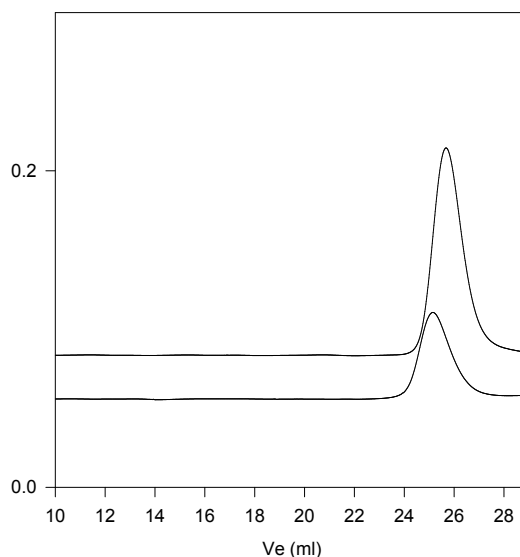
### Solubility:

Poly(butadiene-b-ethylene oxide) 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.

**<sup>1</sup>H NMR spectrum of the sample  
BdOH terminated**



**SEC profile of the block copolymer  
P10948-BdEO**



Size exclusion chromatography of poly(butadiene-b-ethylene oxide):

- 1,4 polybutadiene M<sub>n</sub>=1400, M<sub>w</sub>=1500, PI=1.08
- Block Copolymer PBd(1,400)-b-PEO(1,000), PI=1.15  
Composition from H NMR