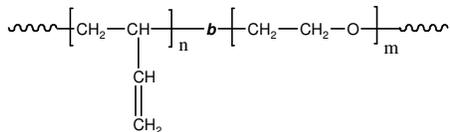
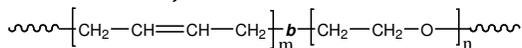


**Sample Name:** Poly(butadiene-*b*-ethylene oxide) Poly butadiene rich in 1,2 or 1,4 microstructure  
**Sample #:** P18323-BdEO (poly butadiene block rich in 1,2 microstructure)

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



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



**Composition:**

Mn x 10 <sup>3</sup> Bd- <i>b</i> -EO	Mw/Mn (PDI)	% 1,2 addition Butadiene
81.0- <i>b</i> -25.0	1.08	95%
Dp: of each block: 40- <i>b</i> -34		

**Synthesis Procedure:** Initiator used : Cumyl Potassium. 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.

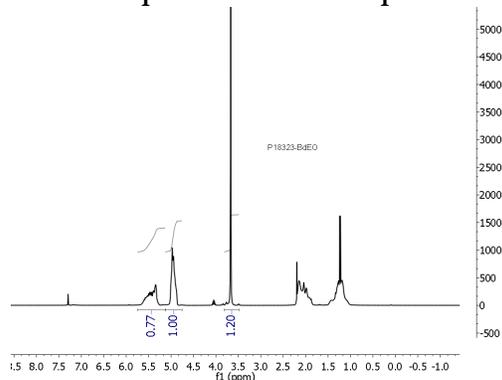
**Characterization:**

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:**

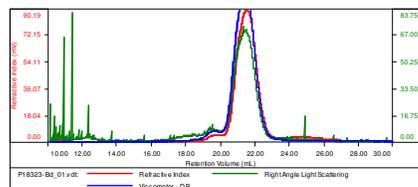
Poly(butadiene-*b*-ethylene oxide) is soluble in THF, CHCl<sub>3</sub>, and toluene. The polymer has variable solubility in hexane, methanol, ethanol and water depending on its composition.

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

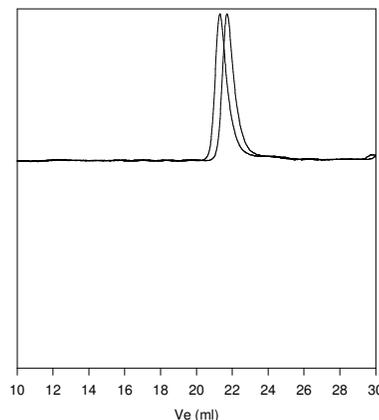
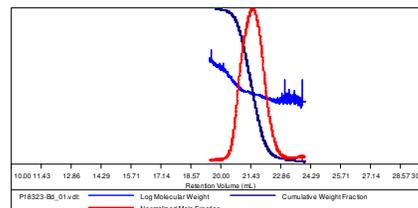


**SEC profile of the block copolymer**  
**Sample ID: P18323-Bd**

Concentration (mg/mL)	4.7408
Sample dn/dc (mL/g)	0.1270
Method File	PS30K-NOV25-2013-0000.vcm
Column Set	3x PL 1113-8300
System	System 1



Sample	Mn	Mw	Mp	Mw/Mn	IV
P18323-Bd_01.vcl	81,189	84,168	79,241	1.037	1.3977



Size exclusion chromatography of poly(butadiene-*b*-ethylene oxide):  
 — 1,2 polybutadiene M<sub>n</sub>=81,000, M<sub>w</sub>=84500, PI=1.04  
 — Block Copolymer PBd(81,000)-*b*-PEO(25,000), PI=1.08  
 Composition from <sup>1</sup>H-NMR.