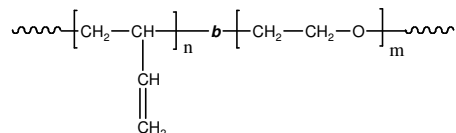
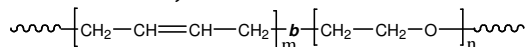


Sample Name: Poly(butadiene-b-ethylene oxide) *Poly butadiene rich in 1,2 or 1,4 microstructure*
Sample #: P18323-BdEO (*poly butadiene block rich in 1,2 microstructure*)

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



Structure of 1,4-rich microstructure:



Composition:

| Mn x 10 ³ Bd-b-EO | Mw/Mn (PDI) | % 1,2 addition Butadiene |
|---------------------------------|-------------|-----------------------------|
| 81.0-b-25.0 | 1.08 | 95% |
| Dp: of each block: 40-b-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-BuP₄** 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.

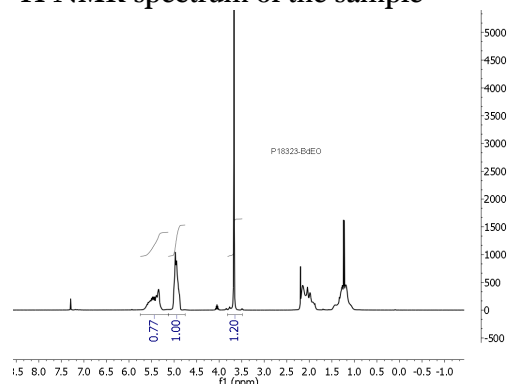
Characterization:

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 ¹H-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 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 also present at 5.4 ppm.

Solubility:

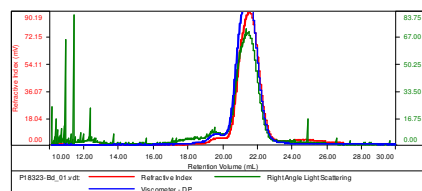
Poly(butadiene-b-ethylene oxide) is soluble in THF, CHCl₃, and toluene. The polymer has variable solubility in hexane, methanol, ethanol and water depending on its composition.

¹H NMR spectrum of the sample

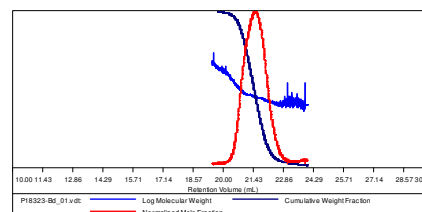


SEC profile of the block copolymer
Sample ID: P18323-Bd

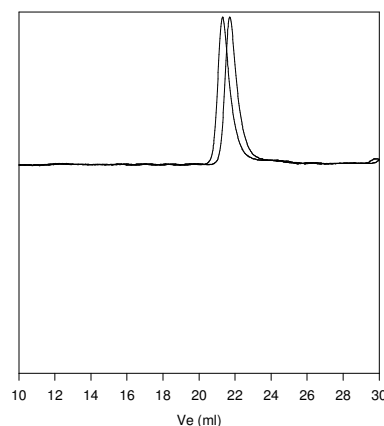
| | |
|-----------------------|---------------------------|
| Concentration (mg/mL) | 4.7408 |
| Sample dn/dc (mL/g) | 0.1270 |
| Method File | PS80K-NCV25-2013-0000.vcm |
| Column Set | 3x PL 1113-8300 |
| System | System 1 |



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



P18323-BdEO



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

- 1,2 polybutadiene M_n=81,000, M_w=84500, PI=1.04
- Block Copolymer PBd(81,000)-b-PEO(25,000), PI=1.08

Composition from ¹H-NMR.