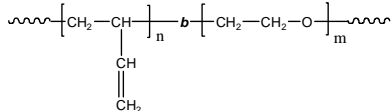


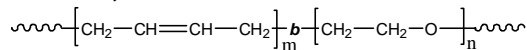
**Sample Name: Poly(butadiene-b-ethylene oxide)**

**Sample #: P18952-BdEO**  
**(poly butadiene block rich in 1,2-addition)**

**Structure of 1,2-rich microstructure:**



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



**Composition:**

Mn x 10 <sup>3</sup> Bd-b-EO	Mw/Mn (PDI)	% 1,2 addition butadiene
9.0-b-10.0 (Dp: 166-b-227)	1.11	89

**Synthesis Procedure:**

Poly(butadiene[1,4- 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 reported in *Macromolecules* 1999, 32 (8), 2783–785. The polymers can also be successfully synthesized using the different end-functionalized polymers as investigated in our lab. These methodologies are proprietary.

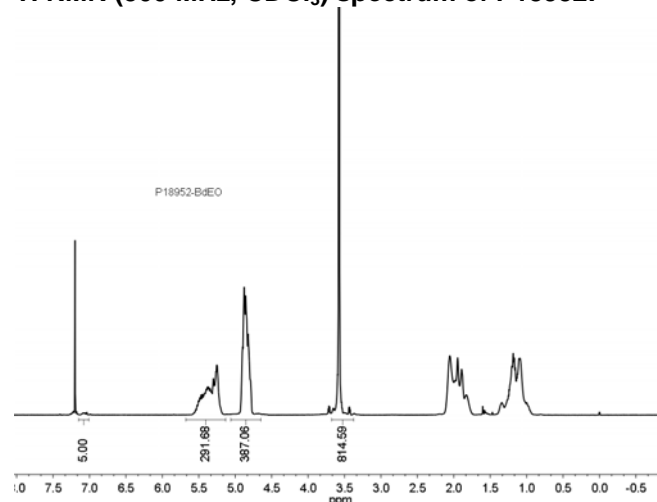
**Characterization:**

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.

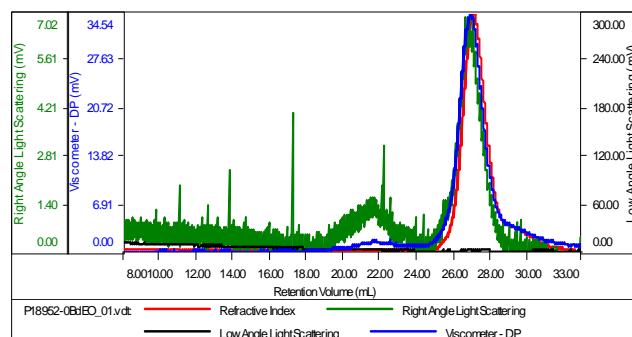
**<sup>1</sup>H NMR (500 MHz, CDCl<sub>3</sub>) spectrum of P18952:**



**SEC elugram of the block copolymer:**

**Sample ID: P18952-BdEO**

Concentration (mg/mL)	9.6488
Sample dn/dc (mL/g)	0.0780
Method File	PS80K-NDV-2014-0003.vcm
Column Set	3x PL 1113-6300
Solvent	THF

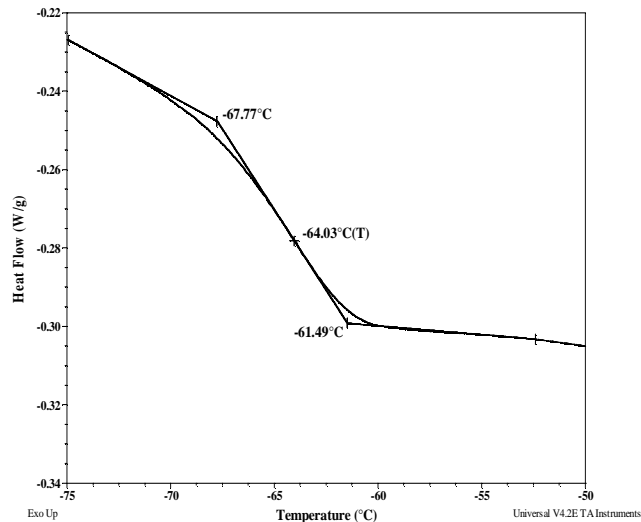


Sample	MW Number Average (Da)	MW Weight Average (Da)	MW at Peak (Da)	Polydispersi	Intrinsic Viscosity (dL/g)
P18952-BdEO_01.vdt	18,576	20,501	20,016	1.104	0.1588

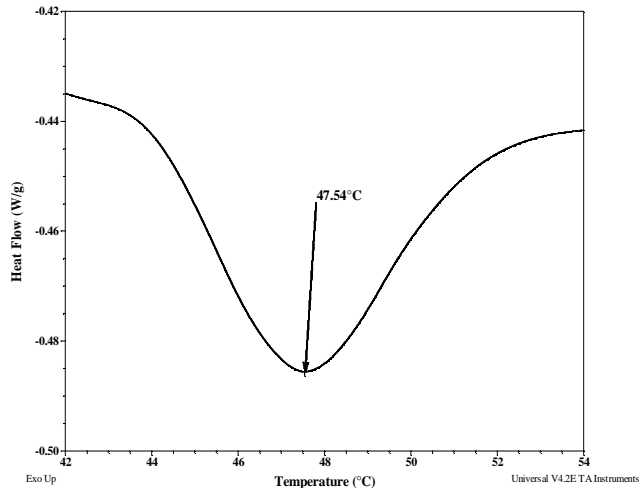
DSC thermal analysis of P18952-BdEO:

Thermal analysis of the samples was carried out on a TA Q100 differential scanning calorimeter at a heating rate of 10°C/min. The midpoint of the slope change of the heat flow plot of the second heating scan was considered as the glass transition temperature ( $T_g$ ). The melting temperature ( $T_m$ ) was taken as the maximum of the endothermic peak where as the crystallization temperature ( $T_c$ ) was considered as the minimum of the exothermic peak.

DSC thermogram for PEO block:



DSC melting curve for PEO block:



Summary of thermal analysis results for P18952:

For Bd block		
$T_g$ : -31°C	$T_m$ : -	$T_c$ : -
For PEO block		
$T_g$ : -64°C	$T_m$ : 48°C	$T_c$ : not found

DSC thermogram for PBd block:

