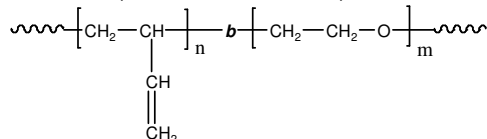


Sample Name: Poly(butadiene-b-ethylene oxide)

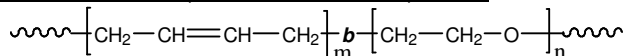
Sample #: P19553-BdEO

(poly butadiene block rich in 1,2-addition)

Structure of PBd(1,2-microstructure)-PEO:



Structure of PBd(1,4-microstructure)-PEO:



Composition:

Mn x 10 ³ Bd-b-EO	Mw/Mn	Butadiene: 1,2-addition
95.0-b-46.0	1.08	85%

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*-BuP₄ 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.

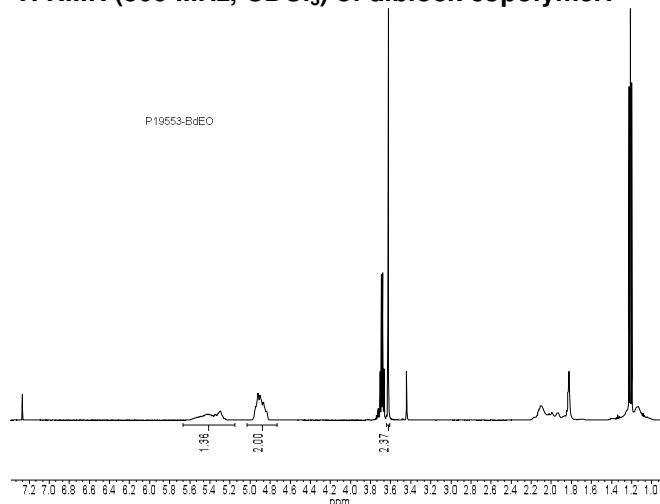
Characterization:

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 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.

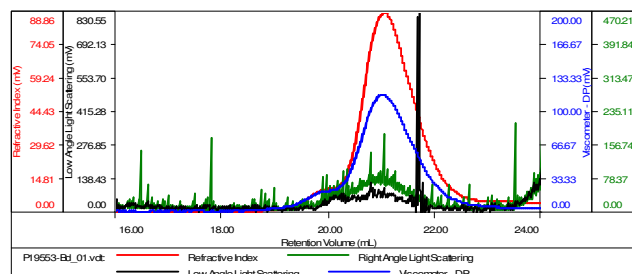
¹H NMR (500 MHz, CDCl₃) of diblock copolymer:



SEC elugram of the polybutadiene (first block):

Sample ID-P19553-Bd

Concentration (mg/mL)	0.3350
Sample dn/dc (mL/g)	0.1270
Method File	PS80K-Nov-2015-0000.vcm
Column Set	3x PL 1113-6300
Solvent	THF

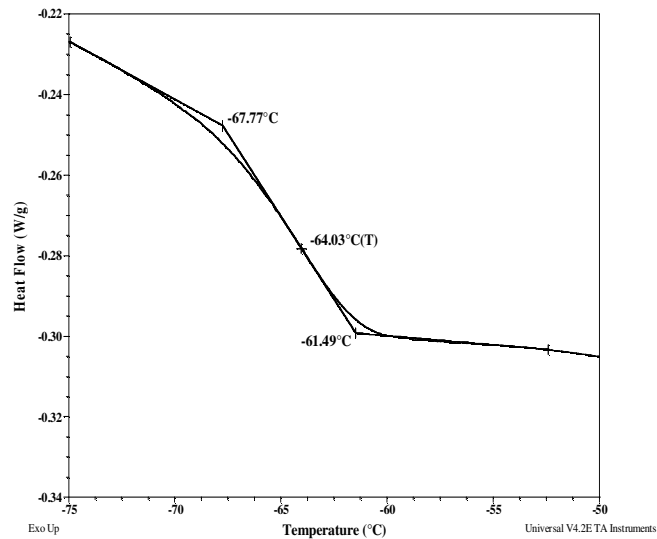


Sample	MW Number Average (Da)	MW Weight Average (Da)	MW at Peak (Da)	Polydispersity	Intrinsic Viscosity (dL/g)
P19553-Bd_01.vdt	94,805	99,032	94,001	1.045	12.8470

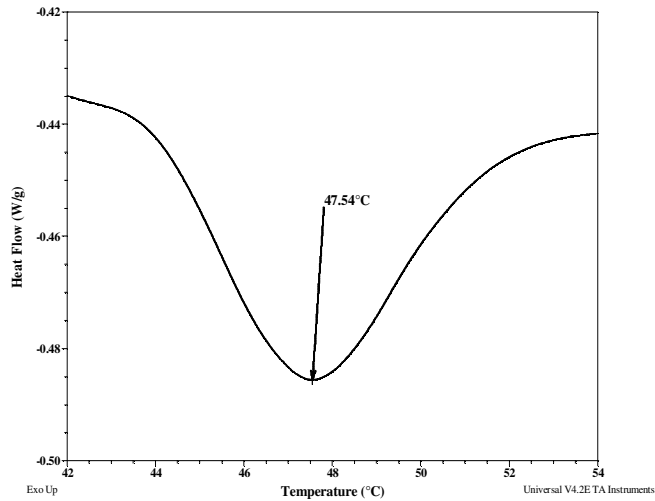
DSC thermal analysis of P19553-BdEO:

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.

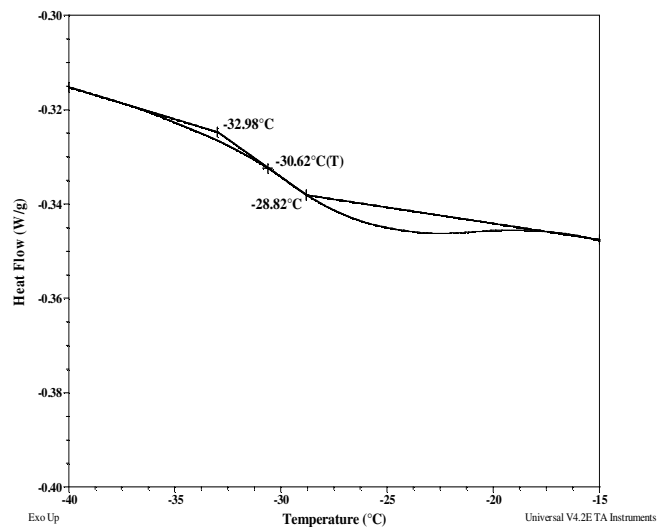
DSC thermogram: Tg curve for PEO block:



DSC thermogram: Melting curve for PEO block:



DSC thermogram: Tg curve for PBd block:



Summary of thermal analysis results:

Bd block:		
T _g : -31°C	T _m : -	T _c : -
PEO block		
T _g : -64°C	T _m : 48°C	T _c : -